Arizona Diabetes Action Plan and Report

January 1, 2019

Report to the Legislature of the State of Arizona in response to the Fifty-Third Legislature, Second Regular Session, 2018: House Bill 2258. This is a collaborative report from the Arizona State Department of Health, the Arizona State Department of Administration, Arizona Health Care Cost Containment System, Arizona State Retirement System, Public Safety Personnel Retirement System, the Arizona Diabetes Coalition and Leadership Council and Arizona Diabetes Stakeholders.

~ Health and Wellness for all Arizonans ~

Douglas A. Ducey, Governor
State of Arizona

Cara M. Christ, M.D., M.S., Director
Arizona Department of Health Services

ARIZONA DEPARTMENT OF HEALTH SERVICES
BUREAU OF TOBACCO AND CHRONIC DISEASE
DIVISION OF PUBLIC HEALTH PREVENTION SERVICES

150 North 18th Avenue, Suite 310
Phoenix, Arizona 85007
Phone: 602-364-0824; FAX: 602-542-1890
http://www.azdhs.gov/prevention/ tobacco-chronic-disease/index.php

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House Bill 2258: Diabetes Action Plan and Report

State of Arizona, January 2019

Acknowledgments / Contributors

Arizona Department of Health Services

Addey Rascon, CHES
Carmen Batista, MPH
Teresa Aseret-Manygoats, MPA
CDR Michelle Sandoval-Rosario, MPH, CPH
Wayne Tormala, MSW
Sheila Sjolander, MSW

Arizona Department of Administration

Bobbi Fisher
Yvette Medina
Michael Meisner

Arizona State Retirement System

Paul Matson
Dave King
Russ Levine
UnitedHealthcare

Arizona Health Care Cost Containment System

Karen Grady
Judy Wilder
Samantha O'Neil
Sara Salek, MD
Mike Sisson
Suzanne Berman
Matthew Isiogu
Kyle Sawyer

Public Safety Personnel Retirement System

Patricia Shaner

Diabetes Stakeholders in Arizona

Vitalyst Health Foundation
American Diabetes Association
Arizona Diabetes Coalition and Leadership Council
Blue Cross Blue Shield of Arizona

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Executive Summary

The Arizona Department of Health Services is pleased to release the first Arizona Diabetes Action Plan, a comprehensive report highlighting statewide initiatives and the burden of diabetes on Arizonans. This comprehensive report was drafted in collaboration with the Arizona Health Care Cost Containment System, the Arizona State Retirement System, the Arizona Department of Administration Benefits Division, Vitalyst Health Foundation, the American Diabetes Association and the Arizona Diabetes Coalition and Leadership Council.

On March 29th, 2018, Governor Ducey signed House Bill 2258 (see Appendix 1) requiring the Arizona Department of Health Services to jointly submit a report to the Legislature describing the burden of diabetes on Arizona residents, efforts currently underway to address the burden, and suggestions for action to reduce the burden of diabetes in Arizona.

The Arizona Department of Health Services would like to extend its gratitude to each of the collaborators and stakeholders that aided in the production of this report. Thank you for the dedication and continued collaboration as we work towards reducing the burden of diabetes on the State of Arizona and her residents.

Diabetes is the 6th disease related cause of premature death in Arizona and greatly contributes to early disability. Improperly managed diabetes can lead to a multitude of health issues including heart diseases, stroke, kidney disease, blindness, nerve damage, lower leg amputation and death. With an approximate 10% increase in Arizonans diagnosed with diabetes between 2011 and 2016, and with one third of the population being undiagnosed, it is not unreasonable to estimate that nearly 600,000 adults are diabetic. It is also estimated that 1 out of every 3 adults in Arizona have prediabetes. Of those with prediabetes, 90% are not aware they have it, putting them at greater risk of developing type 2 diabetes (Arizona Diabetes Burden Report 2018). By 2020, Arizona's population is expected to grow by one million people to 7,485,000. At this same rate of growth, by 2050, there could be almost 12 million people in Arizona (1).

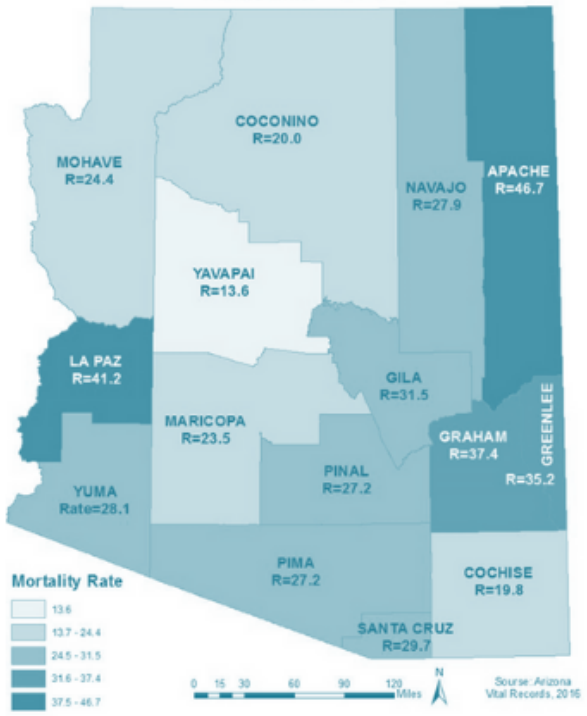
Race and ethnicity play a major role in the development of prediabetes and diabetes. African American, Hispanic/Latino, American Indian, Pacific Islander and Asian Americans are at the greatest risk. These disparities exist due to multiple factors, including genetic makeup, greater insulin resistance and decreased insulin secretion and an increased rate of obesity. Disparities are also attributed to lack of access to healthy foods, places to exercise and play, and ability to receive adequate medical and preventative care (2).

2019 DIABETES IN ARIZONA

ALL 15 ARIZONA COUNTIES HAVE DEATHS FROM DIABETES

Age-Adjusted Diabetes Mortality Rate Per 100,000 People by County, 2016

State Rate = 24.5



DIABETES RATES

1 IN 3
estimated adult Arizonans have pre-diabetes

1 IN 10
Arizonans have diabetes

DIABETES CREATES HIGHER RISKS FOR:

Blindness

Heart Disease

Loss of toes, feet, or legs

Risk of death for adults with diabetes is

50% HIGHER

than for adults without diabetes.

DIABETES COSTS IN ARIZONA

5.1 Direct Medical Costs (doctor visits, medications, supplies, hospital care)

\+ **1.7** Indirect Costs (absenteeism, lower work productivity, early disability)

$6.8 BILLION DOLLARS IN DIABETES RELATED COSTS

DIABETES IN ARIZONA

DEMOGRAPHICS

Arizonans Who Reported Ever Having Diabetes

Characteristic	Percent	N*	Confidence Interval	
			Lower Mean	Upper Mean
National	**10.5%**	**54**		
Arizona	**10.8%**	**1600**	**10.0%**	**11.6%**
Male	12.2%	790	10.9%	13.5%
Female	9.5%	810	8.5%	10.4%
18-24	0.5%	3	0.0%	1.1%
25-34	2.7%	17	1.1%	4.3%
35-44	4.4%	61	3.1%	5.6%
45-54	12.6%	176	10.0%	15.1%
55-64	19.5%	380	16.9%	22.1%
65+	20.8%	963	19.2%	22.4%
Married	12.4%	818	11.2%	13.7%
Divorced	15.1%	259	12.3%	18.0%
Widowed	17.3%	297	14.6%	20.0%
Separated	10.4%	33	5.1%	15.8%
Never Married	5.4%	157	4.0%	6.8%
Unmarried Couple	2.5%	25	1.2%	3.9%
Less than highschool	16.6%	164	13.1%	20.2%
High School/GED	11.2%	415	9.6%	12.8%
Some College/Technical School	10.6%	534	9.4%	11.9%
College/Technical School Grad	7.5%	483	6.5%	8.4%
Employed for Wages	6.5%	296	5.3%	7.6%
Self Employed	4.7%	52	2.9%	6.6%
Out of Work	10.0%	58	6.5%	13.5%
Homemaker	10.3%	99	7.3%	13.3%
Student	2.2%	8	0.0%	4.6%
Retired	19.9%	851	18.3%	21.6%
Unable to Work	28.3%	229	23.5%	33.1%
Less than $10,000	16.4%	104	12.0%	20.9%
$10,000 to $14,999	21.2%	98	15.0%	27.3%
$15,000 to $19,999	13.6%	138	9.4%	17.7%
$20,000 to $24,999	11.9%	135	8.8%	15.1%
$25,000 to $34,999	9.4%	171	7.4%	11.5%
$35,000 to $49,999	10.7%	206	8.6%	12.8%
$50,000 to $74,999	9.0%	207	7.1%	11.0%
Above $75,000	8.0%	256	6.7%	9.3%
White Non-Hispanic	10.2%	1123	9.4%	11.1%
Black/African American	13.8%	52	9.2%	18.3%
Hispanic	11.5%	248	9.4%	13.6%
Asian/Pacific Islander	3.1%	8	0.5%	5.7%
American Indian Non-Hispanic	19.4%	118	14.2%	24.5%
Other	10.5%	51	6.1%	15.0%

Use caution in interpreting cell sizes less than 50. N* is unweighted.
National N is 53 = all 50 states, DC and Territories. Source: Arizona BRFSS, 2016

PRIORITY POPULATIONS

People with pre-diabetes

Adults over age 45

Youth

Pregnant women

TOP 3 RECOMMENDATIONS

1. Support and investigate primary and secondary causes of death attributed to diabetes as listed on certification of death in Arizona.
2. Develop and support a framework for data integration and enhancement.
3. Implement data driven decision making with information collected with data framework.

PREDIABETES

WHAT IS PREDIABETES?

Prediabetes is a serious, but reversible condition where blood sugars are higher than normal, but not high enough to be diagnosed as diabetes. Without treatment, prediabetes can lead to diabetes, heart disease and stroke.

WHO DOES PREDIABETES IMPACT?

The Centers for Disease Control estimates that **1 out of 3 adults** have prediabetes. Of those, **90% are unaware** that they have prediabetes.

An estimated **2.1 MILLION** Arizonans have prediabetes. **1.9 million don't know** they have prediabetes.

WHAT CAN BE DONE?

1. **Get screened** for prediabetes.
2. **If you have prediabetes, lose weight** by:

eating healthy + being more active

lowering your risk of getting type 2 diabetes by **HALF**

TYPE 2 DIABETES

WHAT IS TYPE 2 DIABETES?

In type 2 diabetes, the body can make insulin but cannot use the insulin properly. Insulin is a hormone that changes blood sugar into energy for the body.

Can develop at any age and in most cases can be prevented.

HOW MANY ARIZONANS HAVE DIABETES?

An estimated 95% of all diabetes cases are type 2 diabetes. This is almost 720,000 people in Arizona.

There are more people living with diabetes in Arizona than living in the city limits of Tucson and Flagstaff combined.

RISK FACTORS

Some risk factors for diabetes can be changed and some cannot.

- Being overweight
- Being 45 and older
- Having a family history of diabetes
- Not being physically active

COMPLICATIONS

Diabetes is the **leading cause of blindness** in adults

People living with diabetes are:

2 TO 4 times more likely to have a stroke

2 TO 3 times more likely to have depression

TYPE 1 DIABETES

WHAT IS TYPE 1 DIABETES?

Type 1 diabetes occurs when the body does NOT make any insulin. Insulin is a hormone that changes blood sugar into energy for the body.

There is no known way to prevent type 1 diabetes.

PRIORITY POPULATION

Type 1 diabetes can develop at any age but is usually diagnosed in children, teenagers and young adults. Across America 18,000 youth are diagnosed each year.

Type 1 is estimated at **5%** of all adult diabetes cases. In Arizona this is almost 38,000 people.

TREATMENT

Ongoing treatment includes multiple injections of insulin a day. Insulin is delivered by manual injection or pump.

In 2017, insulin pumps cost an average of **$4,500 with annual supply costs of $1,500 per person.**

COMPLICATIONS

Untreated **short-term complications** include:

- Seizures
- Confusion
- Comas
- Early death

Long-term complications of untreated diabetes type 1 include:

- End stage renal (kidney) failure
- Blindness
- Lower limb amputations or infections
- Early death

GESTATIONAL DIABETES

WHAT IS GESTATIONAL DIABETES?

Gestational diabetes is when pregnant women, who have never had diabetes before, have high blood sugars during pregnancy.

PRIORITY POPULATION

Up to **9.2%** **of all pregnancies are impacted by gestational diabetes.** In 2016, there were 84,404 births in Arizona. Gestational diabetes may have impacted 7,800 births.

5-10% **of women continue having diabetes after the baby is born.**

RISKS TO MOTHER AND CHILD

Blood sugar management supports a healthy pregnancy. There are increased risks of late term pregnancy loss and preterm labor.

Women are **20-50%** more likely to develop type 2 diabetes within 10 years of having gestational diabetes. **Children are up to 10% more likely to be overweight and get type 2 diabetes when** their mothers had gestational diabetes.

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Recommended Policies and Actions

The following recommendations were identified by the Diabetes Action Plan and Report planning team that would be most impactful and actionable in addressing the burden of diabetes in Arizona.

Recommendation #1 - Support and investigate primary and secondary causes of death attributed to diabetes as listed on death certificates in Arizona. Conduct analysis and effectiveness of other states who have tracked death attributable to diabetes.

Rationale - Diabetes may represent a more prominent factor in causes of death than reported and recorded on death certificates. If deaths are underreported, it is necessary to identify a true cause of death as related to diabetes.

Recommendation #2 – Support and integrate a data framework for data enhancement and integration. A data framework will provide a process to assess, manage, control and improve data related to the rate and cost of diabetes in the state of Arizona. The data framework will also enable the use of a healthcare cost estimation to track diabetes across the state. The Health Information Exchange (HIE) is a data repository that aggregates clinical data from medical practices, hospitals, labs and other healthcare organizations in one accessible location. The system connects different electronic health records (EHR) platforms and securely stores it. In addition to utilizing the HIE, Arizona has access to other sources of ongoing data, such as hospital discharge data (HDD), vital statistics and the BRFSS. With that said, each of these data sources need framework to manage the systems, data analytics and utilization of data. Additionally, sources such as HDD, vital statistics and the BRFSS have a lag time from data collection to interpretation and analytics of the collected data of a few years.

Rationale - The Diabetes Program within ADHS will update the Diabetes Action Plan and Report biennially. Having a data framework will ensure the Diabetes Program under the Arizona Department of Health Services will be able to efficiently gather, store and analyze data, strategies and initiatives in a timely manner. A data framework will enable ADHS to identify any gaps in data, improve and integrate all surveillance systems needed to identify, track and intervene amongst highest burden populations within Arizona in a targeted and timely manner. In addition, community efforts can target diabetes related interventions within highest burden populations with the ability to validate the interventions more effectively.

Recommendation #3 – Use data to drive decision making. Using data from surveillance support the Diabetes Action Plan and Report with investments in analytics, data translation and data visualization.

Rationale - Data is essential in achieving better health, better care and lower overall medical costs. Data drives quality and consistency related to care for those with diabetes. Using data at the public health level enables stronger healthcare strategies with the ability to validate their

effectiveness. Easily deliverable dashboards and data visualization will enable access to interactive information for community collaborators and stakeholders.

Recommendation #4 – Encourage all health plans in Arizona to provide inclusive diabetes benefits as part of health coverage.

Rationale - Diabetes is an expensive disease requiring ongoing care, medication management, preventive screenings, durable medical equipment and testing supplies, oral health, behavioral health and smoking cessation. Currently, Arizona does not have consistent coverage across all health plans for Diabetes Self-Management Education. Diabetes prevention should also be considered as a covered benefit. It is known that 1 out of every 3 Arizonans are considered prediabetic.

Recommendation #5 – Promote access to and coverage for the CDC's evidence based lifestyle change program; the National Diabetes Prevention Program (NDPP), across Arizona.

Rationale - 1 out of every 3 Arizonans has prediabetes, and of those - 90% do not know it. The NDPP has been proven by the Centers for Medicare and Medicaid Services Office of the Actuary to save $2,650 per Medicare enrollee over a 15 month period. The evaluation of results from the Health Care Innovation Award; Centers for Medicaid and Medicare Innovation (CMMI) Project (report in Appendix 5, under NDPP) indicate that participants in the NDPP achieved success with both losing weight and increasing exercise, effectively reducing their incidence of diabetes. To drive home the importance of investing in prevention, the Centers for Disease Control and Prevention released the following financial statement:

> "The Centers for Medicare and Medicaid Services (CMS) estimated that Medicare would spend $42 billion more in 2016 on fee-for-service, non-dual eligible, over age 65 beneficiaries with diabetes than it would spend if those beneficiaries did not have diabetes—$20 billion more for Part A hospital care, $17 billion more for Part B medical services, and $5 billion more for Part D prescription drugs. Medicare will spend an estimated $1,500 more per beneficiary on Part D prescription drugs, $3,100 more per beneficiary for hospital and facility services, and $2,700 more per beneficiary in physician and other clinical services for those with diabetes than those without diabetes (3)."

While the cost saving data is reflective of the CMMI Project, which focused on NDPP interventions in the Medicare eligible population, participants over the age of 18 have been shown to have significant results as well.

As of publishing this report, 22 organizations in Arizona offer NDPP. However; as a state, Arizona does not currently have consistent coverage across all health plans for the NDPP. As the Diabetes

Program within ADHS supports capacity building, sustainability and reimbursement for the NDPP, it is imperative that capacity is built around having insurance reimbursement across all health plans. Having NDPP as a covered benefit for all Arizonans; insured and uninsured would ensure all NDPP eligible participants would have access to this proven cost-savings prevention program.

Recommendation #6 - Increase access to safe and affordable active living where people work, learn, play and worship (cross-cutting initiative with Arizona Health Improvement Plan).

Rationale - 51.9% of Arizona's adults over the age of 18 engaged in the recommended amount of physical activity for optimal health (4).

Recommendation #7 - Increase access to affordable healthy foods and beverages where people live, work, learn, play and worship (cross-cutting initiative with the Arizona Health Improvement Plan).

Rationale - According to data from the 500 Cities Project; a partnership between the Robert Wood Johnson Foundation and the CDC using city and census tract data to estimate chronic disease measures, models estimate adults over the age of 18 experience obesity by as much as 29.8% in Maricopa, Pima and Yuma counties (5).

Additionally, the United States Department of Agriculture (USDA) measures access to supermarkets, supercenters, grocery stores and other sources of healthy and affordable foods. “Food Deserts” are defined by accessibility to healthy foods as measured by distance or number of stores within a defined area, family and individual income or transportation needs and the neighborhood income level and access to public transportation. Using these definitions, residents in all of Arizona's 15 counties experience some level of healthy food disparity. In 2013 11.3% of Arizona residents 18 and over reported eating vegetables at least three times per day and fruits twice daily (6). In addition, in 2015 only 25.3% of farmers markets in Arizona accepted SNAP and WIC benefits.

Recommendation #8 – Integrate use of Z-codes, ICD-10 codes that are used in tracking “Factors influencing health status and contact with health services”.

Rationale - Social determinants of health are the conditions in which a person is born, grows, lives, works and ages. ICD-10 codes have been created to correspond with these social determinants. Social determinants of health take into account factors like a person's education, employment, physical environment, socioeconomic status, and social support network. The use of social determinants allows a healthcare provider to identify things such as illiteracy, unemployment, a lack of adequate food and safe drinking water, social exclusion and rejection, homelessness, alcoholism, and many other factors that could affect a person’s overall health and wellbeing. As related to diabetes, social determinants should be examined. Medication adherence and access to affordable and healthful foods can lead to chronically high blood sugar levels, further increasing complications. These complications are directly due to affordability of medication and access to healthful foods and physical activity.

Appendix 1: Legislation

State of Arizona:
House of Representative
Fifty-Third Legislature
Second Regular Session
2018

CHAPTER 94

HOUSE BILL 2258

AN ACT

AMENDING TITLE 36, CHAPTER 1, ARTICLE 2, ARIZONA REVISED STATUTES, BY ADDING SECTION 36-142; RELATING TO DIABETES.

(TEXT OF BILL BEGINS ON NEXT PAGE)

Be in enacted by the Legislature of the State of Arizona:

section 1. Title 36, chapter1, article 2, Arizona Revised Statutes, is amended by adding section 36-142, to read:

36-142. Diabetes information: report

A. THE DIABETES ACTION PLAN TEAM IS ESTABLISHED IN THE DEPARTMENT OF HEALTH SERVICES. THE TEAM IS COMPOSED OF THE HEAD OF THE FOLLOWING ENTITIES OR THAT PERSON'S DESIGNEE:

1. THE ARIZONA DIABETES PROGRAM WITHIN THE DEPARTMENT OF HEALTH SERVICES.

2. THE ARIZONA HEALTH CARE COST CONTAINMENT SYSTEM.

3. THE PUBLIC SAFETY PERSONNEL RETIREMENT SYSTEM.

4. THE ARIZONA STATE RETIREMENT SYSTEM.

5. THE DEPARTMENT OF ADMINISTRATION BENEFITS SERVICES DIVISION.

6. DIABETES STAKEHOLDER ORGANIZATIONS, INCLUDING HEALTH INSURERS, A NATIONALLY RECOGNIZED DIABETES ASSOCIATION AND THE ARIZONA DIABETES COALITION.

B. THE TEAM SHALL COMPILE A REPORT ONCE EVERY TWO YEARS THAT INCLUDES THE FOLLOWING INFORMATION.

1. THE PREVALENCE IN THIS STATE OF:

(a) DIABETES BY TYPE.

(b) DIABETES BY AGE, RACE AND GENDER.

(c) COMPLICATIONS ASSOCIATED WITH DIABETES.

(d) PREDIABETES.

2. THE COSTS OF DIABETES IN THIS STATE.

3. THE ARIZONA DIABETES PROGRAM'S PLAN FOR REDUCING THE INCIDENCE OF DIABETES IN THIS STATE. IMPROVING DIABETES CARE AND REDUCING DIABETES-RELATED HEALTH DISPARITIES, INCLUDING PROPOSED ACTION STEPS.

4. A DESCRIPTION OF THE LEVEL OF COORDINATION THAT EXISTS BETWEEN THE DEPARTMENT OF HEALTH SERVICES AND HOSPITALS, THE DEPARTMENT'S CONTRACTED PARTNERS AND OTHER STAKEHOLDERS ON ACTIVITIES AND PROGRAMMATIC ACTIVITIES AND THE LEVEL OF COMMUNICATION ON MANAGING, TREATING OR PREVENTING ALL FORMS OF DIABETES AND ITS COMPLICATIONS.

C. THE REQUIREMENTS OF SUBSECTION B, PARAGRAPHS 1 AND 2 OF THIS SECTION ARE LIMITED TO THE DIABETES INFORMATION, DATA, INITIATIVES AND PROGRAMS WITHIN EACH AGENCY BEFORE THE EFFECTIVE DATE OF THIS SECTION, UNLESS THERE IS UNOBLIGATED FUNDING FOR DIABETES IN AN AGENCY THAT MAY BE USED FOR NEW RESEARCH, DATA COLLECTION AND REPORTING FOR THE PURPOSES OF SUBSECTION B, PARAGRAPHS 1 AND 2 OF THIS SECTION.

D. ON OR BEFORE JANUARY 1, 2019 AND ONCE EVERY TWO YEARS THEREAFTER, THE DEPARTMENT SHALL PROVIDE THE REPORT REQUIRED BY SUBSECTION B OF THIS SECTION. INCLUDING ITS RECOMMENDATIONS FOR ACTION, TO THE GOVERNOR, THE PRESIDENT OF THE SENATE AND THE SPEAKER OF THE HOUSE OF REPRESENTATIVES AND SHALL SUBMIT A COPY TO THE SECRETARY OF STATE.

Appendix 2: What is Diabetes?

Diabetes Overview:

More than 30 million Americans have diabetes, or roughly 9.4 percent of the U.S. population (7). One-third of Americans who have diabetes aren't even aware that they have it, and another one-third of Americans have prediabetes. To understand diabetes, it is important to understand how your body uses glucose and insulin. Glucose, a form of sugar is the main fuel the body needs and uses for energy. It is made when the foods you eat are broken down during digestion. Glucose travels through the bloodstream and enters the cells in the body with the help of insulin. Insulin, a hormone made in the pancreas, is the "key" that "opens" cells so the glucose can enter the cell and provide the body with energy.

Diabetes develops when insulin is either completely absent (type 1), or is in short supply or poorly used by the body (type 2). Without insulin, too much glucose remains in the bloodstream rather than entering the cells. If diabetes is not diagnosed and treated, blood glucose levels continue to rise, and over time leads to serious health complications; such as blindness, heart disease, stroke, kidney failure, nerve damage and lower limb amputations. Taking care of diabetes by eating the right foods, exercising regularly and taking medication, if prescribed, help provide the best defense against serious complications.

Type 1 Diabetes:

Type 1 diabetes represents approximately 5% of all diabetes cases. Type 1 diabetes (also called juvenile diabetes or insulin dependent diabetes) occurs due to autoimmune attack on insulin producing pancreatic beta cells resulting in severe insulin deficiency (8). People with type 1 diabetes require multiple daily injections of insulin, and if untreated can be fatal. Insulin is delivered by injection or insulin pump and must be used in conjunction with blood sugar monitoring, carefully balanced food intake and exercise in order to regulate healthy blood sugar levels. Without daily and carefully monitored blood sugar control, hypoglycemia or hyperglycemia can occur. Hypoglycemia is a common and potentially life-threatening condition in which the level of glucose in the blood drops below normal by not carefully balancing insulin intake with food and physical activity. Hypoglycemia, if left untreated can result in seizures and loss of consciousness, and in severe cases, death (9). In comparison, hyperglycemia is a result when blood sugar becomes too high. This can occur by skipping or not taking enough insulin in order to balance food intake. Signs of very high blood sugar include extreme thirst and urination, nausea, trouble seeing, poor concentration, confusion, drowsiness or coma (10).

Type 1 diabetes is usually diagnosed in children, teenagers and young adults and is characterized with a short duration of symptoms with a sudden onset to include polyuria, polydipsia and weight loss. A very rare form (less than 4% of all diabetes cases) of diabetes called monogenic diabetes, can strike newborns (Neonatal Diabetes Mellitus (NDM)) and teens (Maturity-Onset Diabetes of the Young (MODY)) and is often mistaken for type 2 diabetes. Monogenic diabetes results from a

mutation of a single gene that is inherited from one or both parents and is often correctly diagnosed only after genetic testing (11).

There are no modifiable risk factors, such as obesity or high blood pressure, which are associated with or contribute to the development of type 1 diabetes. While there appears to be a genetic factor to the development of type 1 diabetes, many environmental factors may trigger and/or influence the severity of an autoimmune attack on insulin producing beta cells (12).

Type 2 Diabetes:

Type 2 diabetes accounts for 90%-95% of the total cases of diabetes in the United States (2). Type 2 diabetes is caused by a combination of insulin resistance; largely due to obesity, and deficient insulin secretion by the pancreatic beta cells. As the need for insulin rises, the pancreas gradually loses its ability to produce adequate amounts to control blood glucose levels. Many factors have been linked to the development of type 2 diabetes as listed below:

Risk factors for type 2 diabetes include:

Modifiable (13)	Non-Modifiable (13)	Socially Determined (14)
Overweight or obesity	Age 45 or over	Access to affordable healthy foods
Physical inactivity	Ethnicity	Access to affordable health care
Tobacco use	Family history, direct relative with diabetes	Access to affordable and safe physical activity
High blood pressure	History of gestational diabetes	Discrimination based on geography
Abnormal cholesterol levels	Polycystic Ovarian Syndrome (PCOS)	Discrimination based on race
History of prediabetes, impaired glucose tolerance	Acanthosis Nigricans (darkened skin around neck and armpits)	Discrimination based on socioeconomic status
Cardiovascular disease		

As noted above, a person's risk for developing diabetes can be influenced by many factors including age, family history, ethnicity and other factors that cannot be changed. While there are many factors that cannot be changed, there are factors that influence a person's health such as education attainment, access to affordable nutritious food, employment and access to affordable health care. Social determinants of health are the conditions in which a person is born, grows, lives, works and ages.

Diabetes in pregnancy:

Gestational Diabetes Mellitus (GDM):

Pregnant women who have never had a diagnosis of diabetes before but have high blood glucose levels during pregnancy are said to have gestational diabetes. According to a 2014 analysis by the

Centers for Disease Control and Prevention (CDC), the prevalence of gestational diabetes is as high as 9.2% of pregnancies (15). Woman who are overweight or obese, had GDM in a prior pregnancy, had larger babies (>9 pounds), high blood pressure, high cholesterol and/or heart disease, or have polycystic ovary syndrome are at a greater risk of GDM. In addition, women who have a family history of diabetes, over the age of 25 or are Hispanic, African American, American Indian/Alaskan Native or Pacific Islander are at an increased risk (16).

Gestational diabetes occurs when the hormonal changes of pregnancy demand more insulin of the body than it would normally make or use efficiently, increasing insulin resistance. Gestational diabetes usually occurs in the second to third trimester or around 20-28 weeks gestation. Most women with GDM have healthy pregnancies due to proper blood sugar management; however they are still at increased risks for possible complications such as high blood pressure and preeclampsia, late-term pregnancy loss, preterm labor and delivery complications resulting in cesarean section. Though gestational diabetes usually resolves itself postpartum, 5-10% of women will continue to have diabetes post pregnancy. In addition, having gestational diabetes greatly increases the risk of developing type 2 diabetes within 10 years by as much as 50% (17). As these children age, they are also shown to have glucose intolerance and to be more overweight or obese as compared to their non-GDM counterparts (by as much as 10%) (17).

***Pregestational Diabetes Mellitus*:**

Distinct from gestational diabetes, pregestational diabetes occurs when a woman has insulin-dependent diabetes prior to pregnancy. All diabetic women who wish to become pregnant are encouraged by their medical provider to carefully plan their pregnancies in advance, achieve controlled blood sugar levels, and maintain a healthy weight prior to pregnancy to achieve the best outcomes for both mother and baby. Prenatal care is essential for a healthy outcome, as normal blood sugar levels are essential during the formative first trimester. High levels of glucose in the blood prior to pregnancy and during the first trimester greatly increase the risk of birth defects to the heart, brain, spinal cord, urinary tract and gastrointestinal system (18). In addition, babies born to mothers with pregestational diabetes are at increased risk for complications before and after birth including large-birth weight (increasing risk of birthing injury), low blood sugar, preterm birth, jaundice and breathing problems (19). With proper diabetes management including diet management and insulin therapy, blood glucose values are kept at normal levels greatly reducing serious health risks to the baby.

Prediabetes:

Prediabetes is a term used to define those at a high risk of developing diabetes in the future and includes those that have elevated fasting blood glucose levels and those that have had a history of gestational diabetes.

Prediabetes is a serious yet reversible health condition where blood sugar levels are higher than normal but not high enough yet to be diagnosed as diabetes. Prediabetes puts you at increased risk for developing type 2 diabetes, heart disease and stroke.

Approximately 1 out of every 3 Arizonans have prediabetes. Of those that do have prediabetes, 90% of them are unaware of their diagnosis. You can have prediabetes for years but have no clear or defining symptoms, therefore it often goes undetected until serious health problems arise. Because there are no clear symptoms of prediabetes, it is important to be aware of the risk factors. Anyone who is considered overweight, 45 years or older or having a direct blood relative with diabetes or having gestational diabetes during pregnancy, and those that are active less than 3 days a week are at an increased risk of developing prediabetes. Additionally, it should be noted that African Americans, Hispanic and Latin Americans, American Indians, Pacific Islanders and Asian Americans are at higher risk (20).

Lifestyle intervention consisting of a diet containing foods lower in fat, foods with lower caloric content and an increase in moderate physical activity of at least 150 minutes per week coupled with formative behavior modifications has been shown to reduce the incidence of diabetes conversion by as much as 58% (21).

Complications of Diabetes:

Diabetes is recognized as one of the leading causes of death and disability in the United States. Over time, people with chronically high levels of blood glucose suffer lasting and debilitating effects, including damage to their nerves and blood vessels. Those with diabetes are also more likely to suffer from depression and mental health distress. Because of this long-term exposure to elevated levels of glucose, those with diabetes experience (22):

Heart Disease

- Death rates are two to four times higher for those with diabetes than those without
- Stroke risk among those with diabetes is also two to four times higher than those without diabetes

High Blood Pressure

- It is estimated that 2 out of every 3 persons with diabetes also suffer from high blood pressure

Blindness and eye problems

- Diabetes is the leading cause of blindness among adults

Kidney disease

- Diabetes is the leading cause of kidney failure, resulting in dialysis, transplant or end stage renal failure

Nervous system disease

- An estimated 60%-70% of people with diabetes suffer from some form of nervous system damage, including neuropathy of the hands and feet and decreased gastric motility

Amputation

- More than 60% of non-traumatic lower limb amputations are a direct result of diabetes

Dental diseases

- Nearly one-third of those with diabetes also suffer from periodontal disease

Complications of pregnancy

- Birth defects are more common in babies born to mothers with poorly controlled glucose levels in the first trimester
- Poorly controlled diabetes in the second and third trimesters can result in large birth weight babies, posing greater risk for complications during childbirth
- Babies born to diabetic mothers are at a greater risk for developing diabetes later in life

Depression and mental health distress

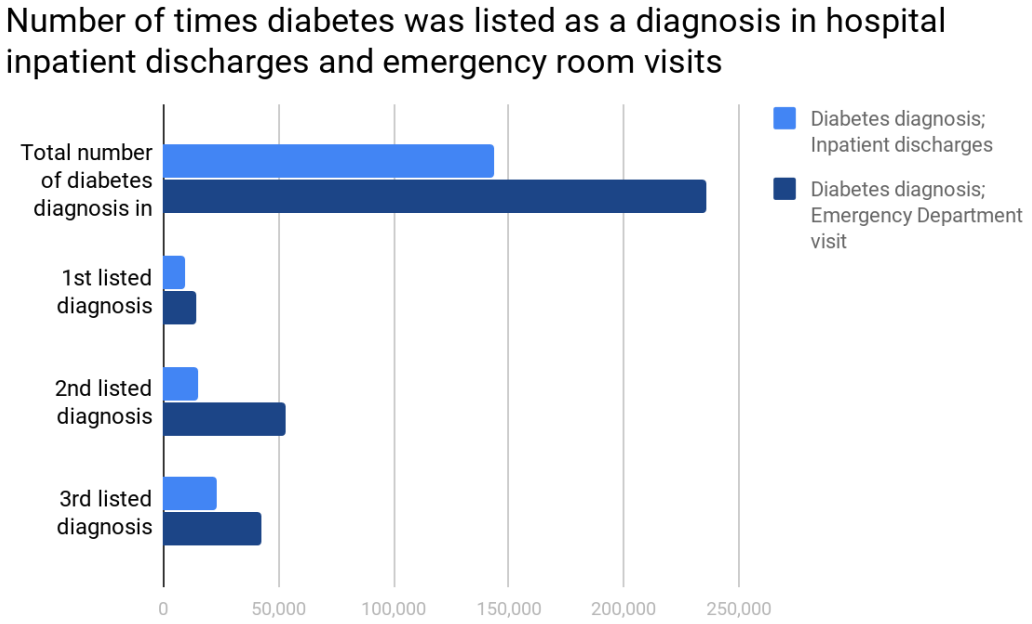
- In any 18-month period, 33% to 50% of people with diabetes have diabetes distress, characterized by overwhelming feeling of discouragement, frustration, and feeling of defeat as related to diabetes management (25). Diabetes health distress is not effectively treated with medication. Comorbid depression in diabetes may lead to poorer outcomes and increased risk in complications because of lower adherence to medication, glucose monitoring, exercise and diet (26)
- People with diabetes are 2 to 3 times more likely to have depressive episodes that those without diabetes

Appendix 3: Diabetes in Arizona

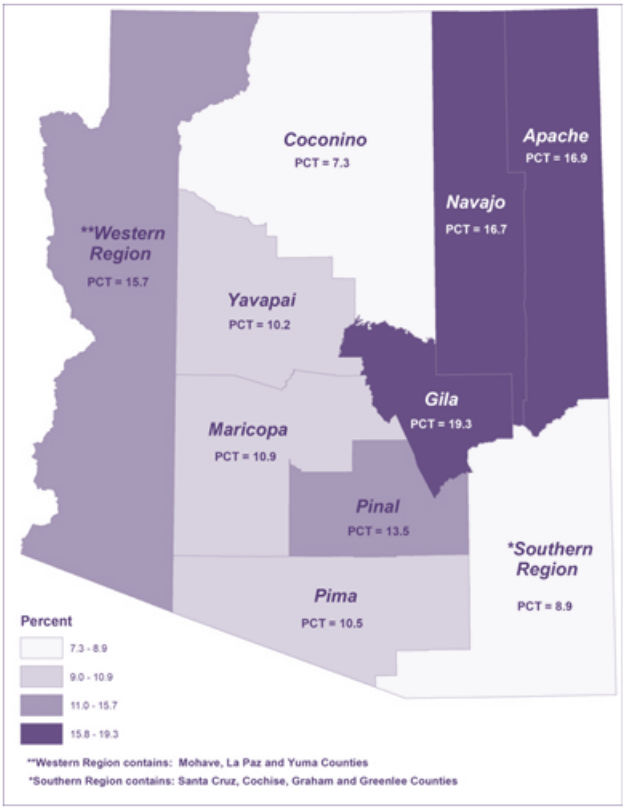
According to the Arizona Department of Health Services Vital Statistics and Hospital Discharge Data analysis for 2016, 143,714 Arizonans were discharged from inpatient hospital care and 235,393 visited the emergency room as a result of diabetes. Note; these figures do not distinguish between the types of diabetes.

County	Number of Diabetes-related Discharges	Number of discharges with diabetes listed as the primary diagnosis
Apache	2,059	224
Cochise	6,842	610
Coconino	5,431	336
Gila	4,517	270
Graham	3,017	159
Greenlee	474	40
La Paz	951	116
Maricopa	217,350	16,105
Mohave	17,770	1,037
Navajo	6,448	476
Pima	58,254	3,773
Pinal	28,828	1,645
Santa Cruz	2,935	212
Yavapai	13,362	785
Yuma	13,363	929
Total	**379,107**	**24,210**

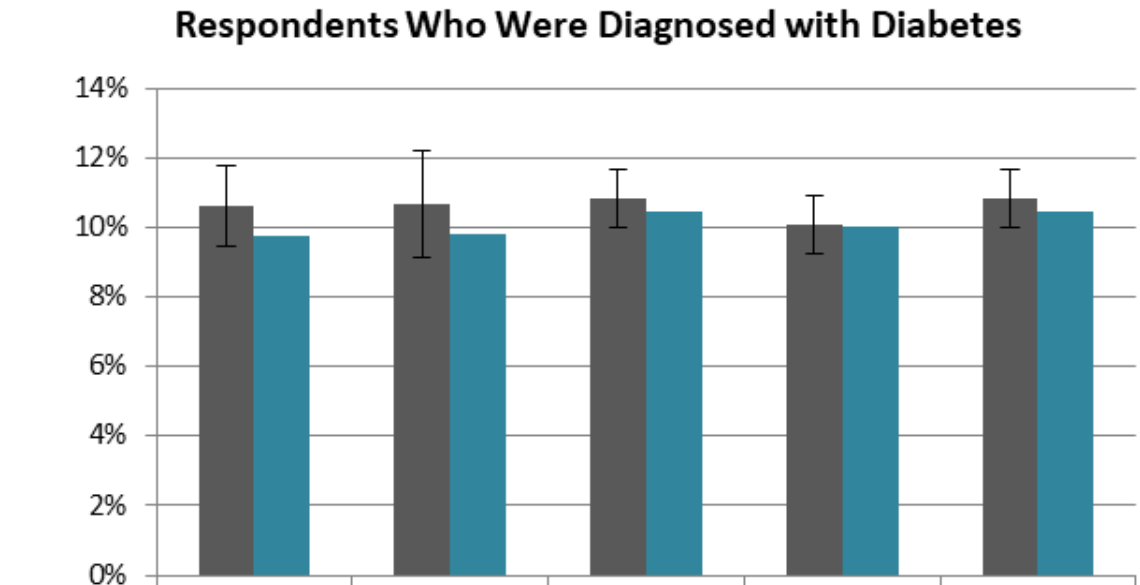
Notes: Beginning 2016 data year, counts of illness are no longer restricted to the first nine listed diagnoses but include all the 25 diagnoses recorded on the medical chart.



Arizona Respondents Who Reported Being Diagnosed With Diabetes by a Health Care Professional, by County and Region, BRFSS 2016

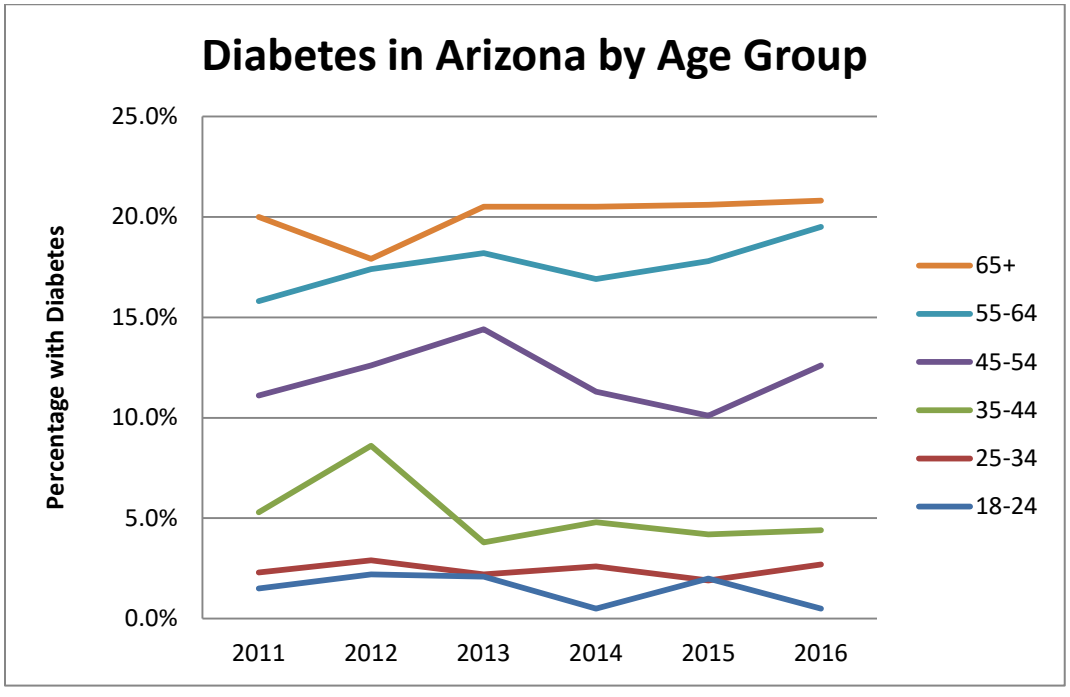


The percentage of Arizonans who were surveyed and reported as having diabetes increased from 2012 with a decrease in 2015. In 2016, 10.8% of Arizonans reported as having diabetes. Additionally, Arizona consistently has higher rates of diabetes than the national average.



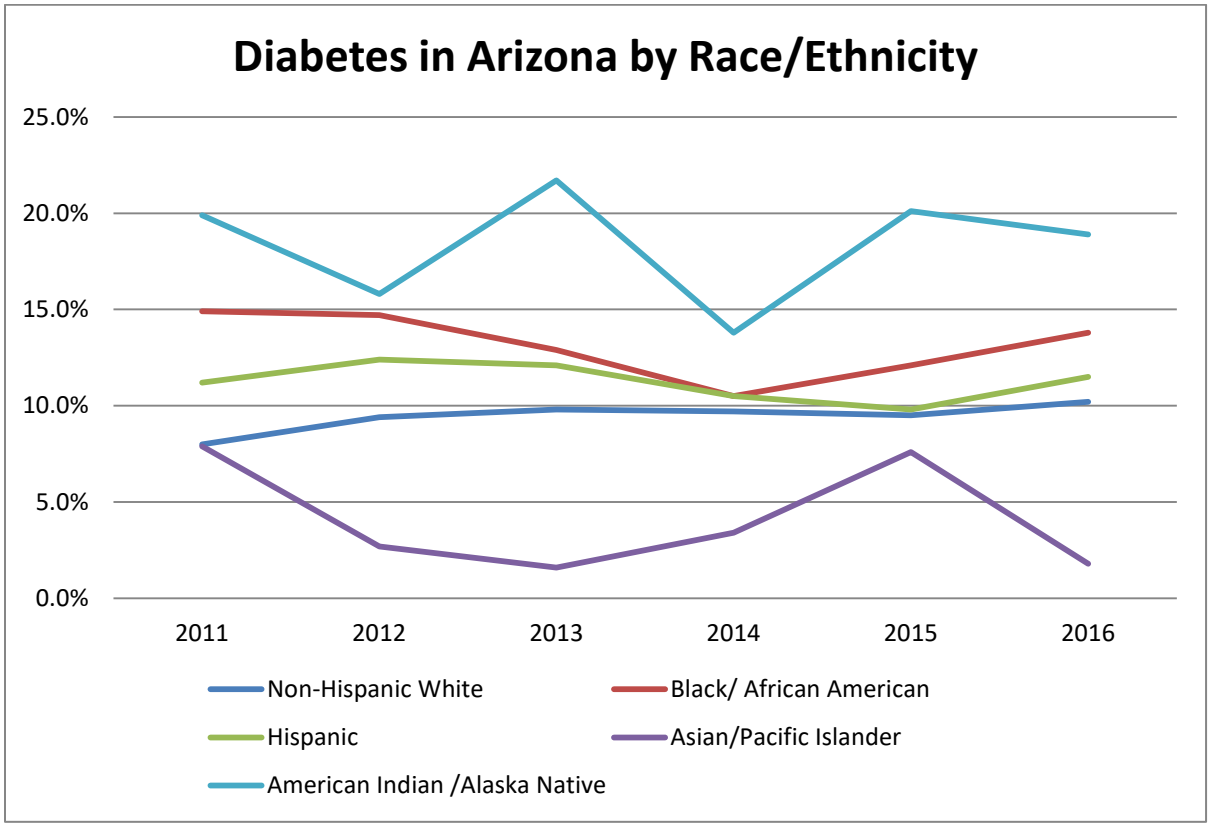
	2012	2013	2014	2015	2016
Arizona	10.6%	10.7%	10.8%	10.1%	10.8%
National	9.7%	9.8%	10.5%	10.0%	10.5%

Arizona and National 2012-2016 BRFSS respondents who reported that they were diagnosed with diabetes between 2012-2016. The "I" lines show the 95% confidence intervals. A 95% confidence interval is a range of values that you can be 95% certain contain the true average of the population.



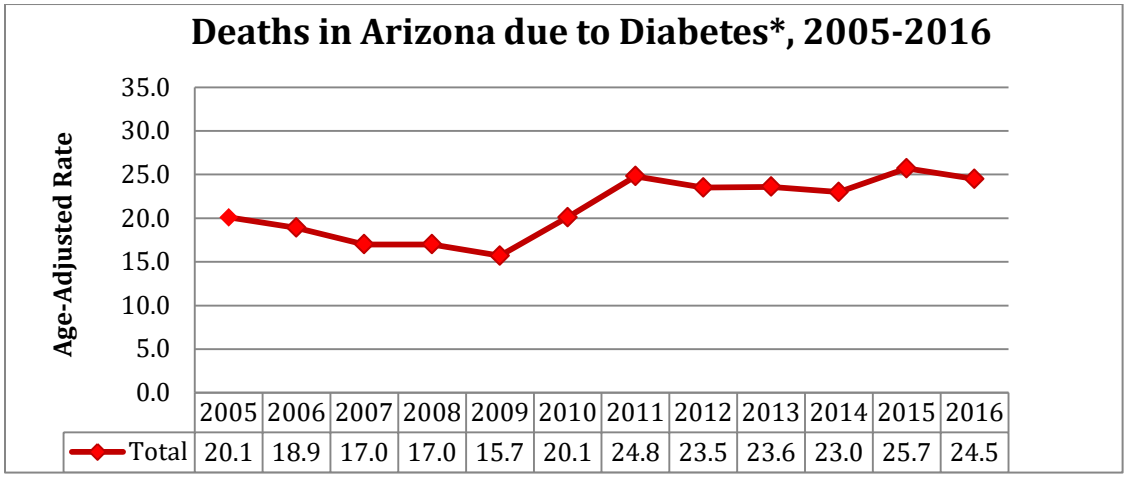
Source: Arizona BRFSS, 2011-2016

According to the BRFSS, Arizonans with diabetes is increasing in every age group with the exception of those 18-24, which saw a decline. Because the BRFSS is a survey of adults over the age of 18, the rates of diabetes in those from birth to 17 is not captured in the above chart.

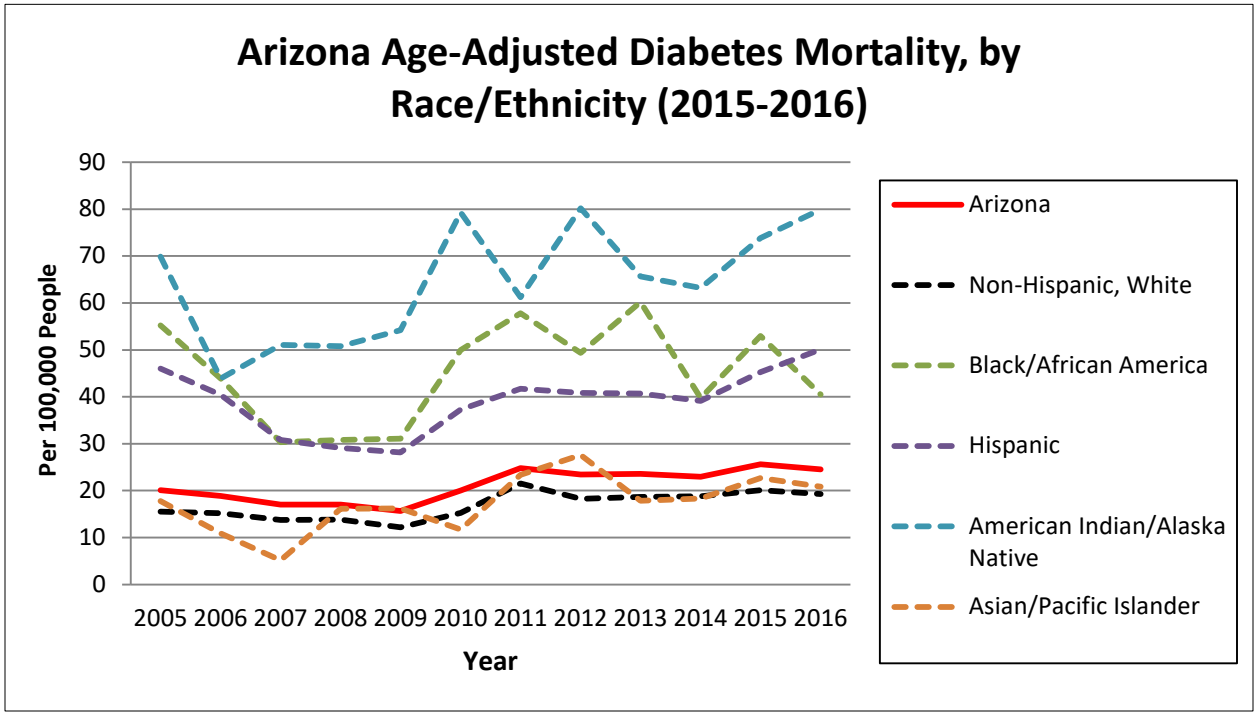


Source: Arizona BRFSS, 2011-2016

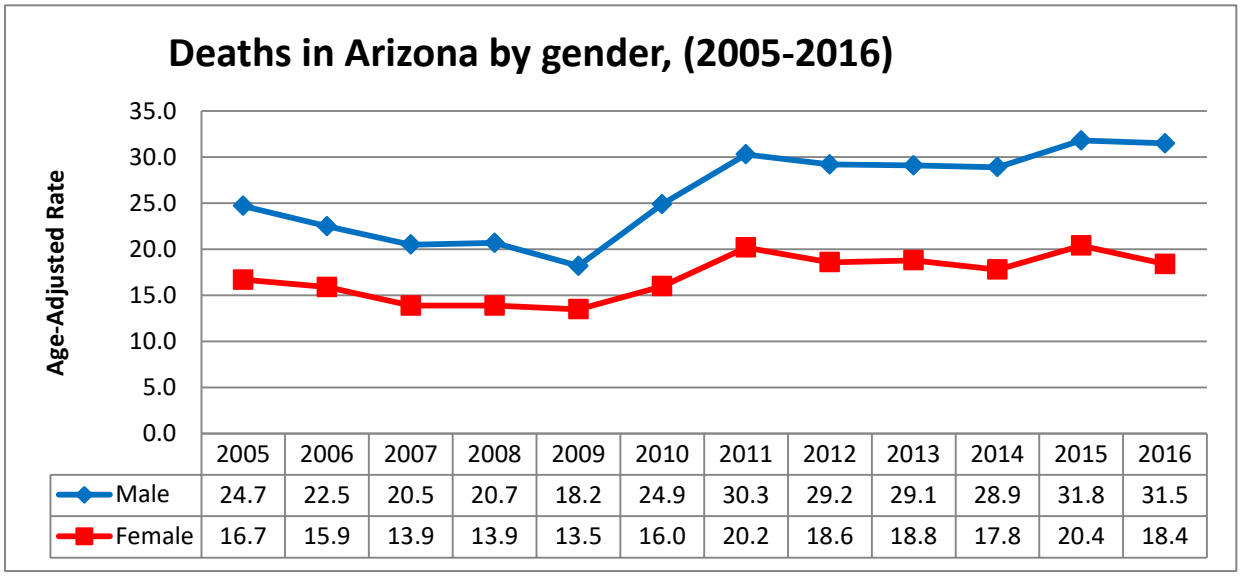
Arizona experienced a 28% decrease in diabetes related deaths; however there was sharp increase in 2010. In 2016, 24.5 per 100,000 Arizonans deaths were attributed to diabetes, a slight decrease from 2015.



Source: Arizona Vital Records, 2012-2016
***Deaths are calculated per 100,000 people**



In looking at diabetes related deaths in Arizona, by race and ethnic, and gender, diabetes rates were highest among American Indian/Alaska Native, Hispanic and Black/African American. Males also have a higher death rate than females.



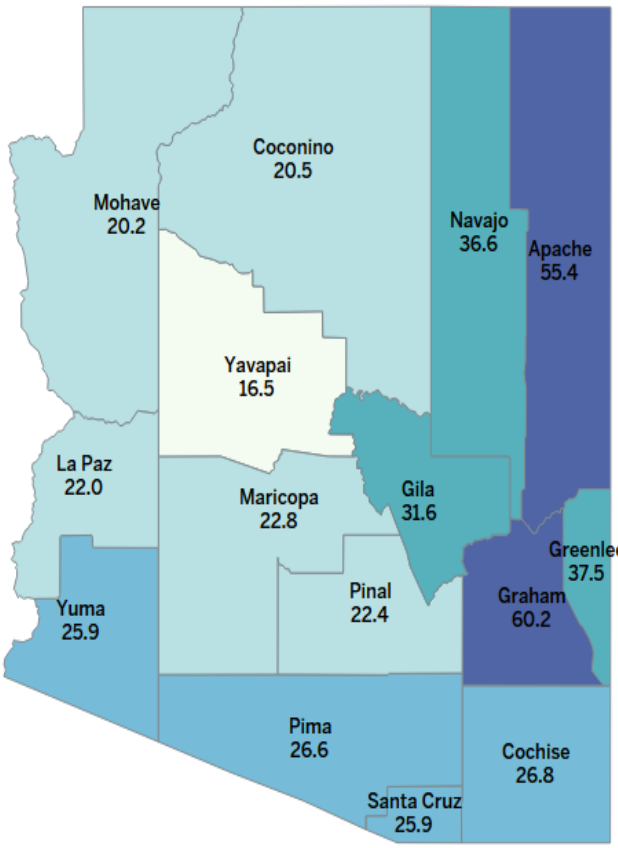
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Male	24.7	22.5	20.5	20.7	18.2	24.9	30.3	29.2	29.1	28.9	31.8	31.5
Female	16.7	15.9	13.9	13.9	13.5	16.0	20.2	18.6	18.8	17.8	20.4	18.4

Source: Arizona Vital Records, 2006-2016

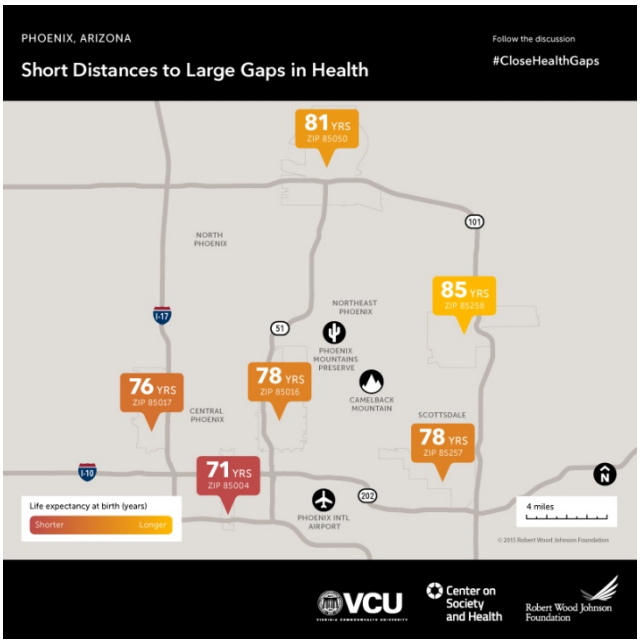
Deaths are calculated per 100,000 people

According the 2016 BRFSS, rates of diabetes are highest in American Indian/Alaskan Native Arizonans, followed by Black/African American and Hispanic with rates of 19.4%, 13.8% and 11.5%. Rates are also highest among males at 12.2% as compared to females at 9.5%.

Diabetes rates are also highest among those without a high school diploma (16.6%), followed by those with a high school diploma or GED diploma (11.2%) and some college and technical school education (10.6%). Those having graduated either a technical school or college have lowest rates of diabetes (7.5%). These differences represent critical health and social issues as related to life-expectancy and disease free quality of life. As shown is the map below, life expectancy can vary greatly within a city, based on zip code and educational attainment.

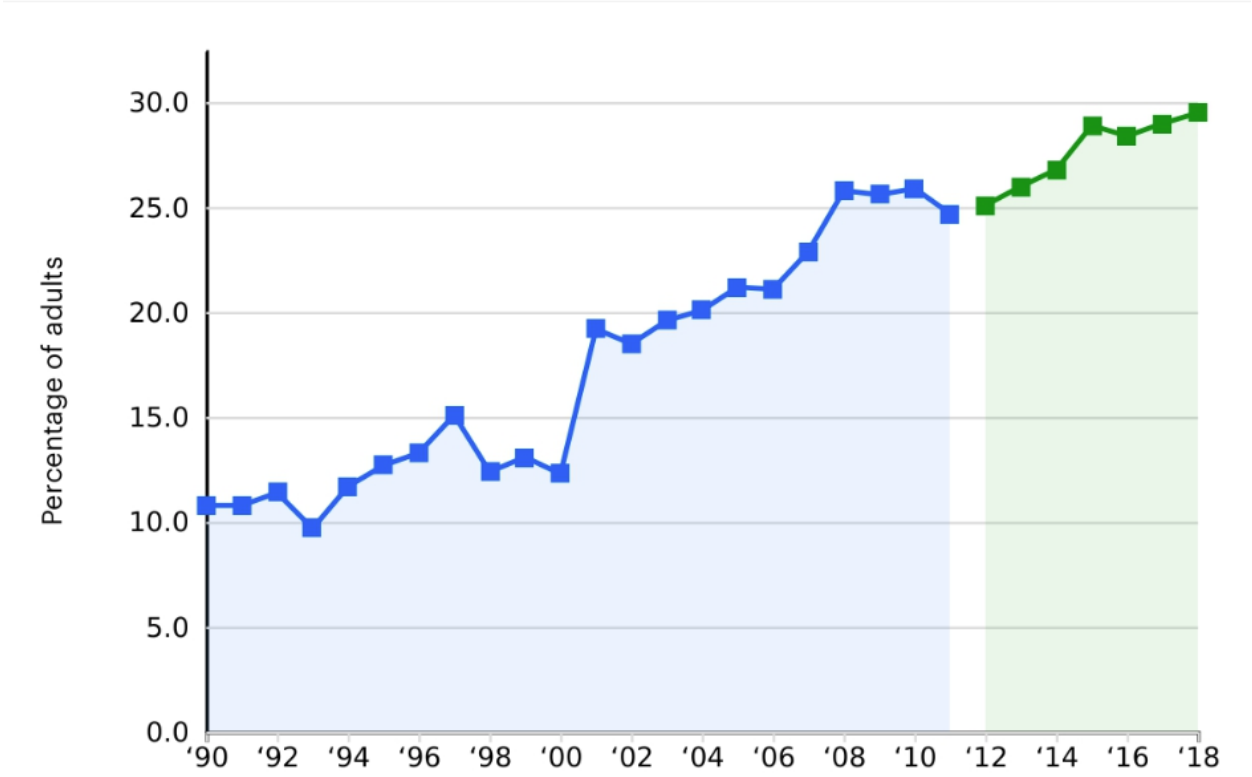


2017 Mortality rates per 100,000 population



Although the diabetes mortality rate has been consistent in the last five years, we still continue to see disparities across counties. Compared to the state rate of 23.8 deaths per 100,000 populations, Apache and Graham counties had more than double the rate of deaths due to diabetes.

Source: America's Health Rankings, 2017



The chart above represents obesity trends in Arizona. The blue squares represent the percentage of adults with a body mass index of 30% or higher based on reported height and weight (pre-2011 BRFSS methodology). The green squares represent the percentage of adults with a body mass index of 30% or higher based on reported height and weight.

The table below shows the proportion of Arizonans who were diagnosed with diabetes by age, marital status, educational attainment, employment status, income and race/ethnicity.

Arizonans Who Reported Ever Having Diabetes

Characteristic	Percent	n	Lower Mean	Upper Mean
National	10.5%	54		
Arizona	**10.8%**	**1600**	**10.0%**	**11.6%**
Male	12.2%	790	10.9%	13.5%
Female	9.5%	810	8.5%	10.4%
18-24	0.5%	3	0.0%	1.1%
25-34	2.7%	17	1.1%	4.3%
35-44	4.4%	61	3.1%	5.6%
45-54	12.6%	176	10.0%	15.1%
55-64	19.5%	380	16.9%	22.1%
65+	20.8%	963	19.2%	22.4%
Married	12.4%	818	11.2%	13.7%

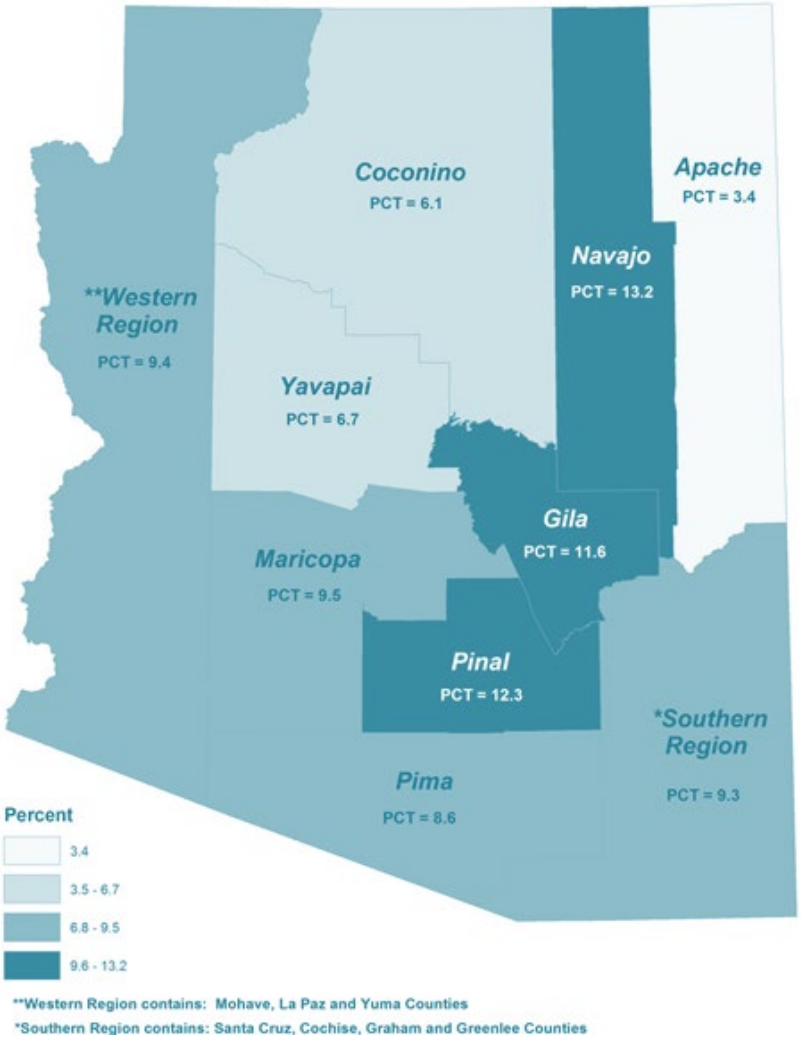
Characteristic	Percent	n	Lower Mean	Upper Mean
Divorced	15.1%	259	12.3%	18.0%
Widowed	17.3%	297	14.6%	20.0%
Separated	10.4%	33	5.1%	15.8%
Never Married	5.4%	157	4.0%	6.8%
Unmarried Couple	2.5%	25	1.2%	3.9%
Less than high school	16.6%	164	13.1%	20.2%
High School/GED	11.2%	415	9.6%	12.8%
Some College/Technical School	10.6%	534	9.4%	11.9%
College/Technical School Grad	7.5%	483	6.5%	8.4%
Employed for Wages	6.5%	296	5.3%	7.6%
Self Employed	4.7%	52	2.9%	6.6%
Out of Work	10.0%	58	6.5%	13.5%
Homemaker	10.3%	99	7.3%	13.3%
Student	2.2%	8	0.0%	4.6%
Retired	19.9%	851	18.3%	21.6%
Unable to Work	28.3%	229	23.5%	33.1%
Less than $10,000	16.4%	104	12.0%	20.9%
$10,000 to $14,999	21.2%	98	15.0%	27.3%
$15,000 to $19,999	13.6%	138	9.4%	17.7%
$20,000 to $24,999	11.9%	135	8.8%	15.1%
$25,000 to $34,999	9.4%	171	7.4%	11.5%
$35,000 to $49,999	10.7%	206	8.6%	12.8%
$50,000 to $74,999	9.0%	207	7.1%	11.0%
Above $75,000	8.0%	256	6.7%	9.3%
White Non-Hispanic	10.2%	1123	9.4%	11.1%
Black/African American	13.8%	52	9.2%	18.3%
Hispanic	11.5%	248	9.4%	13.6%
Asian/Pacific Islander	3.1%	8	0.5%	5.7%
American Indian Non	19.4%	118	14.2%	24.5%
Other	10.5%	51	6.1%	15.0%

Source: 2016 BRFSS, Pre-Diabetes data was not captured in the 2016 BRFSS

***Use caution in interpreting cell sizes less than 50. N* is unweighted**

Nation N is 53 = all 50 states, DC and Territories

Arizona Respondents Who Reported Being Diagnosed with Pre-Diabetes, by County and Region, BRFSS 2014



Arizonans Who Reported Having Been Told by a Doctor or other Health Professional that they have Pre-Diabetes or Borderline Diabetes

Characteristic	Percent	N*	Lower Mean	Upper Mean
National	8.6%	40		
Arizona	**9.1%**	**1465**	**8.4%**	**9.8%**
Male	8.1%	578	7.1%	9.1%
Female	10.0%	887	9.0%	11.0%
18-24	3.7%	17	1.7%	5.7%
25-34	4.4%	41	2.7%	6.1%
35-44	6.7%	96	5.0%	8.4%
45-54	10.0%	201	8.2%	11.8%
55-64	15.1%	372	13.2%	17.1%
Characteristic	**Percent**	**n**	**Lower Mean**	**Upper Mean**
65+	14.5%	738	13.2%	15.9%
Married	10.2%	778	9.2%	11.2%
Divorced	10.4%	256	8.5%	12.4%
Widowed	12.8%	236	10.6%	14.9%
Separated	11.7%	29	5.5%	17.9%
Never Married	5.4%	124	3.8%	7.0%
Unmarried Couple	6.7%	27	2.9%	10.5%
Less than high school	8.3%	99	5.8%	10.7%
High School/GED	7.8%	293	6.5%	9.1%
Some College/Technical School	10.7%	503	9.3%	12.0%
College/Technical School Grad	8.9%	555	7.9%	9.9%
Employed for Wages	7.1%	400	6.1%	8.1%
Self Employed	8.2%	85	5.6%	10.7%
Out of Work	8.8%	54	5.3%	12.3%
Homemaker	6.9%	84	5.0%	8.9%
Student	2.1%	8	0.1%	4.1%
Retired	15.2%	675	13.6%	16.7%
Unable to Work	18.2%	141	13.8%	22.6%
Less than $10,000	10.9%	74	6.6%	15.3%
$10,000 to $14,999	9.8%	73	6.0%	13.5%
$15,000 to $19,999	7.1%	81	4.6%	9.6%
$20,000 to $24,999	10.9%	123	8.0%	13.8%
$25,000 to $34,999	8.5%	143	6.4%	10.6%
$35,000 to $49,999	10.1%	225	8.0%	12.2%
$50,000 to $74,999	8.4%	184	6.6%	10.1%
Above $75,000	9.9%	338	8.4%	11.5%
White Non-Hispanic	9.6%	1148	8.8%	10.4%
Black/African American	14.7%	58	9.3%	20.1%
Hispanic	7.1%	178	5.6%	8.7%
Asian/Pacific Islander	9.0%	21	4.8%	13.2%
American Indian Non	9.7%	28	3.8%	15.6%
Other	10.0%	32	5.0%	14.9%

Source: 2014 BRFSS, Pre-Diabetes data was not captured in the 2016 BRFSS *Use caution in interpreting cell sizes less than 50. N* is unweighted Nation N is 53 = all 50 states, DC and Territories

Appendix 4: Financial Costs of Diabetes in Arizona

A Cost Estimate Baseline for Diabetes in Arizona

Background

Cost estimates for diabetes in Arizona require sustainable cross functional health care data frameworks and a periodic cost estimate cadence to produce a reliable cost estimate model. Alignment of data systems in two public health systems, Syndromic Surveillance and Hospital Discharge Data, and their common message formats (i.e., HL7, electronic health records) may provide the data framework to develop a sustainable Arizona diabetes cost estimate model. Current data frameworks provide information that at times omits information or is collected for an earlier time period.

The table below identifies nine sources currently assessing the burden or cost of diabetes in Arizona. Historically, the Arizona Department of Health Services (ADHS) Diabetes Burden Report is Arizona's source of the cost of diabetes in Arizona. The burden report's data source for cost is Hospital Discharge Data. Alignment of any new diabetes cost estimate with the Diabetes Burden Report cost estimate will ensure a single authoritative method to describe the cost of diabetes in Arizona.

Organization	Name of Report	Link
Arizona Department of Health Services	Diabetes Burden Report	https://www.azdhs.gov/documents/prevention/tobacco-chronic-disease/diabetes/reports-data/diabetes-burden-report-2018.pdf
Center for Disease Control	Data and Statistics	https://www.cdc.gov/diabetes/data/
American Diabetes Association	2018 National and State Report	http://care.diabetesjournals.org/content/early/2018/03/20/dci18-0007, http://main.diabetes.org/dorg/assets/pdfs/advocacy/state-fact-sheets/Arizona2018.pdf
UnitedHealth Foundation	America's Health Rankings	https://www.americashealthrankings.org/explore/annual/measure/Diabetes/state/AZ https://www.americashealthrankings.org/learn/reports/2018-senior-report
National	National	https://ftp.cdc.gov/pub/Health_Statistics/NCHS/NHIS/SHS/2017_

Centers for Health Statistics (CDC)	Health Interview Survey	SHS_Table_A-4.pdf
National Centers for Health Statistics (CDC)	National Health and Nutrition Examination Survey (NHANES)	https://wwwn.cdc.gov/nchs/nhanes/default.aspx
Robert Wood Johnson Foundation	County Health Rankings and Roadmaps	http://www.countyhealthrankings.org/app/arizona/2016/measure/outcomes/60/data
Sanofi: Managed Care Digest Series	Type 2 diabetes report - 2018	2018 Sanofi Report

Diabetes Cost Estimation Resources – not an exhaustive list

Cost Estimation Research/Method

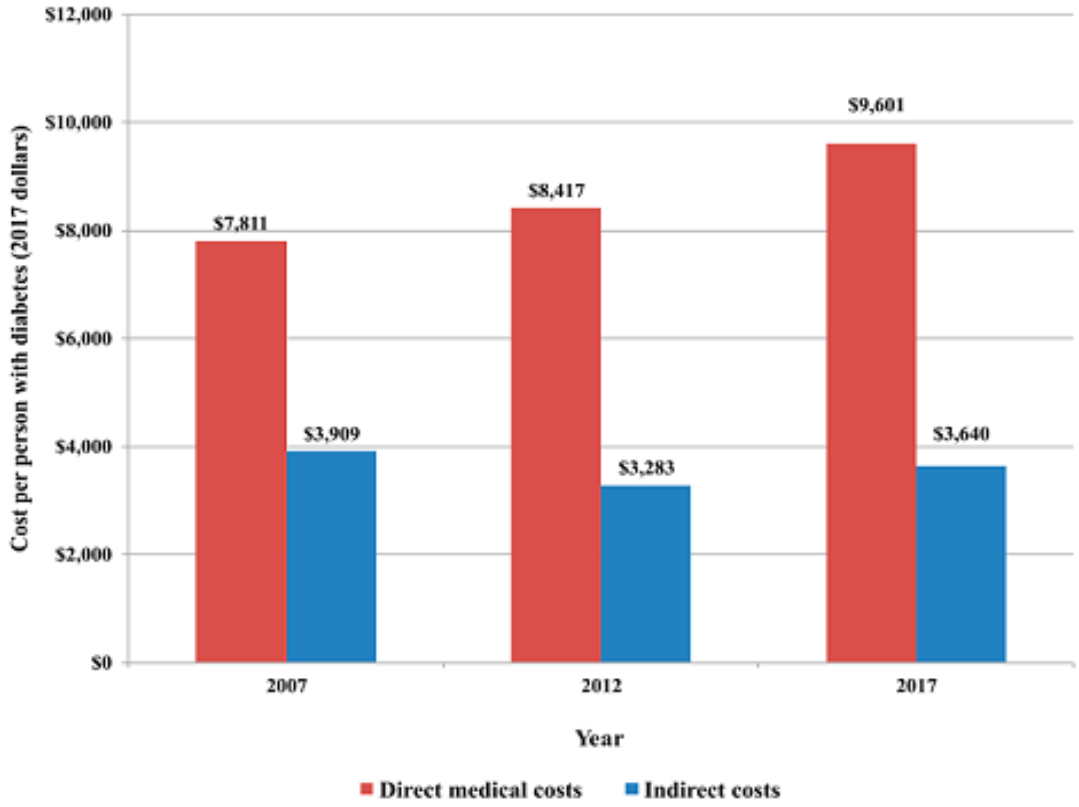
Diabetes costs are typically broken into direct medical or indirect costs, where the direct costs are associated with diabetes medical financial codes. The indirect costs may be financial burdens where diabetes has contributed to other primary, secondary, and tertiary conditions such as diseases of the heart, kidney disease, blindness, lower leg amputations and arthritis. These financial costs could also be described as explicit or implicit costs. The ADHS current 2018 Diabetes Burden Report is the primary source of information for the cost of diabetes used in the development of this report.

To align with the American Diabetes Association's (ADA), *Economic Cost of Diabetes in the U.S. 2017*, Arizona diabetes costs will be described as direct medical and indirect costs. ADA's cost model is an inflation and growth adjusted model associated with diabetes prevalence.

Future Arizona diabetes cost estimates will also strive to align with the Arizona Management System (AMS) to support operational decision making for all organizations involved in executing the Arizona Diabetes Action Plan.

Until a data framework is developed with a sustainable cost estimation model, Arizona will use the ADA diabetes per capita cost estimate to reference direct medical and indirect costs for 2017 which are listed below. This will provide a per capita cost estimate for different Arizona populations that lack specific per capita cost.

Average Direct medical cost per capita-$9,601 (in 2017 Dollars).
Average Indirect cost (ie: costs such as absenteeism, reduced productivity while at work, or inability to work as a result of disease-related disability) per capita-$3,640 (in 2017 Dollars).



ADA Average cost of diabetes, 2007–2017 (in 2017 dollars)

The time frame for the Arizona diabetes cost estimate within this report is based on one year, primarily using data from the 2018 Burden Report. This initial cost estimate will establish a baseline and further help identify data elements and structures required to develop a model. While this cost estimate is a point estimate, additional years of data are needed to develop a cost estimate model similar to the model developed by the ADA.

Arizona Diabetes Operational and Financial Data

The following State of Arizona data sources were used:

1. UnitedHealthcare | ASRS
2. Arizona Department of Administration - medical data
3. AHCCCS - medical data
4. Public Safety Retirement data

The following external data sources were used:

1. American Diabetes Association - Economic Cost of Diabetes
2. Behavioral Risk Factor Surveillance System (BRFSS)

3. Hospital Discharge Data

These data sources where selected due to the availability of data, historic relevance and role of state institutions providing support to prevent, control, and treat diabetes. Access to financial codes to support the cost estimate was also a big factor in identifying state data sources.

State Cost Estimate – Hospital Discharge Data (HDD):

Diabetes Related Inpatient & Emergency Department Discharges			
Payer Type	**Number of Discharges**	**Total Charges**	**Average Length of Stay (Days)**
Charity	118	$1,754,403	6.8
Medicaid	23,246	$328,916,536	5.6
Medicare	124,292	$1,947,035,088	5.6
Other	4,994	$87,580,067	5.3
Private Insurance	35,384	$561,049,135	5.1
Self-Pay	3,976	$42,040,185	6.0
Total	**192,010**	**$2,968,375,414**	

Source: Arizona Hospital Discharge Data, 2016

For the purpose of this report, 2016 hospital discharge data was used. 2017 hospital discharge data analysis was not fully complete and therefore unavailable for inclusion in this report.

According to the American Diabetes Association, the total Arizona estimated cost of diagnosed diabetes in 2017 was $6.8 billion (ADA website). $5.1 billion were attributed to direct medical costs (physician office visits, prescription medications, diabetes supplies, hospital inpatient care). $1.7 billion were attributed to indirect costs (absenteeism, reduction in work productivity, early disability, and mortality). When compared to the 2018 ADHS Burden Report data, it is noted that financial burden estimates are smaller. This disparity is largely due to data differences in ICD9 and ICD10 transitions and data interpretations at the individual state level. As noted in the HDD expense chart above, over 192,000 Arizonans were discharged from inpatient care or the Emergency Department due to diabetes in 2016, with the majority of hospital stays occurring within the Medicare population followed by Private Insurance and Medicaid. The average hospital stay for these individuals was 5.7 days.

Appendix 5: Strategies, Services and Programs Addressing Diabetes in Arizona

The Arizona State Legislation directed the Arizona State Department of Health, the Arizona State Department of Administration, Arizona Health Care Cost Containment System, Arizona State Retirement System, Public Safety Personnel Retirement System, the Arizona Diabetes Coalition and Leadership Council and Arizona Diabetes Stakeholders to provide action plans for how each agency addresses the burden of diabetes in Arizona. In the following pages are agency and organizational diabetes initiatives that have been implemented up to the date of bill execution.

Arizona Department of Health Services (ADHS)

The Arizona Department of Health Services uses a multi-prong approach to address several behavioral and physical risk factors and chronic health conditions, including diabetes. ADHS is multi-structured with several Bureaus creating depth and breadth of health and wellness services and initiatives targeting all Arizonans. ADHS works in areas involving school health, access to nutritious foods, physical activity, community design, worksite wellness, community and clinical linkages and utilization of a non-physician workforce to reach into rural and disparate communities. While the Diabetes Program is housed within the Bureau of Tobacco and Chronic Disease, cross pollinating with the cardiovascular program and the community health worker workforce, diabetes efforts are imbedded among several Bureaus.

The Arizona Department of Health Services' Diabetes Action Plan and Report strategies align with the ADHS' current strategic plan and focuses on the entire public health system at the state, county and community level. ADHS' leading public health issues were identified as leading health issues impacting the health and quality of life for a significant number of Arizonans. All of Arizona's 15 county health departments conducted Community Health Assessments using surveys, focus groups, interviews, and community stakeholder meetings to gather information about local health issues. Almost 10,000 community members and key stakeholders across the state participated in exploring and establishing the local public health priorities.

Diabetes was identified as one of the top leading health priorities across all of Arizona's 15 counties, addressing a comprehensive list of key factors including: magnitude of the problem, mortality/morbidity, potential impact (winnable battle), cost effectiveness, existence of evidence-based models, political feasibility, community readiness, disparities, current trends and quality of life. The Arizona Health Improvement Plan (AzHIP) identifies strategic issues and desired health outcomes to be achieved in a coordinated effort of many partners, striving for measurable success over a five year period, 2016-2020.

Arizona Health Improvement Plan; Healthy People, Healthy Communities Diabetes Strategic Plan

2020 Goal: Reduce deaths attributable to diabetes by 10%.

Strategies for Reducing Diabetes

1. ***Increase the utilization of an integrated, team-based approach to the care and treatment of diabetes.***
   Using an integrated care model comprised of a multi-disciplinary team of professionals (physicians, nurses, dietitians, community health workers, pharmacists, behavior health) working collectively will improve health outcomes for people with diabetes.

2. ***Promote the use of established diabetes clinical guidelines and increase participation in diabetes self-management education.***
   To increase awareness of diabetes risk and protective factors amongst the general population, with an emphasis on the at-risk or vulnerable populations disproportionately impacted by diabetes.

3. ***Increase awareness of prevention and the management practices for diabetes and prediabetes.***
   Approximately 90% of patients with prediabetes are undiagnosed. Prediabetes is a stage in which patients have elevated blood sugar and exhibit risk factors for diabetes, but the blood sugar levels are not high enough to be diagnosed with diabetes. If undiagnosed or not managed correctly, prediabetes may become diabetes, which can lead to secondary complications (i.e., heart disease, blindness, kidney and nerve damage, etc.). Enhancing linkages between clinical- and community-based prevention efforts increases the availability and use of evidence based and promising practices.

Increase the utilization of an integrated, team-based approach to the care and treatment of diabetes

Tactics	Action Items
Increase engagement of non-physician team	1. Increase participation in statewide Diabetes Coalition

members in diabetes self-management healthcare communities.	2. Provide education and resources to non-physician team members through engaging and innovative approaches.

***Promote the use of established diabetes clinical guidelines and increase participation in diabetes self-management education.**

Tactics	Action Items
Educate providers on established clinical guidelines.	1. Create an online repository for established clinical guidelines for different provider types.
	2. Identify and promote provider educational resources for diabetes self-management.
	3. Increase awareness of resources related to the American Association of Diabetes Educators 7 Self-Care Behaviors.
Educate on the health and cost benefits of utilizing diabetes self-management education programs.	1. Promote the Community-Based Referral Network for self-management programs.
	2. Increase awareness of reimbursement mechanisms for diabetes self-management education programs.

***Increase awareness of prevention and management practices for diabetes and prediabetes.**

Tactics	Action Items
	1. Identify innovative partners, strategies, and approaches to reach target audiences.

Develop an integrated and comprehensive communications plan.	2. Assess and compile resources to align and coordinate efforts.
	3. Prepare a health brief to address health disparities and to identify the leading secondary complications for diabetes in Arizona.
	4. Collaborate and coordinate with organizations who are implementing awareness campaigns for consistent messaging.
	5. Engage stakeholders to promote awareness campaign through organization and member communications.
Educate community and faith-based organizations on available resources related to diabetes and prediabetes.	1. Provide technical assistance to community and faith-based organizations to increase awareness of prediabetes.
Educate providers and health care workers on prediabetes.	2. Integrate, distribute, and provide technical assistance for the Agents of Change (Chronic Disease Provider) Toolkit.

Arizona Health Improvement Plan (AzHIP) success stories:

The Arizona Diabetes Coalition

The Arizona Diabetes Coalition, formally established in 2005, is comprised of more than 300 members who serve as conduits for promoting diabetes prevention and management. The Arizona Diabetes Coalition uses a collaborative and coordinated approach with statewide stakeholders and the Arizona Department of Health Services in designing, implementing and evaluating community-driven strategies. The Coalition works to eliminate health disparities and reduce the burden of diabetes on individuals, families, communities and the healthcare system. This is achieved by increasing awareness of diabetes and advocating for and promoting policies and programs that increase access to care, treatment and outcomes for those diagnosed with diabetes or those with an elevated risk of developing diabetes.

St. Vincent de Paul - Family Wellness Program

St. Vincent de Paul (SVdP's) Family Wellness Program, located in Phoenix, serves and extends health services to the uninsured and underinsured residents of Arizona. SVdP addresses important medical issues for those who otherwise would not have access to care. Each year, more than $43.6 million worth of medical and dental services are provided to uninsured working families.

SVdP established the Family Wellness Program in 2000, offering Diabetes Self-Management Education (DSME) classes for adults 18 and over who have been diagnosed with diabetes. Adults diagnosed with diabetes participate in a series of classes that provide them with the knowledge and tools to help manage and control their diabetes. Since 2000, SVdP has conducted approximately 850 DSME classes - serving roughly 1700 individuals. SVdP became accredited through the American Association of Diabetes Educators in July 2015. Since then, SVdP has delivered 108 DSME classes to ~228 individuals. Over the past 4 years, SVdP has had about 64 new patients go through the DSME program per year. SVdP's successes are highlighted by their overall patient HbA1c reduction from 10% to 6.7%.

University of Arizona - Primary Prevention Mobile Unit

The University of Arizona - Mel & Enid Zuckerman College of Public Health (MEZCOPH) in collaboration with the Mexican section of the U.S. - Mexico Border Health Commission developed and implemented a self-sustaining primary prevention mobile health clinic (UA - Mobile Unit) to provide access to preventative health care services, including blood glucose screenings. The UA Mobile Unit deploys a team of doctors, nurses, pharmacists, promotoras and community health workers to engage the population. The UA Mobile Unit improves health equity and access to care by delivering these services to the underserved, vulnerable and distressed Hispanic/Latino populations in Maricopa and Pima counties regardless of socioeconomic or residential status.

During the period from July to December 2017, the UA Mobile Unit saw a total of 1,961 new participants (63% in Maricopa County, 37% in Pima County). The UA Mobile Unit identified a total of 466 patients that were currently being monitored for their diabetes.

Pre-Diabetes Media Campaign - Mission Possible / Agents of Change

Today, one in every 3 adults has prediabetes and doesn't even know it. Arizona residents are underdiagnosed for prediabetes because they are unaware of the risk factors and are not routinely screened for diabetes by their primary care providers. The Agents of Change (27) campaign addresses low rates of screening and referrals to a Centers for Disease Control and Prevention (CDC) recognized Diabetes Prevention Program (DPP), whereas the Mission Possible (28) campaign is more consumer driven and expresses the need for awareness, being proactive about asking for screenings and, more importantly, that prediabetes is reversible. The primary

goals of the Prediabetes Media Campaign were to make consumers aware of the risk factors for diabetes while encouraging screening and referrals to a CDC's DPP.
The work done to date has evolved as the Arizona Department of Health Services worked with Urias Communications to build ADHS microsites, educational videos, posters, brochures and toolkits. Current efforts underway with Davidson and Belluso Advertising agency have been effective due to purposeful marketing in specific areas using Google Analytics, various publications, a strong social media presence and billboard placement in key areas in Phoenix and Tucson.

Health in Arizona Policy Initiative (HAPI):

The Health in Arizona Policy Initiative (HAPI) is a collaborative approach with local county health departments and other partners to improve Arizona population health through the implementation of evidence-based health policy within the environments of *Where We Live, Work, Learn and Receive Care.*

HAPI, strives to address many populations concurrently by: 1) Implementing strategies and activities impacting health outcomes which are identified and driven locally; 2) Ensuring that staff and community partners are trained on how to advance population health through the implementation of policy, system and environmental approaches and; 3) Utilizing a coordinated approach of engaging staff and stakeholders to reduce duplication of resources.

Through HAPI, ADHS seeks to advance policies around the areas of worksite wellness, healthy community design, school health, clinical linkages to community programs with an inclusion of those with chronic diseases and youth with special health care needs.

ADHS-Led Initiatives: Evidence-based and Best Practices

Diabetes Self-Management Education:

Diabetes Self-Management Education and Support (DSMES) is the foundation of care for people with diabetes. DSME is a well-defined process that educates a person with diabetes on how to manage their diabetes by teaching self-care behaviors including medication management, being active and inclusion of healthy foods. DSMES also help people make informed decisions regarding their care, problem solving and healthy coping strategies. DSMES have been shown to be a cost effective approach to reducing hospitalizations and diabetes related health care costs and is considered a key component to patient-centered care. Three national organizations (American Diabetes Association, American Association of Diabetes Educators, Self-Management Resource Center (formerly Stanford Chronic Disease Self-Management Program (CDSMP)), using evidence based practices and curriculum, accredit or recognize diabetes education programs to ensure that they are following national standards on diabetes self-management training. Nationally accredited and recognized programs may be eligible for insurance reimbursement with a physician referral. Despite reimbursement opportunities, it is widely known that DSMES is an underutilized program.

In addition to accredited programs such as DSME, many community based organizations offer non-accredited diabetes education classes that focus efforts on healthy eating.

National Diabetes Prevention Program (NDPP):

The National Diabetes Prevention Program was launched by the Centers for Disease Control and Prevention in 2012 after results of a 3 year research study and several translational studies concluded that research participants greatly reduced their overall risks of developing type 2 diabetes. The study results were consistent across gender, race and socioeconomic status. Differences were noted across age; 58% diabetes risk reduction was noted in adults between 18-59 whereas participants over the age of 60 showed greater risk reduction - 71%. The results of the DPP research study suggested that millions of people in the United States with prediabetes can lower their risk of developing type 2 diabetes by losing a modest amount of weight through decreased fat and calorie intake and by engaging in moderate intensity physical activity at least 150 minutes each week. The NDPP was determined by the Department of Health and Human Services; Office of the Actuary to reduce healthcare costs without reducing the quality of care and thus was certified in 2016 and recertified in 2017.

The NDPP is a year-long structured program delivered in two distinct phases: 16 weekly 1-hour sessions in the first 6 months followed by a second six month phase where participants meet at least once per month or six times for the remainder of the program. The program is facilitated by a trained lifestyle coach on the CDC-approved evidence based curriculum. During the sessions, participants interact with fellow participants and the lifestyle coach, while focusing on behavior modification, managing stress and peer support.

- The CDC-led NDPP is a partnership of public and private organizations across the nation working together to build an infrastructure for nationwide delivery and sustainability of the evidence-based lifestyle change program. Over 1300 organizations have registered with the CDC to deliver the NDPP in community based organizations, work sites, healthcare facilities and places of worship

CDC preliminarily and fully recognized NDPP programs are eligible for private insurance reimbursement and Medicare reimbursement and can be utilized without a physician referral or copay. As of printing of this report, 22 individual organizations offer the NDPP throughout Arizona. Several non-recognized organizations are also offering the Diabetes Prevention Program, to include tribal locations and non-profit agencies.

Funding:

Arizona Department of Health Services receives CDC cooperative funds which are used to support state-level diabetes personnel and operating costs, support epidemiological and evaluation efforts, support diabetes coalition efforts, and support special projects related to the prevention and management of diabetes within the State of Arizona. Under the "*State Public Health Actions to*

Prevent and Control Diabetes, Heart Disease, Obesity and Associated Risk Factors and Promote School Health (1305)" grant from 2013-2018, Arizona had distinct strategies related to diabetes:

- Promote reporting of blood pressure and A1c measures; and as able, initiate activities that promote clinical innovations, team-based care, and self-monitoring of blood pressure
- Promote the awareness of prediabetes among people at high risk for developing type 2 diabetes
- Promote participation in ADA-recognized, AADE-accredited, state-accredited/certified, and/or Stanford licensed DSME programs
- Increase the use of health-care extenders in the community in support of self-management of diabetes

Arizona has embarked on a new round of CDC funding; *"Improving the Health of Americans Through Prevention and Management of Diabetes and Heart Disease and Stroke (1815)"* beginning in October 2018. Strategies are designed to build capacity of diabetes prevention programming and diabetes self-management within rural and disparate communities using a collaborative, coordinated and community driven approach. Strategies include:

- Improve access to and participation in ADA-recognized/AADE-accredited DSMES programs in underserved communities
- Increase engagement of pharmacists in the provision of medication management or DSMEs for people with diabetes
- Assist healthcare organizations in implementing systems to identify people with prediabetes and refer them to a CDC-recognized lifestyle change program for type 2 diabetes prevention
- Implement strategies to increase enrollment in CDC-recognized lifestyle change programs for the prevention of type 2 diabetes
- Develop a statewide infrastructure to promote long-term sustainability/reimbursement for Community Health Workers as a means to establish or expand their use in a) CDC-recognized lifestyle change programs for type 2 diabetes prevention and/or b) ADA-recognized/AADE-accredited DSMES programs for diabetes management.

Arizona Healthcare Cost Containment System (AHCCCS):

Founded in 1982, the Arizona Health Care Cost Containment System (AHCCCS) is Arizona's Medicaid program. Built on a system of competition and choice, AHCCCS is a $12 billion program that operates under an integrated managed care model, through a Research and Demonstration 1115 Waiver. Contracted health plans coordinate and pay for medical services delivered by more than 70,000 health care providers for 1.9 million individuals and families in Arizona.

Arizona has the distinction of being the first state to create a "mandatory" Managed Care model, meaning that with the exception of the American Indian population, who under federal law cannot be mandated into managed care, all Medicaid enrollees must be enrolled in an MCO, including dual eligible and long term care members.

AHCCCS MCOs are prepaid a capitation for the services provided to its membership, and are thus incentivized to promote health and wellness, ensure members have access to preventative services, and be innovative in identifying ways to improve outcomes, while also lowering costs.

Disease/Chronic Care Management:

MCOs focus on diabetes as part of their requirement to implement a Disease/Chronic Care Management Program [42 CFR 438.3(s)] that focuses on members with high risk and/or chronic conditions that have the potential to benefit from a concerted intervention plan. The goal of the Disease/Chronic Care Management Program is to increase member self-management and improve practice patterns of providers, thereby improving healthcare outcomes for members.

The Disease Management Program includes, but is not limited to:

- Members at risk or already experiencing poor health outcomes due to their disease burden
- Health education that addresses the following:
    - Appropriate use of health care services
    - Health risk-reduction and healthy lifestyle choices including tobacco cessation
    - Screening for tobacco use with the Ask, Advise, and Refer model and refer to the Arizona Smokers Helpline utilizing the proactive referral process
    - Self-care and management of health conditions, including wellness coaching
    - Self-help programs or other community resources that are designed to improve health and wellness
    - EPSDT services for members including education and health promotion for dental/oral health services and
    - Maternity care programs and services for pregnant women including family planning
- Interventions with specific programs that are founded on evidence based guidelines
- Methodologies to evaluate the effectiveness of programs including education specifically related to the identified members' ability to self-manage their disease and measurable outcomes

- Methods for supporting both the member and the provider in establishing and maintaining relationships that foster consistent and timely interventions and an understanding of and adherence to the plan of care
- Components for providers include, but are not limited to:
    - Education regarding the specific evidenced based guidelines and desired outcomes that drive the program
    - Involvement in the implementation of the program
    - Methodology for monitoring provider compliance with the guidelines and
    - Implementation of actions designed to bring the providers into compliance with the practice guidelines

AHCCCS has developed and implemented performance metrics to monitor MCO compliance in meeting contractual requirements related to the delivery of care and services to members. AHCCCS Performance Measures (PMs) are based on CMS Core Measure Sets, National Committee for Quality Assurance (NCQA) Healthcare Effectiveness Data and Information Set (HEDIS) measures, Substance Abuse and Mental Health Services Administration (SAMHSA) quality measures, and other resources.

The 2018 MCO performance measures AHCCCS has established related to diabetes care include:

Comprehensive Diabetes Care: Eye Exam (CDC)- Minimum performance standard (MPS) 55%

Comprehensive Diabetes Care: Hemoglobin A1c (HbA1c) Poor Control (>9.0%) (HPC)- MPS 43%

Comprehensive Diabetes Care: Hemoglobin A1c (HbA1c) Testing (HA1C) MPS-86%

American Indian Medical Home and Diabetes Education:

In October 2017, AHCCCS implemented a new program called the American Indian Medical Home (AIMH) for the American Indian population enrolled in Fee-For-Service (FFS). The AIMH provides qualified Indian Health Service (IHS) or Tribally operated 638 facilities tiered per member per month payments for offering their enrolled members care coordination, including accredited diabetes education, and for participation in the HIE. At this time over 9,000 American Indian members are participating in AIMH care coordination. In Calendar Year 2017, AHCCCS reimbursed approximately $229.6 million for primary diagnosis diabetes related services for 147,591 distinct members. In addition, AHCCCS reimbursed $284,930,726 related to co-occurring conditions, $128,760,457 for pharmacy, and $12,803,207 for diabetic supplies. Total reimbursement for diabetes primary diagnosis and co-occurring conditions, pharmacy and supplies totaled $656,091,704.

To read AHCCCS' complete data, usage and financial report, please visit Appendix 6.

Arizona State Retirement System (ASRS)

For over 65 years, ASRS has provided retirement benefits to Arizona's public servants, including teachers, employees of all three of Arizona's universities, community college districts, school districts and charter schools, all of Arizona's 15 counties, municipal workers and other government employees. The ASRS proudly serves more than a half-million members, including more than 140,000 retired members.

For the retired members of ASRS with diabetes, 27% were Medicare Advantage, 22% were Supplemental Plan and 18% were non-Medicare members. Highest rates of diabetes were noted in Yuma and Pinal counties, with an addition of Graham County for the Senior Supplemental Plan and Greenlee County for Medicare Advantage and non-Medicare members.

Diabetes support for non-Medicare members:

The Diabetes Management Program is a comprehensive solution for non-Medicare members that receive benefits through the Arizona State Retirement System. The program is designed to help individuals learn how to effectively manage their condition and its comorbidities (including depression) and limit disease progression. Members will better understand risk factors, how to maintain a healthy lifestyle, and adhere to physician treatment plans and medications.

To do this, nurses address gaps in care and screen for co-morbidities and risk factors. In addition, nurses assess all diabetic members for depression and refer them to behavioral health resources, as necessary. Medical directors are available to review care plans and conduct peer-to-peer outreach to treating physicians. Regular monitoring (blood glucose, cholesterol, A1c) and screenings (dental, foot, eye) are performed. Fully synchronized pharmacy and care management systems monitor adherence to prescribed medication and any compliance issues, to include identifying duplications and contraindications. These processes create deeper insights, allowing faster gap identification to drive better, more relevant member engagement, improve clinical outcomes and ultimately reduce costs. ASRS uniquely leverages pharmacy touchpoints, including placing pharmacists on the care team.*(Only applies to those using OptumRx as their pharmacy benefit services provider).

High risk members are identified and counseled on understanding, managing and averting any long-term health effects related to their condition. As needed, patients are referred to Diabetes Self-Management to gain skills and adopt a healthy lifestyle. Members are also encouraged to enroll in weight-loss, tobacco cessation or exercise programs, when appropriate. Nurses can schedule physician appointments and promote additional resources for members, including referring members to resources such as psychosocial services and community resources.

Of the 10,167 ASRS members in the non-Medicare plan in 2017, 1,804 had a diagnosis of diabetes. 89% of the diabetic population identified, were diagnosed with type 2 diabetes.

Diabetes Support for Medicare members:

ASRS provides web based healthy eating and exercise programs that include meal planning to members who are diabetic. Members experiencing high risk behaviors, low medication adherence or have an elevated A1c greater than 9% are assigned Diabetes Health Navigators for more deliberate care and disease management. Low to moderate risk members with diabetes are identified and are assigned to telephonic diabetes interventions designed to close any gaps in care.

Of the 25,343 ASRS Medicare members, 6,831 had a diagnosis of diabetes.

To read the UnitedHealthcare complete data and usage report, please visit Appendix 6. A financial report was not submitted for the purpose of this report.

Arizona Department of Administration; Benefits Division (ADOA)

The Arizona Department of Administration was established by the Arizona State Legislature in 1973 to support the operation of state government, including providing medical and health benefits to roughly 136,000 active state and university employees, retirees and COBRA members and their eligible dependents. In addition to medical, pharmacy, dental and vision, ADOA also maintains a statewide wellness program offering numerous health enhancement, education and prevention programs and services to all benefits eligible state employees.

ADOA offers free mini-health screenings to all benefit eligible employees one time per calendar year to encourage them to "know their numbers", and for those who are eligible to receive an A1C test to take appropriate steps if they are at risk. ADOA also provides a free online health risk assessment to all benefit eligible employees one time per calendar year and provides employees with a personalized report of their current health. Any employee at risk of developing diabetes or is at an increased risk for complications are encouraged to participate in digital health coaching, Diabetes Self-Management programs and other disease management programs available from all medical carriers under ADOA. A complete list of diabetes resources can be found on the ADOA Wellness Benefits website: www.benefitoptions.az.gov/wellness

ADOA also offers an incentive based employee wellness program, the Health Impact Program (HIP) to all benefit eligible employees. Points are awarded to employees who participate in various activities such as qualified weight loss programs, mini-health screening, online health assessment, digital health coaching, completion of a medical carrier sponsored disease management programs, educational webinar and campaigns, as well as other preventive screenings/exams.

- Real Appeal

  Real Appeal is a weight loss program, using simple and manageable measures that can easily be integrated into daily life for long-term health benefits and lasting weight loss. Real Appeal is a year-long web-based program using weekly sessions around education and behavior change. For employees who qualify for the program as high risk , one-on-one personal coaching is also available. Real Appeal is currently available at no charge to all benefit eligible employees and dependents 18 years and older who are on one of the four State of Arizona medical plans

- Naturally Slim

  Naturally Slim is an online weight loss program. The program provides weekly sessions for one year. The foundation of the class encourages the attendee to rediscover the pleasures of eating by retraining your brain by the way you eat. Encourages attendees to change how they eat, not what they eat and increase their activity level. This program is employee paid

- Eat Smart | Move More Weigh Less

Eat Smart | Move More Weigh Less is a 15 weeks online class, delivered in an interactive real-time format with a live instructor

This evidence-based program empowers the attendee to live mindfully as food and activity choices lead them to health and wellness. Each lesson informs, empowers and motivates participants to live mindfully as they make choices about eating and physical activity. This program is employee paid

- Weight Watchers

Participants attend in-person meetings at either the worksite or at a community Weight Watchers location. These 12-week sessions encourage healthy eating by consuming more fruits, vegetables, lean proteins, reducing sugars and unhealthy fats and increasing physical activity. This program is employee paid

- Am I Hungry? Mindful Eating for Diabetes

Am I hungry is a prediabetes and diabetes management program that puts the participant in charge of their decisions instead of diets focused on restrictive dieting. This program addresses emotional eating, mindless eating and other habits. In addition, Am I Hungry teaches awareness diabetes and ways to manage the condition. This 6-week course is offered online and is self-paced. This program is employee paid

As of writing the Diabetes Action Plan and Report, the National Diabetes Prevention Program is not provided to state employees as either a paid benefit or a wellness benefit.

ADOA reported 16,456 members of a total 136,214 that had visited a primary care provider and had an ICD-10 code designated for diabetes, prediabetes or a comorbid condition in addition to diabetes. Within this population, 79% of ADOA members were diagnosed with type 2 diabetes, 13% with type 1 diabetes and 7% were diagnosed with gestational diabetes.

Among ADOA members that were reported as having an IDC-10 code associated with diabetes, 5.54% had an A1c greater than 9%, 13.28% had an A1c between 6.5-8.9% and 16.81% were considered prediabetic. 58.02% of these members were listed as “unknown” regarding their A1c level.

ADOA’s healthcare administrator reimbursed a total $46,938,766 for its 16,456 diabetic members. In addition to this, of ADOA’s diabetic members – 9,501 reported having at least one comorbid condition, reimbursing a total of $11,873,267.

To read ADOA’s complete data, usage and financial report, please visit Appendix 6.

Public Safety Personnel Retirement System

Due to limited personnel resources, time constraints and data limitations; Public Safety Personnel Retirement System was unable to provide input and resources to the development of this document.

American Diabetes Association; Arizona

The American Diabetes Association's Arizona & New Mexico office is committed to educating communities on strategies and initiatives on how to Stop Diabetes and supporting those living with the disease. The American Diabetes Association can provide resources for you and your family about all types of diabetes as well as information for caregivers and others affected indirectly by the disease. Several initiatives are planned each year, benefiting residents of Arizona.

Diabetes Day at the Arizona Capitol is organized in coordination with statewide diabetes stakeholders and advocates. This yearly event is held on the lawn of the Arizona State Capitol and features vendors armed with diabetes related information and opportunities for attendees to get screened for diabetes. This one day event allows diabetes advocates and constituents to meet with Arizona legislative district Senators and Representatives from across Arizona.

Diabetes is Primary is a program for healthcare professionals and their teams interested in clinical management of diabetes and its complications. This innovative educational initiative was developed specifically for the primary care community. The initiative provides information and tools needed to improve patient outcomes through patient and clinical engagement. The primary focus of the initiative is type 2 diabetes prevention and prediabetes, management of high blood sugars, emotional support for those with diabetes, obesity management in those with diabetes and cardiovascular management and treatment options.

Held the fourth Tuesday of March each year, American Diabetes Association Alert Day is a day to sound the alarm about the prevalence of type 2 diabetes by asking everyone to take the Type 2 Diabetes Risk Test (29). The free, anonymous risk test only takes a minute to complete. By answering questions such as “Do you have a family history of diabetes?” and “Are you physically active?” you can learn if you’re at risk for type 2 diabetes in 60 seconds.
Held the first Wednesday of May each year, National Get Fit Don't Sit Day™ is an opportunity for the American Diabetes Association (ADA) to increase awareness of the dangers of excessive sitting and the importance of getting up and moving throughout the day—especially at work (30).

Every year, Congress at Home allows diabetes advocates and constituents to meet with Arizona legislative district Senators and Representatives from across Arizona. This opportunity encourages and primarily advocates for increase in funding for Diabetes Research and Programs through National Institutes of Health, the Centers for Disease Prevention and Control, Special Diabetes Program, and other entities that support research, prevention and treatment for those at risk for and those currently with diabetes.

November is National Diabetes Month. During this month, partners, organizations and health professionals across the nation team up to bring attention to diabetes and its impact on Americans. National Diabetes Month themes change yearly and includes free marketing materials, toolkits and other resources.

The American Diabetes Association's Camp AZDA has been offering a camping experience for youth for over 40 years. ADA's Camp AZDA residential camp program is designed for youth with Type 1, Type 2 and MODY. Camp AZDA helps children with diabetes develop confidence, social skills while also fostering independence. Kids that attend Camp AZDA learn awareness of healthy eating, exercise and emotional wellbeing. They also learn key aspects related to diabetes such as glucose control.

The American Diabetes Association has programs, initiatives and events that are ongoing within communities across Arizona to include ADA's Living with Type 2 Program, Paper Risk Test distribution, Walmart Wellness Days, Safe at School Advocacy Workshops, Type 1 diabetes Summits, Youth Ambassador Program, and ProDiabetes healthcare professional memberships. The ADA also promotes the utilization of Diabetes Education Program attendance and referrals for those with diabetes. A list of current ADA recognized Diabetes Self-Management programs can be found at https://professional.diabetes.org/erp_list_zip.

Arizona Diabetes Leadership Council and Coalition

The Arizona Diabetes Leadership Council and Coalition (ADC) includes representatives from over 300 organizations, agencies and individuals that work to promote diabetes prevention and control. The mission of the ADC is to reduce the burden of diabetes on individuals, families, communities, the health care system, and the state. This shall be done by increasing awareness of diabetes, and 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. The Arizona Diabetes Control Program and Arizona Advisory Council were established in 1994, having added "Prevention" to its title as a result of the Diabetes Prevention Program Study in 2002. In 2005, The Arizona Advisory Council became the Arizona Diabetes Coalition and is represented by the Arizona Diabetes Leadership Council (ADLC), the 21 member council serves as advisors to the Arizona Diabetes Control and Prevention Program at ADHS. The ADLC works collaboratively with the ADC and the Arizona Diabetes Control and Prevention Program at ADHS in designing, implementing and evaluating community-driven strategies to eliminate health disparities in diabetes. The Leadership Council and Coalition is tasked with the highlighted items below:

- Community mobilization by creating and maintaining active partnerships at the state and local levels that jointly pursue issues related to diabetes in communities across Arizona
- Public awareness and education that improve awareness of diabetes prevention, diabetes management strategies and training opportunities for healthcare professionals and the general public
- Diabetes Self-Management Education and Support (DSMES) provides a variety of educational programs and classes within the communities of Arizona. The primary goal of DSMES is to educate and support people with or at risk for developing diabetes. DSMES provide participants with the foundation to help better navigate decisions and activities that have been shown to improve health outcomes including self-care behaviors, problem solving and developing relationships that encourages active collaboration with health care providers
- Expanding Diabetes Prevention programming and training opportunities across Arizona

Arizona Diabetes Leadership Council and Coalition - Represented Organizations as of October 31, 2018*

American Diabetes Association

Abrazo Health Systems

Aetna

Arizona Department of Health Services

Arizona Department of Administration

Arizona Integrated Medical Solutions

Arizona Living Well Institute

Arizona Public Health Association

Arizona State University: Southwest Interdisciplinary Research Center

Banner Health System

Blue Cross Blue Shield Arizona

BD Medical

Bristol-Myers Squibb

Campesinos Sin Fronteras

Canyonlands Healthcare

Veterans Administration Healthcare: Carl T. Hayden

Carondelet Health Network

Celerion

Chandler Regional Medical Center

Flagstaff Medical Center

Navajo Special Diabetes Program

Cigna Medical Group

Community Partners Inc.

Concentra Primary Care

Concilio Latino de Salud, Inc.

Desert Senita Community Health Center

DiabeVita; Primary Care for Diabetes

El Rio Community Health Center

Gila River Indian Community

Glendale Elementary School District

Hanger Prosthetics and Orthotics

Health Choice Arizona

Health Net Access

Health Services Advisory Group

Hualapai Tribe

Humana

Indian Health Services: Phoenix

The Mayo Clinic

Medtronic Inc.

Navajo Area Indian Health Services

NIH, NIDDK; Phoenix Office

North Country Healthcare

MercyCare Health Plan

Maricopa Integrated Health System

Mountain Park Health Center

National Association of Hispanic Nurses

National Kidney Foundation of Arizona

Native Americans for Community Action, Inc.

Native Health Community Health Center

Novo Nordisk, Inc.

Page Family Practice

Pascua Yaqui Tribe

Phoenix Indian Medical Center

Pima County Department of Public Health

Regional Center for Border Health

Rio Rico Fire District

Salt River Pima-Maricopa Indian Community

Sanofi

Scottsdale Healthcare

SinfoniaRX

Sonora Quest Laboratory

St. Joseph Hospital and Medical Center

St. Vincent de Paul Family Wellness Center

Ft. McDowell Yavapai Nation

Tohono O'odham Nation

Tuba City Regional Healthcare Corporation

Tucson Medical Center

University of Arizona; College of Pharmacy

Yuma County Public Health Services District

Northern Arizona Veterans Administration

University of Arizona; Mel and Enid Zuckerman College of Public Health

United Healthcare

University of Arizona; Cooperative Extension

Vitalyst Health Foundation

Sun Health Center for Health and Wellbeing

White River Indian Health Service

Winslow Indian Health Center

Yavapai County Community Health

Yavapai Regional Medical Center

*Full Coalition membership; Non-Voting representation

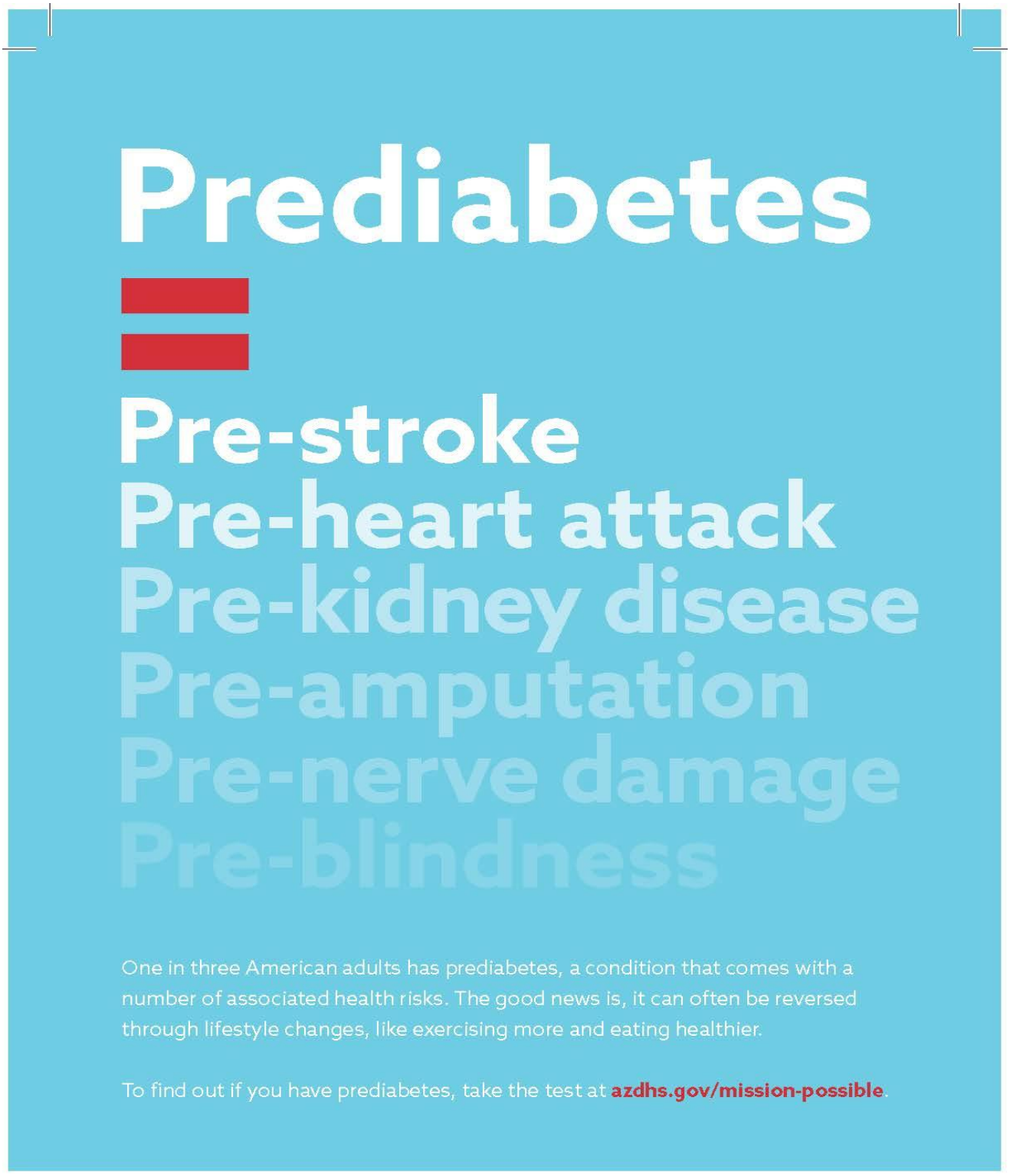
Public Service Announcements (PSAs):

Arizona Department of Health Services, in coordination with the Arizona Diabetes Coalition disseminate DoIHavePrediabetes.org PSAs to include risk tests and shareable campaign videos, brochures and pamphlets. The campaign, developed by the American Medical Association, the CDC and The Ad Council consists of helpful provider resources and lighthearted and informational PSAs. The campaign encourages the general population to assess their prediabetes risks by taking a short, one-minute risk assessment. The PSAs also are designed to encourage the general public to speak with their healthcare provider about their risks and prevention mechanisms.

Prediabetes Awareness Campaign in Arizona

The Agents Of Change media campaign is specifically designed with the medical provider in mind. Educational outreach to providers ensure they are recognizing risk factors in developing diabetes and proactively testing for prediabetes using the CDC Prediabetes Screening test or performing and A1c screening.

ADHS has engaged in a multi-year marketing campaign, focusing on increasing awareness of prediabetes and establishing a network of primary care providers that refer their eligible patients to a Nationally Recognized Diabetes Prevention Program located within Arizona.


Prediabetes
=
Pre-stroke
Pre-heart attack
Pre-kidney disease
Pre-amputation
Pre-nerve damage
Pre-blindness
One in three American adults has prediabetes, a condition that comes with a number of associated health risks. The good news is, it can often be reversed through lifestyle changes, like exercising more and eating healthier.
To find out if you have prediabetes, take the test at azdhs.gov/mission-possible.
ARIZONA DEPARTMENT OF HEALTH SERVICES
Agents of CHANGE
FOR DIABETES PREVENTION
MISSION POSSIBLE

84 MILLION AMERICANS HAVE PREDIABETES. DO YOU?

1. How old are you?
   - Less than 40 years (0 points)
   - 40—49 years (1 point)
   - 50—59 years (2 points)
   - 60 years or older (3 points)
2. Are you a man or a woman?
   - Man (1 point)
   - Woman (0 points)
3. If you are a woman, have you ever been diagnosed with gestational diabetes?
   - Yes (1 point)
   - No (0 points)
4. Do you have a mother, father, sister, or brother with diabetes?
   - Yes (1 point)
   - No (0 points)
5. Have you ever been diagnosed with high blood pressure?
   - Yes (1 point)
   - No (0 points)
6. Are you physically active?
   - Yes (0 points)
   - No (1 point)
7. What is your weight status? (see chart at right)

Write your score in the box.

Add up your score.

Height	Weight (lbs.)		
4' 10"	119-142	143-190	191+
4' 11"	124-147	148-197	198+
5' 0"	128-152	153-203	204+
5' 1"	132-157	158-210	211+
5' 2"	136-163	164-217	218+
5' 3"	141-168	169-224	225+
5' 4"	145-173	174-231	232+
5' 5"	150-179	180-239	240+
5' 6"	155-185	186-246	247+
5' 7"	159-190	191-254	255+
5' 8"	164-196	197-261	262+
5' 9"	169-202	203-269	270+
5' 10"	174-208	209-277	278+
5' 11"	179-214	215-285	286+
6' 0"	184-220	221-293	294+
6' 1"	189-226	227-301	302+
6' 2"	194-232	233-310	311+
6' 3"	200-239	240-318	319+
6' 4"	205-245	246-327	328+
	(1 Point)	(2 Points)	(3 Points)
	You weigh less than the amount in the left column (0 points)		

Adapted from Bang et al., Ann Intern Med 151:775-783, 2009.
Original algorithm was validated without gestational diabetes as part of the model.

If you scored 5 or higher:

You're likely to have prediabetes and are at high risk for type 2 diabetes. However, only your doctor can tell for sure if you do have type 2 diabetes or prediabetes (a condition that precedes type 2 diabetes in which blood glucose levels are higher than normal). Talk to your doctor to see if additional testing is needed.

Type 2 diabetes is more common in African Americans, Hispanic/Latinos, American Indians, Asian Americans and Pacific Islanders.

Higher body weights increase diabetes risk for everyone. Asian Americans are at increased diabetes risk at lower body weights than the rest of the general public (about 15 pounds lower).

For more information, visit us at

DoIHavePrediabetes.org

RISK TEST — American Diabetes Association. — COURTESY OF

LOWER YOUR RISK

Here's the good news: it is possible with small steps to reverse prediabetes - and these measures can help you live a longer and healthier life.

If you are at high risk, the best thing to do is contact your doctor to see if additional testing is needed.

Visit **DoIHavePrediabetes.org** for more information on how to make small lifestyle changes to help lower your risk.

Ad Council · American Diabetes Association. · AMA American Medical Association · CDC

Appendix 6 - Data Measures and Sources Included in Diabetes Action Plan and Report (Charts and Data Tables)

The financial data reported in this section is limited to what was accessible within the allocated budget, time limitations and agency expertise.

2018 Arizona Diabetes Burden Report

https://www.azdhs.gov/documents/prevention/tobacco-chronic-disease/diabetes/reports-data/diabetes-burden-report-2018.pdf

Arizona State Retirement System | UnitedHealth Group Diabetes Data request

2018 Sanofi Type 2 Diabetes Report

ASRS

Results from Requested Data Gathering on Diabetes Population

Medicare Advantage Plan
Senior Supplement Plan
Non-Medicare Plan

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Executive Summary

UnitedHealthcare EMPLOYER & INDIVIDUAL

Arizona HB2258 was introduced into legislature in January 2017 to establish a Diabetes Action Plan Team. It was passed by both House and Senate and later signed into law by Governor Ducey on March 28, 2018. Under this Bill, a Diabetes Action Plan Team or Task Force was created to gather and report bi-annually on the health and well being of Arizona residents diagnosed with diabetes. Specifically, the Task Force is to report on diabetes prevalence, it's costs and an action plan for reducing prevalence, diabetes related health disparities, and improving and managing care for Arizona residents with a diabetes diagnosis.

ASRS is a participant of this Task Force and has requested its medical plan provider, United Healthcare (UHC), to gather the requested information for its members on behalf of the plan. As part of this effort, ASRS via The Diabetes Task Force, has requested various data elements on ASRS membership with a diagnosed diabetes condition. In conversations with The Diabetes Task Force Chair and ASRS, this report contains UHC's results of the requested data gathered and is presented in a format to comply with HIPAA for the protection of Personal Health Information (PHI) and Personal Identification Information (PII).

This report presents the data elements gathered for the ASRS Medicare and Non-Medicare retired members participating in the UHC Medicare Advantage Plan, the Supplemental Benefit Plan and the Pre-Medicare Plans. These plans are fully insured through UHC. The results are based upon 2017 calendar year incurred data, paid through June 2018, claims paid on behalf of the plan, and on information relayed to UHC by Providers. (physicians, hospitals, etc.). In some cases, like foot exams, for example, the prevalence presented in this document may not accurately reflect fi they have been performed since our results are predicated if the physician included this specific code in a member's chart which was relayed to UHC. In addition, since Medicare pays first in the Supplemental Plan, UHC may not be the recipient of the necessary requested data elements

For these retired members diagnosed with diabetes, 27% of Medicare Advantage, 22% of the Supplemental Plan, and 18% of the Non-Medicare members were identified with diabetes. The counties with the largest concentration of diabetic members for all Plans were Yuma and Pinal counties, with an addition of Graham for the Senior Supplemental Plan and Greenlee for the Medicare Advantage and Non-Medicare members. Note the majority of members in all Plans diagnosed with diabetes reside in Metro Arizona (Pima or Maricopa counties): 88% for Medicare Advantage, 59% for Supplemental Plan and 80% for Non-Medicare Plan.

A portion of the ASRS Medicare Advantage membership participates in a n HMO or capitated physician arrangement. As a result, detailed claims data may not provided to UHC if it is not specifically required for coding in the Centers for Medicare and Medicaid Services (CMS) file feeds for Risk Adjustment or for adjudication of claims. We have relied on information gathered. This document highlights area where metrics may not be credible given data limitations.

In a separate study, the 2018 Health Rankings Study on Seniors published by United Health Foundation found that Arizona ranked 37th amongst all states for overall diabetes management of its seniors residing in the state. The study also noted that Arizona ranked 31st as the healthiest state for Seniors, a decline of 8 points from 2017. Additional information on Diabetes and other areas that affect health of seniors can be found via https://www.americashealthrankings.org/

UHC wishes to thank ASRS for its continued partnership.

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Medicare Advantage Results

Diabetes Data Request Results – Medicare Advantage Plan

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The data available to UCH for Medicare Advantage (MA) and Supplemental Plans varies due to the nature of these plans. Since Medicare pays primary under the Supplemental Plan, there are a number of claims paid for members for which UHC does not have access. UHC may not have all data elements or complete information available to identify diabetics for the Supplemental Plan given we only have data on claims paid under this Plan. As a result, we have segregated our results for these two Plans. This section presents the ASRS MA Plan elements gathered for The Diabetes Task Force Data Request. Since UHC pays all claims for members participating in the ASRS MA Plan, the results are more credible and again some metrics are based on data relayed in coding/charting from providers.

Demographic Results

Of the 25,343 unique ASRS MA members in 2017, 6,831 or 27% were identified with a diabetes diagnosis which is lower than our MA PPO Book of Business of 28.5%. Of the diabetic identified MA members, 55% are female with wide variation amongst race, particularly the Asian and Native American populations. Of the MA female membership, 24% have been identified with diabetes, a smaller percentage compared to males at 31%. Statistics on this group by gender, age brackets and race are shown below:

2017 MA Membership with Diabetes Diagnosis				
Age Category	**Males**	**Females**	**Total**	**% of Total**
Less than 65	113	168	281	4%
65-69.9	700	842	1,542	23%
70-759	994	1,192	2,186	32%
76+	1,273	1,549	2,822	41%
Total	**3,080**	**3,751**	**6,831**	**100%**

2017 MA Diabetes identified Membership by Race					
Race	**Male**	**Female**	**Total**	**% Female**	**% of Total MA Members within Race Category**
Asian	16	31	47	66%	37%
Black	92	164	256	64%	40%
Hispanic	82	100	182	55%	44%
Native American	13	33	46	72%	47%
White	2,752	3,324	6,076	55%	26%
Other	90	73	163	45%	41%
Unknown	35	26	61	43%	21%
Total	**3,080**	**3,751**	**6,831**	**55%**	**27.0%**

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Diabetes Data Request Results – Medicare Advantage Plan

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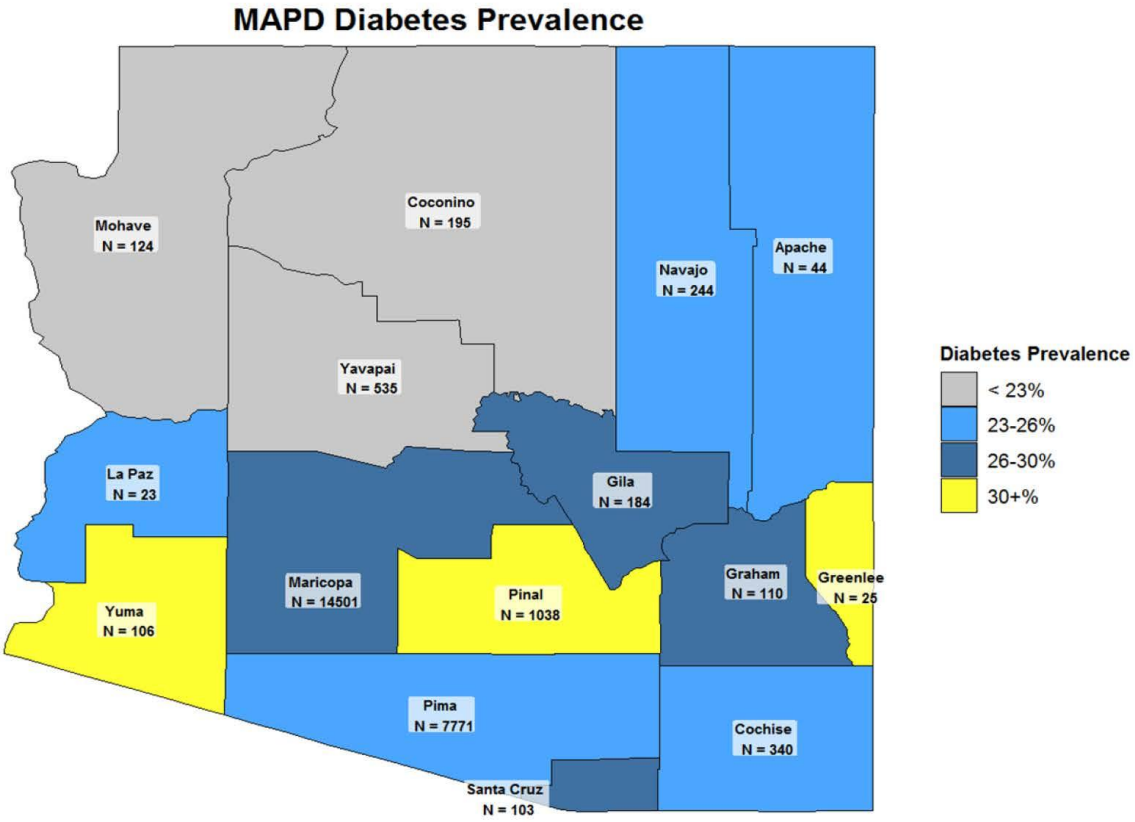
Demographic Results (cont.)

The race category of White represents 89% of the diabetic MA membership. In comparing the percentages of MA members with diabetes within a race category, Native Americans rank the highest at 47%. Note that this group represents one of the smallest overall race categories within the ASRS membership, and any conclusions should be pondered given limited credibility. Female Native American diabetics represent a higher proportion of the overall diabetic membership at 72% compared to the 55% overall percentage of female diabetics and female Native Americans in this population is also greater than the average at 66%.

The next largest percentage of diabetes ranking within a race category is Hispanic at 44% with over 400 members. The lowest percentage of diabetic population by race is the unknown race category at 21% with also the lowest percentage of females who are diabetics.

The diabetic prevalence of MA membership mapped by zip code is shown below:



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Diabetes Data Request Results – Medicare Advantage Plan

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Demographic Results (cont.)

The chart below categorizes the MA diabetic membership by type. As expected, the majority of the diabetic MA population is diagnosed with Type II diabetes.

Medicare Advantage Members with Diabetes Due to:		
Condition	**% of members**	**% of Diabetics**
Gestational	0%	0%
Underlying Conditions	<1%	<1%
Drug Induced	<1%	<1%
Type I	<1%	1%
Type II	26%	98%
Other types	<1%	<1%
Total	27%	100%

Since Type II diabetes represent 98% of the population, the remainder of the MA results are not segregated by Diabetes type. In addition, we have attempted to isolate the MA members who have been diagnosed with pre-Diabetes and Metabolic Syndrome. The results were not reliable for Metabolic Syndrome. We were able to obtain limited results for pre-Diabetes in the Fee for Service MA members and is presented in that section later in this report.

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Diabetes Data Request Results – Medicare Advantage Plan

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Clinical Results for MA Members Identified as Diabetic

There were a number of clinical metrics requested by The Diabetes Task Force. This section presents the results of the requested elements for the Medicare Advantage Plan. Some of the MA membership participate in HMO or capitated arrangements within in the State. For the entire MA membership, we gathered specific conditions and diagnosis codes which we also into CMS per guidelines for determination of Risk Adjustment Factors (RAF) scores. UHC may not receive some of the requested elements for the HMO members if they are not tied to RAF or claims adjudications. As a result, we have split results into data for which we have gathered for the entire MA population as compared to those gathered only for the Fee for Service (or the Non-HMO) membership.

Given size of some of the cohorts below, we have reduced the age and or gender bracketing to protect privacy of members.

Clinical Results for Entire MA Diabetic Membership (6,831 Members)

Stroke: 95 or 1% of MA Diabetic Membership, 59% Female

Major Adverse Cardiovascular Events (MACE): 316 or 5% of MA Diabetic Membership

MA Diabetic Members with MACE					
Age Group	Male	Female	Total	% Female	% of Total MA Diabetic Members
Less than age 70*	31	30	61	49%	3%
70-75.9	51	37	88	42%	4%
76+	75	92	167	55%	6%
Total	**157**	**159**	**316**	**50%**	**5%**

*Age buckets condensed due to small population size

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Diabetes Data Request Results – Medicare Advantage Plan

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Clinical Results for MA Members Identified as Diabetic (cont.)

Ischemic Heart Disease: 169 or 3% of MA Diabetic Membership

MA Diabetic Members Diagnosed Ischemic Heart Disease				
Age Group	**Male**	**Female**	**Total**	**% Female**
Less than age 70*	18	13	31	42%
70-75.9	26	18	44	41%
76+	50	44	94	47%
Total	**94**	**75**	**169**	**44%**

Kidney Disease : 2,877 or 42% of MA Diabetic Membership

MA Diabetic Members Diagnosed with Kidney Disease					
Age Group	**Male**	**Female**	**Total**	**% Female**	**% of Total MA Diabetic Members**
Less than age 65	43	52	95	55%	34%
65- 69.9	209	233	442	53%	29%
70-75.9	403	426	829	51%	38%
76+	702	809	1,511	54%	54%
Total	**1,357**	**1,520**	**2,877**	**53%**	**42%**

End Stage Renal Disease (ESRD): 121 or 2% of MA Diabetic Membership

MA Diabetic Members with ESRD				
Age Group	**Male**	**Female**	**Total**	**% Female**
Less than age 70*	18	13	31	42%
70-75.9	19	19	38	50%
76+	24	28	52	54%
Total	**61**	**60**	**121**	**50%**

*Age buckets condensed due to small population size

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Diabetes Data Request Results – Medicare Advantage Plan

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Clinical Results for MA Members Identified as Diabetic (cont.)

Diabetic Retinopathy 319 or 5% of MA Diabetic Membership

MA Diabetic Members Diagnosed with Retinopathy				
Age Group	**Male**	**Female**	**Total**	**% Female**
Less than age 65	6	10	16	63%
65- 69.9	37	40	77	52%
70-75.9	54	50	104	48%
76+	55	67	122	55%
Total	**152**	**167**	**319**	**52%**

Blindness: 0 or 0% of MA Diabetic Membership

Amputation : 84 or 1% of MA Diabetic Membership, 42% Female

Ketoacidosis: 20 or less than 1% of MA Diabetic Membership, 60% Female

Hypoglycemia: 196 or 3% of MA Diabetic Membership, 59% Female

MA Diabetic Members Diagnosed with Hypoglycemia				
Age Group	**Male**	**Female**	**Total**	**% Female**
Less than age 70*	15	32	47	68%
70-75.9	23	30	53	57%
76+	42	54	96	56%
Total	**80**	**116**	**196**	**59%**

Hyperglycemic Crisis: 43 or less than 1% of MA Diabetic Membership, 56% Female

Congestive Heart Failure (CHF): 1,014 or 15% of MA Diabetic Membership

MA Diabetic Members Diagnosed wit h CHF Listed					
Age Group	**Male**	**Female**	**Total**	**% Female**	**% of Total MA Diabetic Members**
Less than age 65	17	17	34	50%	12%
65- 69.9	66	64	130	49%	8%
70-75.9	139	133	272	49%	12%
76+	285	293	578	51%	20%
Total	**507**	**507**	**1,014**	**50%**	**15%**

*Age buckets condensed due to small population size

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Diabetes Data Request Results – Medicare Advantage Plan

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Clinical Results for MA Members Identified as Diabetic (cont.)

Hypertension : 5,863 or 86% of MA Diabetic Membership

MA Diabetic Members with Hypertension					
Age Group	Male	Female	Total	% Female	% of Total MA Diabetic Members
Less than age 65	100	143	243	59%	86%
65- 69.9	601	664	1,265	52%	82%
70-75.9	861	1,043	1,904	55%	87%
76+	1,095	1,356	2,451	55%	87%
Total	**2,657**	**3,206**	**5,863**	**55%**	**86%**

Coronary Artery Disease (CAD) : 2,112 or 31% of MA Diabetic Membership

MA Diabetic Members Diagnosed with CAD					
Age Group	Male	Female	Total	% Female	% of Total MA Diabetic Members
Less than age 65	35	38	73	52%	26%
65- 69.9	211	118	329	36%	21%
70-75.9	395	225	620	36%	28%
76+	644	446	1,090	41%	39%
Total	**1,285**	**827**	**2,112**	**39%**	**31%**

Peripheral Vascular Disease : 895 or 13% of MA Diabetic Membership

MA Diabetic Members Diagnosed with Peripheral Vascular Disease					
Age Group	Male	Female	Total	% Female	% of Total MA Diabetic Members
Less than age 65	13	14	27	52%	10%
65- 69.9	58	56	114	49%	7%
70-75.9	127	145	272	53%	12%
76+	245	250	495	51%	18%
Total	**443**	**465**	**908**	**51%**	**13%**

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Diabetes Data Request Results – Medicare Advantage Plan

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Clinical Results for MA Members Identified as Diabetic (cont.

Co-morbidities (any condition listed in this section): 3,828 or 56% of MA Diabetic Membership

MA Diabetic Members with Co-morbidities Listed					
Age Group	Male	Female	Total	% Female	% of Total MA Diabetic Members
Less than age 65	62	71	133	53%	47%
65- 69.9	326	296	622	48%	40%
70-75.9	593	574	1,167	49%	53%
76+	911	995	1,906	52%	68%
Total	**1,892**	**1,936**	**3,828**	**51%**	**56%**

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Diabetes Data Request Results – Medicare Advantage Plan FFS Members

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Clinical Results for MA Fee For Service Members Identified as Diabetic

This section provide results for the MA membership who have been diagnosed with diabetes and are under a Fee for Service (FFS) Arrangement. UHC has additional data available for this population as compared to the HMO or capitated arrangement. There are a total of 8,072 unique FFS members, of which 1,985 or 25% are identified as diabetic, slightly less than the overall total of MA membership. As a result, 28% of the HMO or capitated MA membership is diagnosed with diabetes.

Given the size of some of the cohorts below, we have reduced the age and or gender bracketing to protect PHI and PII. In addition, some of the gathered data may be limited and may not have been provided for all members.

Clinical Results for Entire MA FFS Diabetic Membership (1,985) members

A1C Levels 5.7-6.4 (prediabetes): Data not available

A1C Levels 6.5% - 8.9% : 18 MA FFS Diabetic Members

A1C Levels 9 % or Greater: 504 or 25% of MA FFS Diabetic Members

MA FFS Diabetic Members with A1C Great than 9%

Age Group	Male	Female	Total	% Female
Less than age 65	22	16	38	42%
65- 69.9	67	68	135	50%
70-75.9	72	82	154	53%
76+	86	91	177	51%
Total	**247**	**257**	**504**	**51%**

Pre-Diabetes: 323 or 4% of MA FFS Diabetic Members

Note: This result may not be credible based on the available information.

MA FFS Members with Indicators of Pre-Diabetes

Age Group	Male	Female	Total	% Female
Less than age 70*	39	69	108	64%
70-75.9	36	61	97	63%
76+	44	74	118	63%
Total	**119**	**204**	**323**	**63%**

Evidence of DSME Education: 26 or 1% of MA FFS Diabetic Membership

Note: This result may not be credible based on the available information.

*Age buckets condensed due to small population size

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Diabetes Data Request Results – Medicare Advantage Plan FFS Members

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Clinical Results for MA FFS Members Identified as Diabetic (cont.)

Of the 1,985 MA FFS Members:

- Evidence of DSME Education: 26 or 1% of MA FFS Diabetic Membership

Note: This result may not be credible based on the available information.

- Members Received Eye Exam: 167 or 8% MA FFS Diabetic Members
- Prediabetes Education: Data not available
- Members who have had at least two physician visits in 2017: 1,858 or 94%; Of this group, 1,441 or 73% have had 5 or more physician visits in 2017
- Members who have had at least two A1C screenings in 2017: 209 or 11%; Of this group, 4 or <1% have had 5 or more A1C screenings in 2017
- Foot exam: Data is limited and not credible
- Urine Protein Measurement: 688 or 35%
- Blood Pressure Measurement : Data not available
- Lipid Level Measurement: 367 or 18%
- Evidence of DSME: 26- Limited data available and not credible
- Renal Function Exam: 703 or 35%

Note: The above metrics are based on data provided to UHC by providers. While some of these metrics may have been performed by provider, they may not have coded it in the member's health record and provided to UHC.

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Senior Supplemental Results

Diabetes Data Request Results – Senior Supplemental Plan (SUPP)

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Demographic Results

Of the 11,542 unique ASRS Senior Supplemental Plan (SUPP) members whose primary residence was in Arizona in 2017, 2,611 or 23% were identified with a diabetes diagnosis. Given the lower incidence of diabetes as compared to the MA membership, and given that Medicare is the primary payer and UHC is not privy to Medicare's data, we believe the credibility of this result in unknown. Similar to MA results, females are a higher proportion of the diabetic membership at 53%, slightly below the MA membership at 55%. The highest prevalence of diabetes within a race category are the Asian and Hispanics at 34% and 37%, respectively. In addition 70% of Blacks diagnosed with diabetes are females. Statistics on this group by gender, age brackets and race are shown below:

2017 SUPP Membership with Diabetes Diagnosis				
Age Category	**Males**	**Females**	**Total**	**% of Total**
Less than 65	52	69	121	4.6%
65-69.9	317	317	634	24.3%
70-75.9	366	376	742	28.4%
76+	487	627	1,114	42.7%
Total	**1,222**	**1,389**	**2,611**	**100.0%**

2017 SUPP Diabetes identified Membership by Race					
Race	**Male**	**Female**	**Total**	**% Female**	**% of Total SUPP Members within Race Category**
Asian	19	16	35	46%	34%
Black	7	16	23	70%	28%
Hispanic	154	147	301	49%	37%
Native American	8	9	17	53%	23%
White	641	798	1,439	55%	21%
Other	23	28	51	55%	21%
Unknown	370	375	745	50%	21%
Total	**1,222**	**1,389**	**2,611**	**53%**	**23%**

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Diabetes Data Request Results – Senior Supplemental Plan (SUPP)

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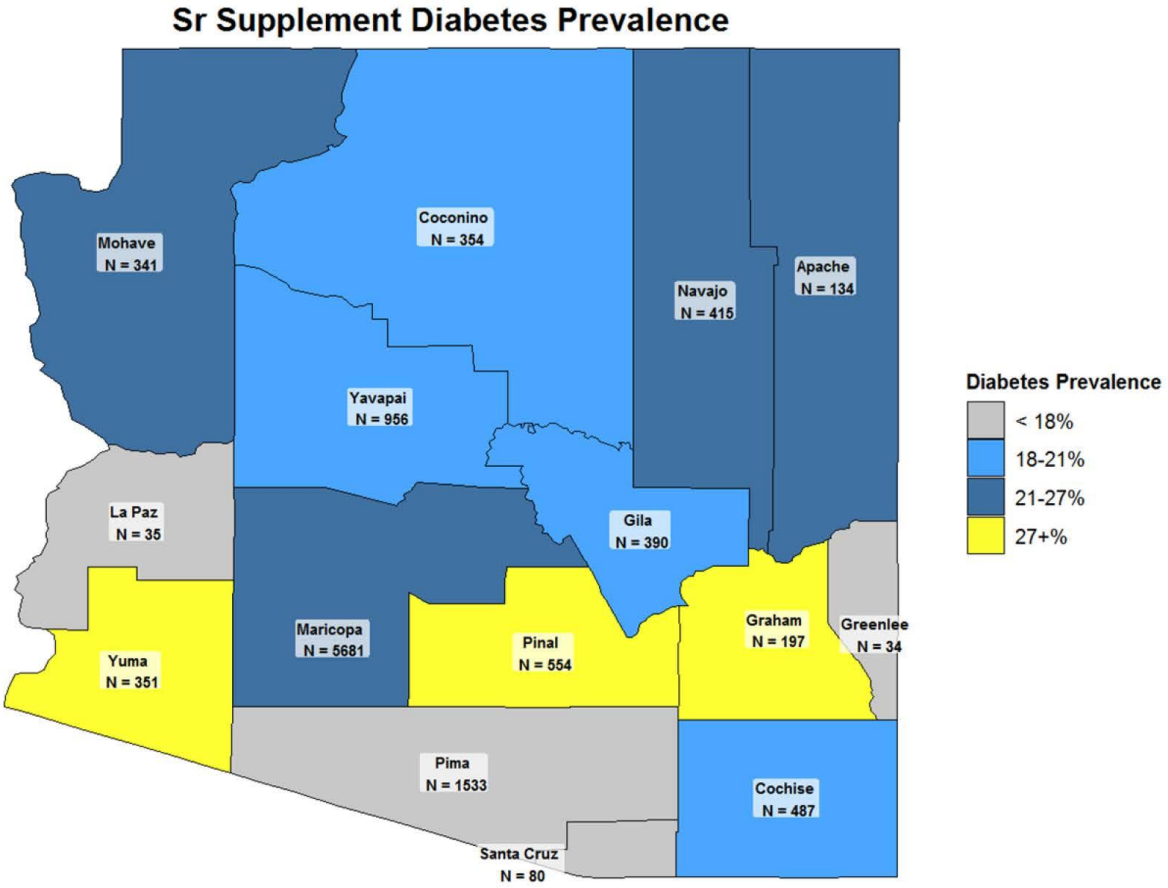
Demographic Results (cont.)



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Diabetes Data Request Results – Senior Supplemental Plan (SUPP)

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Demographic Results (cont.)

The chart below categorizes the SUPP diabetic membership by type. As expected, the majority of the diabetic SUPP population is diagnosed with Type II diabetes.

SUPP Members with Diabetes Due to:		
Condition	**%of members**	**% of Diabetics**
Gestational	0%	0%
Underlying Conditions	<1%	<1%
Drug Induced	<1%	1%
Type I	<1%	2%
Type II	22%	96%
Other types	<1	1%
Total	**23%**	**100%**

In addition, we have attempted to isolate the SUPP members who have been diagnosed with pre-Diabetes and Metabolic Syndrome. Similar to MA results, our data was not credible for determination of Metabolic Syndrome for the SUPP membership.

Pre-Diabetes, 251 or 2% of SUPP Members with pre-diabetes

Note: This result may not be credible based on the available information.

SUPP Members with Indicators of Pre-Diabetes				
Age Group	**Male**	**Female**	**Total**	**% Female**
Less than age 70*	41	72	113	64%
70-75.9	37	67	104	64%
76+	31	62	93	67%
Total	**109**	**201**	**310**	**65%**

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*Age buckets condensed due to small population size

Diabetes Data Request Results – Senior Supplemental Plan (SUPP)

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Clinical Results for SUPP Members Identified as Diabetic

The results of the clinical metrics requested for the SUPP members diagnosed with diabetes are contained in this section. Given the nature of the SUPP plan, it is unclear if the data provided contains total results since Medicare is primary. Hence the results below have limited reliability. Our data results are based upon claims processed within the SUPP Plan. In addition, given the limited size of some of the cohorts below, we have reduced the age and or gender bracketing to protect privacy of members.

Clinical Results for SUPP Diabetic Membership (count = 2,611)

Stroke: 53 or 2% of SUPP Diabetic Membership, 47% Female

Major Adverse Cardiovascular Events (MACE): 132 or 5% of SUPP Diabetic Membership

SUPP Members with MACE				
Age Group	Male	Female	Total	% Female
Less than age 70*	11	7	18	39%
70-75.9	19	12	31	39%
76+	38	45	83	54%
Total	68	64	132	48%

Ischemic Heart Disease: 85 or 3% of SUPP Diabetic Membership, 32% Female

Kidney Disease : 844 or 32% of SUPP Diabetic Membership

SUPP Diabetic Members with Kidney Disease					
Age Group	Male	Female	Total	% Female	% of Total SUPP Diabetic Members
Less than age 65	23	20	43	47%	36%
65- 69.9	64	72	136	53%	21%
70-75.9	107	103	210	49%	28%
76+	204	251	455	55%	41%
Total	398	446	844	53%	32%

*Age buckets condensed due to small population size

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Diabetes Data Request Results – Senior Supplemental Plan (SUPP)

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Clinical Results for SUPP Members Identified as Diabetic (cont.)

End Stage Renal Disease (ESRD): 82 or 3% of SUPP Diabetic Membership

SUPP Diabetic Members with ESRD					
Age Group	Male	Female	Total	% Female	% of Total SUPP Diabetic Members
Less than age 65	10	5	15	33%	12%
65- 69.9	12	8	20	40%	3%
70-75.9	9	6	15	40%	2%
76+	20	12	32	38%	3%
Total	**51**	**31**	**82**	**38%**	**3%**

Diabetic Retinopathy: 272 or 10% of SUPP Diabetic Membership

SUPP Diabetic Members with Diabetic Retinopathy					
Age Group	Male	Female	Total	% Female	% of Total SUPP Diabetic Members
Less than age 65	13	10	23	43%	19%
65- 69.9	32	34	66	52%	10%
70-75.9	31	54	85	64%	11%
76+	43	55	98	56%	9%
Total	**119**	**153**	**272**	**56%**	**10%**

Blindness: 35 or 1% of SUPP Diabetic Membership, 40% Female
Amputation: 39 or 1% of SUPP Diabetic Membership, 36% Female
Ketoacidosis: 20 or 1% of SUPP Diabetic Membership, 55% Female
Hypoglycemia: 72 or 3% of SUPP Diabetic Membership, 57% Female
Hyperglycemic Crisis: 38 or 1% of SUPP Diabetic Membership, 61% Female

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Diabetes Data Request Results – Senior Supplemental Plan (SUPP)

UnitedHealthcare EMPLOYER & INDIVIDUAL

Clinical Results for SUPP Members Identified as Diabetic (cont.)

Congestive Heart Failure (CHF): 382 or 15% of SUPP Diabetic Membership

SUPP Diabetic Members with CHF					
Age Group	Male	Female	Total	% Female	% of Total SUPP Diabetic Members
Less than age 65	13	13	26	50%	21%
65- 69.9	30	20	50	40%	8%
70-75.9	45	35	80	44%	11%
76+	101	125	226	55%	20%
Total	**189**	**193**	**382**	**51%**	**15%**

Hypertension : 2,195 or 84% of SUPP Diabetic Membership

SUPP Diabetic Members with Hypertension					
Age Group	Male	Female	Total	% Female	% of Total SUPP Diabetic Members
Less than age 65	48	46	94	49%	78%
65- 69.9	262	252	514	49%	81%
70-75.9	318	298	616	48%	83%
76+	414	557	971	57%	87%
Total	**1,042**	**1,153**	**2,195**	**53%**	**84%**

Coronary Artery Disease (CAD) : 804 or 31% of SUPP Diabetic Membership

SUPP Diabetic Members with CAD					
Age Group	Male	Female	Total	% Female	% of Total SUPP Diabetic Members
Less than age 65	22	15	37	41%	31%
65- 69.9	96	32	128	25%	20%
70-75.9	144	75	219	34%	30%
76+	228	192	420	46%	38%
Total	**490**	**314**	**804**	**39%**	**31%**

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Diabetes Data Request Results – Senior Supplemental Plan (SUPP)

UnitedHealthcare EMPLOYER & INDIVIDUAL

Clinical Results for SUPP Members Identified as Diabetic (cont.)

Peripheral Vascular Disease : 282 or 11% of SUPP Diabetic Membership

SUPP Diabetic Members with Peripheral Vascular Disease					
Age Group	Male	Female	Total	% Female	% of Total SUPP Diabetic Members
Less than age 70*	31	22	53	42%	8%
70-75.9	35	21	56	38%	8%
76+	76	97	173	56%	16%
Total	**142**	**140**	**282**	**50%**	**11%**

Co-morbidities (any condition listed in this section): 1,367 or 52% of SUPP Diabetic Membership

SUPP Diabetic Members with Co-morbidities Listed					
Age Group	Male	Female	Total	% Female	% of Total SUPP Diabetic Members
Less than age 65	35	30	65	46%	54%
65- 69.9	134	99	233	42%	37%
70-75.9	203	157	360	44%	49%
76+	333	376	709	53%	64%
Total	**705**	**662**	**1,367**	**48%**	**52%**

*Age buckets condensed due to small population size

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Diabetes Data Request Results – Senior Supplemental Plan (SUPP)

UnitedHealthcare EMPLOYER & INDIVIDUAL

A1C Levels 5.7-6.4 (prediabetes): Data not reliable

A1C Levels 6.5% - 8.9%: 98 or 4% SUPP Diabetic Members

A1C Levels 9 % or Greater: 723 or 28% of SUPP Diabetic Members

SUPP Diabetic Members with A1C Great than 9%					
Age Group	Male	Female	Total	% Female	% of Total SUPP Diabetic Members
Less than age 65	20	25	45	56%	37%
65- 69.9	89	92	181	51%	29%
70-75.9	109	106	215	49%	29%
76+	114	168	282	60%	25%
Total	332	391	723	54%	28%

Of the 2,611 SUPP Diabetic Members:

- Evidence of DSME Education: 51 or 2%

Note: The low percentage in this metric may also be that the data hasn't been provided to UHC.

- Members Received Eye Exam: 1,323 or 51
- Prediabetes Education: Data not available
- Members who have had at least two physician visits in 2017: 2,471 or 95%; Of this group, 2,065 or 79% had at least 5 or more physician visits in 2017
- At least two A1C Screenings in 2017: 204 or 8%

Note: Above result may be limited given Medicare pays primary

- Foot exam: Data is limited and not credible
- Urine Protein Measurement: 884 or 34%
- Blood Pressure Measurement : Data not available
- Lipid Level Measurement: 379 or 15%
- Attendance of DSME: 51 or 2%- Limited data available
- Renal Function Exam: 987 or 38%

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Non-Medicare Plan Results

Diabetes Data Request Results – Non-Medicare Plan

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As part of the data request provided by ASRS to UHC from the Diabetes Task Force, this section provides the results of data elements gathered for the Non-Medicare Plan. We have more complete and detailed data with Non-Medicare population. As a result, this report provides results separately.

Demographic Results

Of the 10,167 unique ASRS members in 2017, 1,804 or 18% were identified with a diabetes diagnosis. The percentage of females with of which 36% are female. Statistics on this group by gender, age brackets and race are shown below:

2017 Non-Medicare Membership with Diabetes Diagnosis					
Age Category	**Males**	**Females**	**Total**	**% of Total**	**% Female**
Less than 50	7	24	31	2%	77%
50 – 59	183	285	468	26%	61%
60 – 64	542	753	1,295	72%	58%
65+	9	1	10	<1%	10%
Total	**741**	**1,063**	**1,804**		

2017 Non-Medicare Diabetes identified Membership by Race		
Race	**Diabetic Members**	**% of Total MA Members**
Western European	972	96%
Unknown / Uncoded	301	18%
Hispanic	285	10%
Eastern European	78	5%
Mediterranean	44	3%
Scandinavian	44	3%
African American	28	1%
Total	**1,807**	

Note: More than one ethnicity may be tied to a member

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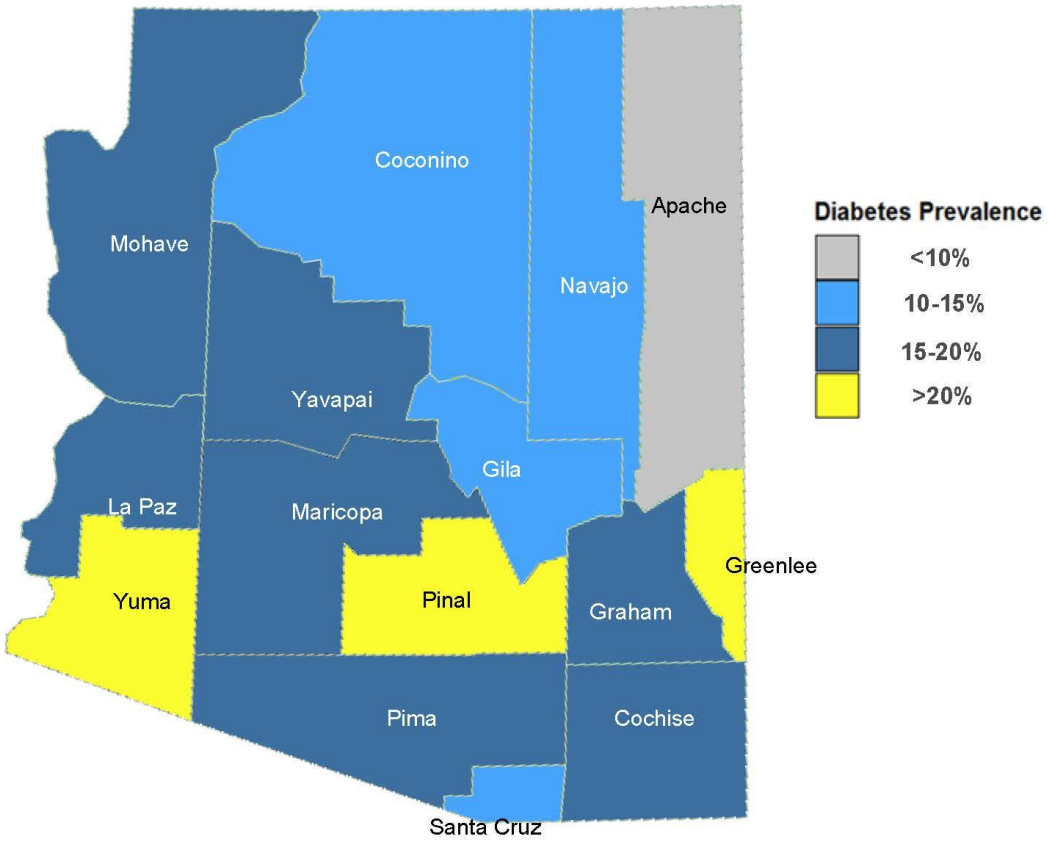
Diabetes Data Request Results – Non-Medicare Plan

UnitedHealthcare EMPLOYER & INDIVIDUAL

Demographic Results

The diabetic membership is mapped by county are shown below:



Metro Counties (Maricopa, Pima, Pinal): 1,474 diabetic members / 8,323 total members

Rural Counties (All other counties): 288 diabetic members / 1,647 total members

Notes specific to the data include the Demographic results including the Map by County reflect information based on Diabetes as a 'Common Condition". This is due to system limitations that cannot drill down to the more specific ICD 10 codes that provide a more detailed categorization of diabetic diagnosis. The remaining slides do provide specific information using the ICD 10 codes that were provided as part of the data request. Also of note, the details of membership by county could not be displayed given the limited membership in many counties that if noted would be in violation of PHI

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Diabetes Data Request Results – Non-Medicare Plan

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Identification of the various categories of diabetics was gathered using ICD 10 codes provided with the categories presented in the data request.

Non-Medicare Members with Diabetes Due to:		
Condition	% of members	% of Diabetics
Pregnancy/Child Birth	0%	0%
Underlying Conditions	<1%	1%
Drug Induced	0%	0%
Type I	1%	7%
Type II	14%	89%
Other types	<1%	3%
Total	16%	100%

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Diabetes Data Request Results – Non-Medicare Plans

UnitedHealthcare EMPLOYER & INDIVIDUAL

Clinical Results for Members Identified as Diabetic

Of the membership who have been diagnosed with diabetes, there were a number of clinical metrics requested. There results are contained in this section

Complications Diabetes	Female	Male	Total	% of Total Diabetics (from slide 3)
----5.7-6.4 (prediabetes)	13	5	18	1%
CAD	50	66	116	7%
Chronic Kidney Disease	57	64	121	8%
diabetic retinopathy	18	16	34	2%
ESRD	11	10	21	1%
hyperglycemic crisis	11	7	18	1%
hypertension	281	278	559	35%
hypoglycemia	8	6	14	1%
Ischemic Heart disease	3	6	9	1%
ketoacidosis	8	4	12	1%
kidney disease	63	67	130	8%
lower-extremity/amputation	1	3	4	< 1%
MACE	6	5	11	1%
Metabolic Syndrome	4	2	6	< 1%
peripheral vascular disease	6	13	19	1%
Pre-Diabetes (no ICD-10 codes)	13	5	18	1%
Stroke	4	1	5	< 1%
Total:	557	558	1115	

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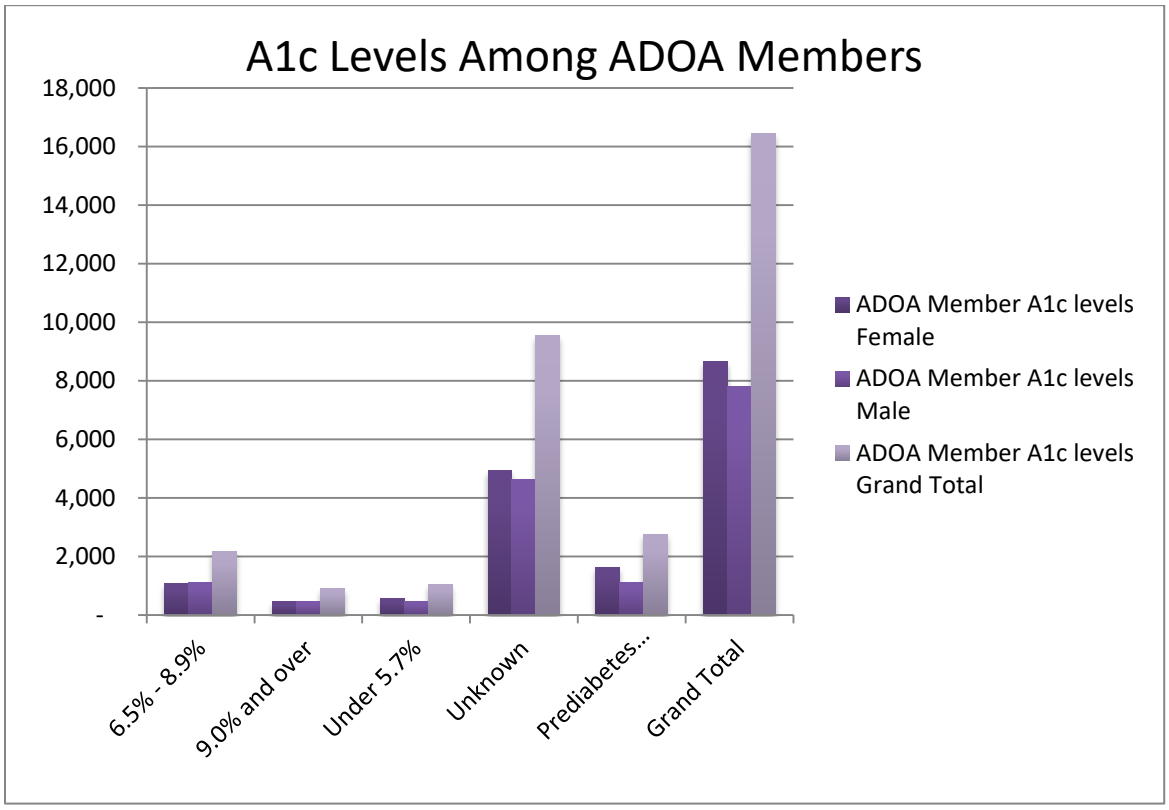
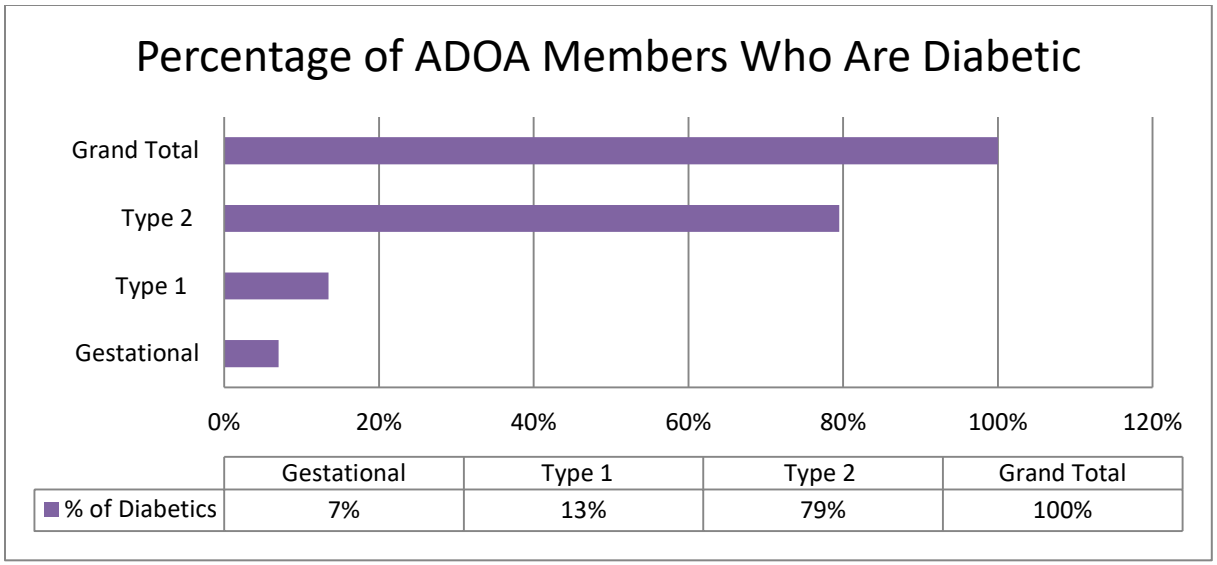
Diabetes Related Reimbursement for ADOA

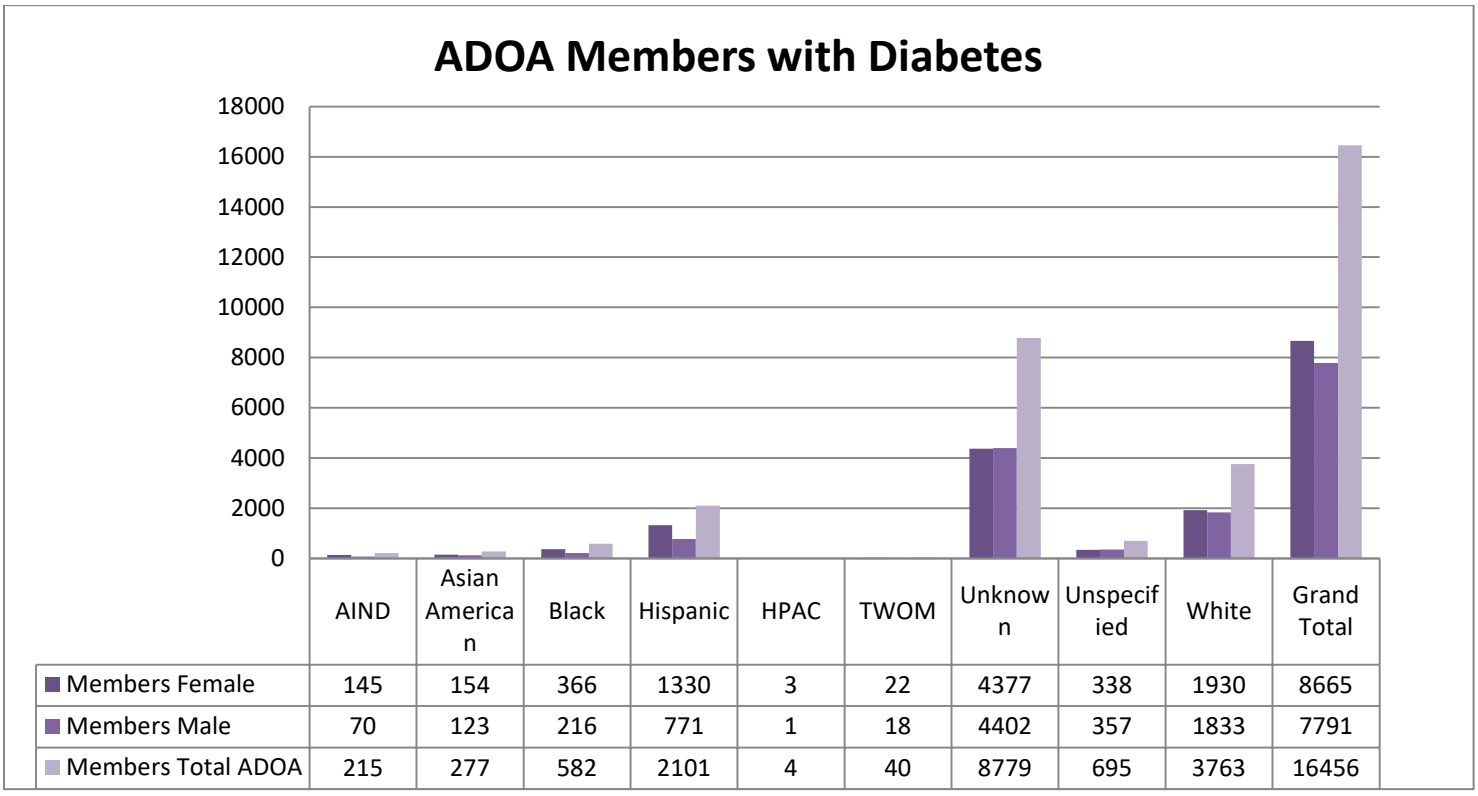
ADOA reported 16,456 members of a total 136,214 that had visited a primary care provider and had an ICD-10 code designated for diabetes, prediabetes or a comorbid condition in addition to diabetes. Within this population, 79% of ADOA members were diagnosed with type 2 diabetes, 13% with type 1 diabetes and 7% were diagnosed with gestational diabetes.

Among ADOA members that were reported as having an IDC-10 code associated with diabetes, 5.54% had an A1c greater than 9%, 13.28% had an A1c between 6.5-8.9% and 16.81% were considered prediabetic. 58.02% of these members were listed as "unknown" regarding their A1c level.

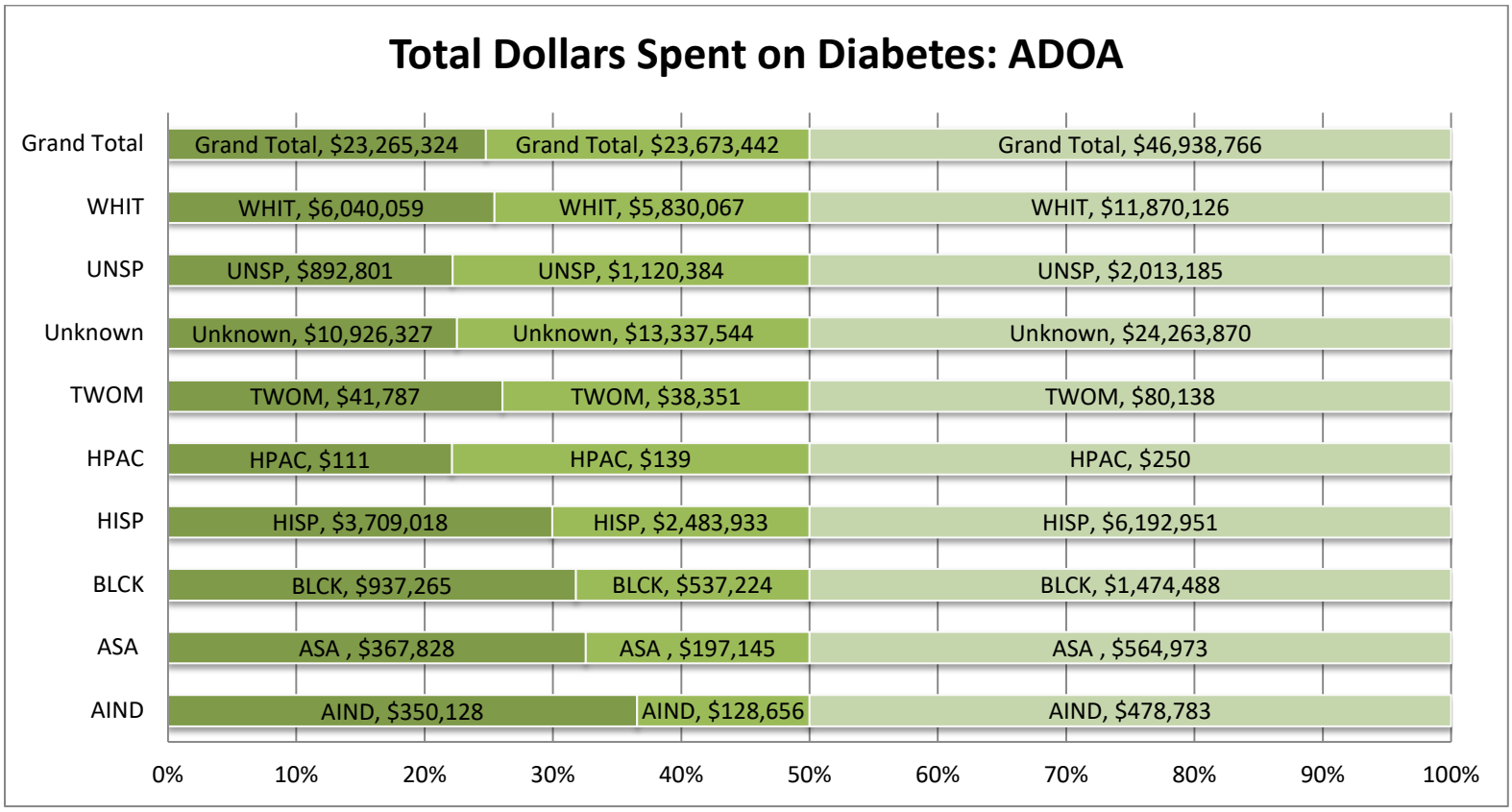




	Gestational	Type 1	Type 2	Grand Total
% of Diabetics	7%	13%	79%	100%



	AIND	Asian American	Black	Hispanic	HPAC	TWOM	Unknown	Unspecified	White	Grand Total
Members Female	145	154	366	1330	3	22	4377	338	1930	8665
Members Male	70	123	216	771	1	18	4402	357	1833	7791
Members Total ADOA	215	277	582	2101	4	40	8779	695	3763	16456



ADOA reported 9,501 members between birth and 99 years of age as having at least one co-morbid condition in addition to diabetes. Co-morbid conditions identified for the use of this report were adverse cardiovascular events, ischemic heart disease, congestive heart failure, hypertension, coronary artery disease, peripheral vascular disease, kidney disease, end stage renal failure, diabetic retinopathy and hyperglycemia. The majority of members with these conditions were between the ages 35-84. A complete list of ages and gender is below and costs associated with them:

Sum of All listed Co-Morbid Conditions			
Age Group	Female	Male	Grand Total
00 -0 4	2	3	5
05 - 09	5	7	12
10 -14	11	9	20
15 - 19	25	30	55
20 - 24	44	40	84
25 - 29	63	54	117

30 - 34	89	72	161
35 - 39	162	145	307
40 - 44	253	262	515
45 - 49	407	475	882
50 - 54	583	581	1,164
55 - 59	803	791	1,594
60 - 64	935	900	1,835
65 - 69	558	734	1,292
70 - 74	296	425	721
75 - 79	182	243	425
80 - 84	84	117	201
85 - 89	42	41	83
90 - 94	18	7	25
95 - 99	2	1	3
Grand Total	**4,564**	**4,937**	**9,501**

Cost of All listed Co-morbid Conditions			
Age Group	Female	Male	Grand Total
00 -0 4	$1,692	$4,107	$5,799
05 - 09	$2,841	$126,158	$128,999
10 -14	$75,530	$23,309	$98,838
15 - 19	$48,400	$129,773	$178,173
20 - 24	$61,197	$62,473	$123,670
25 - 29	$75,962	$116,972	$192,934
30 - 34	$151,233	$184,453	$335,686
35 - 39	$148,143	$139,043	$287,186
40 - 44	$285,640	$301,528	$587,168
45 - 49	$395,100	$417,144	$812,243
50 - 54	$865,867	$912,190	$1,778,057
55 - 59	$823,997	$1,328,817	$2,152,814
60 - 64	$1,366,449	$1,539,184	$2,905,633
65 - 69	$672,883	$634,550	$1,307,433
70 - 74	$187,343	$378,776	$566,119
75 - 79	$70,156	$122,529	$192,684
80 - 84	$23,861	$114,436	$138,297
85 - 89	$61,717	$16,289	$78,006
90 - 94	$3,067	$238	$3,305
95 - 99	$108	$114	$222
Grand Total	**$5,321,185**	**$6,552,082**	**$11,873,267**

List of all Co Morbid Conditions and their Costs		
All ages and Genders	Coronary Artery Disease	$869,014
	Adverse Cardiovascular Events	$35,248

	Ischemic Heart Disease	$95,133
	Sum of Kidney Disease	$2,043,927
	End Stage Renal Failure	$998,552
	Diabetic Retinopathy	$21,970
	Hyperglycemia	$3,704,971
	Heart failure	$193,223
	Hypertension	$3,476,267
	Peripheral Vascular Disease	$434,963
Total		**$11,873,268**

Total Dollars Paid by ADOA Plan

Age Groups	Female	Male	Grand Total
00 -0 4	$2,830	$4,159	$6,988
05 - 09	$34,568	$196,268	$230,836
10 -14	$171,739	$102,835	$274,574
15 - 19	$230,534	$372,969	$603,502
20 - 24	$541,340	$313,873	$855,213
25 - 29	$689,551	$341,883	$1,031,435
30 - 34	$973,617	$527,965	$1,501,583
35 - 39	$946,763	$535,415	$1,482,179
40 - 44	$1,729,168	$1,267,937	$2,997,105
45 - 49	$2,122,584	$2,062,120	$4,184,704
50 - 54	$3,071,424	$3,120,057	$6,191,482
55 - 59	$3,512,414	$3,984,842	$7,497,257
60 - 64	$4,695,643	$4,367,275	$9,062,918
65 - 69	$2,580,979	$3,392,507	$5,973,486
70 - 74	$1,042,567	$1,763,278	$2,805,845
75 - 79	$476,910	$833,260	$1,310,170
80 - 84	$290,407	$385,472	$675,878
85 - 89	$120,263	$89,045	$209,308
90 - 94	$27,360	$12,236	$39,596
95 - 99	$4,662	$46	$4,708
Grand Total	**$23,265,324**	**$23,673,442**	**$46,938,766**

Total Paid by ADOA Plan by Race/Ethnicity

Race/Ethnicity	Female	Male	Grand Total
AIND	$350,128	$128,656	$478,783
ASA	$367,828	$197,145	$564,973
BLCK	$937,265	$537,224	$1,474,488
HISP	$3,709,018	$2,483,933	$6,192,951
HPAC	$111	$139	$250
TWOM	$41,787	$38,351	$80,138
Unknown	$10,926,327	$13,337,544	$24,263,870
UNSP	$892,801	$1,120,384	$2,013,185
WHIT	$6,040,059	$5,830,067	$11,870,126
Grand Total	**$23,265,324**	**$23,673,442**	**$46,938,766**

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Diabetes Related Reimbursement for AHCCCS

In October 2017, AHCCCS implemented a new program called the American Indian Medical Home (AIMH) for the American Indian population enrolled in Fee-For-Service (FFS). The AIMH provides qualified Indian Health Service (IHS) or Tribally operated 638 facilities tiered per member per month payments for offering their enrolled members care coordination, including accredited diabetes education, and for participation in the HIE. At this time over 9,000 American Indian members are participating in AIMH care coordination.

In Calendar Year 2017, AHCCCS reimbursed approximately $229.6 million for primary diagnosis diabetes related services for 147,591 distinct members.

In addition, AHCCCS reimbursed $284,930,726 related to co-occurring conditions, $128,760,457 for pharmacy, and $12,803,207 for diabetic supplies. Total reimbursement for diabetes primary diagnosis and co-occurring conditions, pharmacy and supplies totaled $656,091,704.

Arizona Health Care Cost Containment System

Summary for AHCCCS Members with Diabetes or Prediabetes and Summary for Supplemental Data on the Cohort [1]

Dates of Service Between 1/1/2017 and 12/31/2017

As of 11/30/18

Diabetic Category	Distinct Member Count	Paid Amount
Abnormal Glucose	23,430	4,599,890
Diabetes Due to an Underlying Condition	1,200	1,236,078
Diabetes Related to Pregnancy and Childbirth	4,848	12,124,650
Drug or Chemical Induced Diabetes	134	130,350
Other Types of Diabetes	4,622	7,203,170
Prediabetes	9,242	1,536,615
Type 1 (Juvenile) Diabetes	9,420	20,663,480
Type 2 Diabetes	114,852	182,103,080
Overall - Summary	**147,591**	**$229,597,315**

Summary for Supplemental Data	Distinct Member Count	Paid Amount
Co-Occurring Conditions [2]	101,876	$284,930,726
Pharmacy [3]	62,140	$128,760,457
Diabetic Supplies [4]	27,183	$12,791,546
Supplemental Diabetic Supplies Submitted on a UB [5]	3,516	$11,661
		$426,494,389

Notes:
[1] These AHCCCS Members have a Primary Diagnosis in the Diabetes Diagnosis List (aka "Cohort) See reference page for list of Diagnosis.

Arizona Health Care Cost Containment System

Co-Occurring Diagnosis Code List

DIAGNOSIS_CODE	DESCRIPTION
E780	PURE HYPERCHOLESTEROLEMIA
E781	PURE HYPERGLYCERIDEMIA
E782	MIXED HYPERLIPIDEMIA
E785	HYPERLIPIDEMIA, UNSPECIFIED
E8881	METABOLIC SYNDROME
I10	ESSENTIAL (PRIMARY) HYPERTENSION
I110	HYPERTENSIVE HEART DISEASE WITH HEART FAILURE
I119	HYPERTENSIVE HEART DISEASE WITHOUT HEART FAILURE
I20	ANGINA PECTORIS
I2109	STEMI INVOLVING OTH CORONARY ARTERY OF ANTERIOR WALL
I213	ST ELEVATION (STEMI) MYOCARDIAL INFARCTION OF UNSP SITE
I2510	ATHSCL HEART DISEASE OF NATIVE CORONARY ARTERY W/O ANG PCTRS
I252	OLD MYOCARDIAL INFARCTION
I2584	CORONARY ATHEROSCLEROSIS DUE TO CALCIFIED CORONARY LESION
I4891	UNSPECIFIED ATRIAL FIBRILLATION
I509	HEART FAILURE, UNSPECIFIED
I639	CEREBRAL INFARCTION, UNSPECIFIED
I6523	OCCLUSION AND STENOSIS OF BILATERAL CAROTID ARTERIES
I6529	OCCLUSION AND STENOSIS OF UNSPECIFIED CAROTID ARTERY
I672	CEREBRAL ATHEROSCLEROSIS
I679	CEREBROVASCULAR DISEASE, UNSPECIFIED
I739	PERIPHERAL VASCULAR DISEASE, UNSPECIFIED
Z13220	ENCOUNTER FOR SCREENING FOR LIPOID DISORDERS
Z79899	OTHER LONG TERM (CURRENT) DRUG THERAPY
Z8249	FAMILY HX OF ISCHEM HEART DIS AND OTH DIS OF THE CIRC SYS

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TYPE 2 DIABETES REPORT™ | 2018

In conjunction with the Arizona Diabetes Coalition

12th Edition

Featuring Demographic, Charge, Utilization, and Pharmacotherapy Data

INTRODUCTION

The Arizona Diabetes Coalition and Sanofi are pleased to present the **Arizona Type 2 Diabetes Report** for 2018, an overview of demographic, utilization, charge, and pharmacotherapy measures for Type 2 diabetes patients in key local markets across the state of Arizona. The report also provides state and national benchmarks that can help providers and employers better identify opportunities to serve the needs of their patients. All data are drawn from the Sanofi **Managed Care Digest Series®**.

This 12th edition features a number of examples of the kinds of disease-specific data on Type 2 diabetes that can be provided by these organizations and the **Managed Care Digest Series**. The sponsoring organizations chose Type 2 diabetes (high blood glucose levels caused by either a lack of insulin or the body's inability to use insulin efficiently) as the focus of this resource, as the prevalence of this disease has grown considerably in recent years.

The data in this report (current as of calendar year 2017) were gathered by IQVIA, Durham, NC, a leading provider of innovative health care data products and analytic services. A review process takes place, before and during production of this report, between IQVIA and Forte Information Resources LLC.

Sanofi, as sponsor of this report, maintains an arm's-length relationship with the organizations that prepare the report and carry out the research for its contents. The desire of Sanofi is that the information in this report be completely independent and objective.

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CONTACTS

Addey Rascon
Diabetes Prevention & Control Program Manager
Arizona Department of Health Services
P. 602-542-2758
E. Addey.Rascon@azdhs.gov

Tina Killean
GRADE Study Coordinator
Southwest American Indian Center
P. 602-200-5337
E. Tina.Killean@nih.gov

Melanie Curlett
Account Executive
Sanofi
P. 972-904-9515
E. Melanie.Curlett@Sanofi.com

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www.managedcaredigest.com

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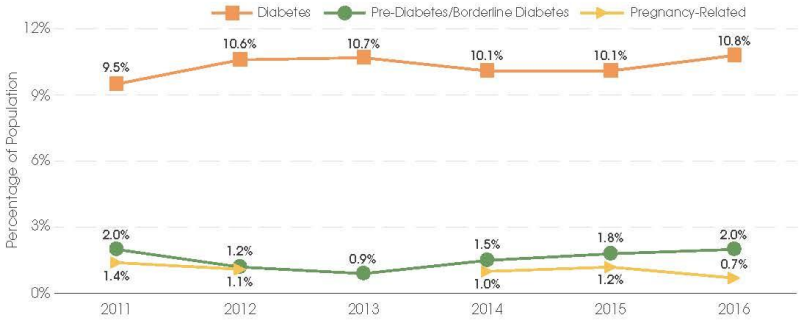
PATIENT DEMOGRAPHICS

PERCENTAGE OF ARIZONA POPULATION REPORTING DIABETES, 2011–2016



Data source: Centers for Disease Control and Prevention (CDC), 2017

COMPLICATION RATES RISE FOR TYPE 2 DIABETES PATIENTS ACROSS ARIZONA

Statewide, the percentages of Type 2 diabetes patients with complications of ASCVD, cardiovascular disease, neuropathy, peripheral artery disease (PAD), or stroke increased from 2016 to 2017. In 2017, Arizona Type 2 diabetes patients were more apt to have depression than similar patients across the nation.

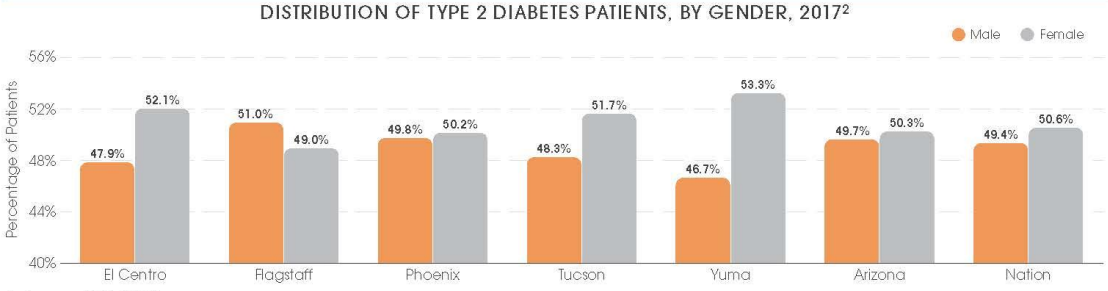
PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY DIAGNOSING SPECIALIST, 2016–2017

	Location of Patients' Type 2 Diabetes Diagnosis							
	Cardiology		Endocrinology		Internal Medicine		Primary Care[1]	
MARKET	2016	2017	2016	2017	2016	2017	2016	2017
El Centro	5.9%	5.9%	2.5%	2.3%	20.5%	19.1%	30.3%	31.3%
Flagstaff	3.5	3.7	1.5	1.5	16.2	15.2	42.1	39.9
Phoenix	4.5	4.4	2.8	2.7	19.9	19.6	31.4	30.5
Tucson	7.2	7.0	3.3	3.1	18.6	17.7	27.0	26.7
Yuma	2.8	2.8	1.4	1.3	30.0	28.3	23.1	25.3
Arizona	4.8	4.7	2.7	2.5	20.3	19.9	31.1	30.3
NATION	**4.3%**	**4.2%**	**3.8%**	**3.7%**	**23.1%**	**22.5%**	**28.1%**	**28.0%**

DISTRIBUTION OF TYPE 2 DIABETES PATIENTS, BY AGE, 2016–2017[2]

	0–17		18–35		36–64		65–79		80+	
MARKET	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017
El Centro	0.0%	0.0%	1.3%	1.5%	30.8%	33.6%	42.5%	42.8%	25.4%	22.0%
Flagstaff	0.0	0.0	3.6	3.6	46.6	48.6	37.7	38.0	12.0	9.7
Phoenix	0.4	0.4	2.6	2.7	37.7	39.1	42.6	42.9	16.7	14.9
Tucson	0.4	0.4	2.7	3.0	39.6	41.1	42.2	41.6	15.1	13.9
Yuma	0.0	0.2	2.4	2.7	40.7	42.1	40.2	40.0	16.6	15.1
Arizona	0.4	0.4	2.5	2.7	37.9	39.4	42.6	42.7	16.6	14.9
NATION	**0.4%**	**0.4%**	**2.4%**	**2.6%**	**39.4%**	**41.3%**	**41.3%**	**40.9%**	**16.5%**	**14.9%**

DISTRIBUTION OF TYPE 2 DIABETES PATIENTS, BY GENDER, 2017[2]



Data source: IQVIA © 2018

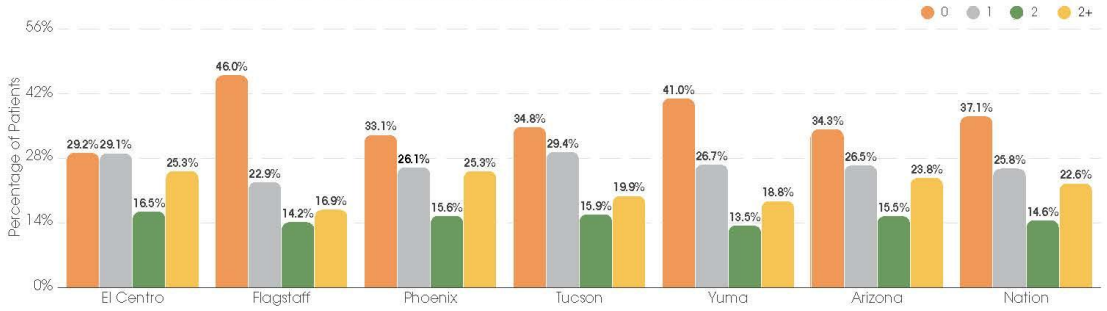
[1] "Primary care" consists of both general and family practitioners.
[2] On all pages, the percentages are representative of the universe of Type 2 diabetes patients for whom claims data have been collected in a given year.
NOTE: Throughout this report, the Phoenix market includes Mesa and Scottsdale. In calendar year 2017, the numbers of Type 2 diabetes patients tracked were as follows: El Centro (6,304) Flagstaff (2,974), Phoenix (197,938), Tucson (32,025), Yuma (8,191), Arizona (264,032), and nation (11,727,591).

PATIENT DEMOGRAPHICS

DISTRIBUTION OF TYPE 2 DIABETES PATIENTS, BY PAYER, 2016–2017

	Commercial Insurance[1]		Medicaid		Medicare	
MARKET	2016	2017	2016	2017	2016	2017
El Centro	26.5%	28.9%	17.0%	19.2%	56.6%	52.0%
Flagstaff	40.8	38.1	23.8	25.8	34.4	34.8
Phoenix	44.4	43.8	21.6	21.5	32.4	32.9
Tucson	33.5	31.9	28.9	29.3	36.4	37.4
Yuma	25.2	28.1	41.4	39.8	32.6	31.4
Arizona	41.6	41.1	23.3	23.4	33.6	33.9
NATION	**49.1%**	**48.0%**	**14.2%**	**15.4%**	**35.7%**	**35.5%**

PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY NUMBER OF COMPLICATIONS, 2017[2]



PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY ACTUAL COMPLICATION, 2016–2017[2]

	ASCVD		CV Disease		Nephropathy		Neuropathy		PAD		Retinopathy		Severe Hypoglycemia		Stroke	
MARKET	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017
El Centro	35.3%	34.2%	38.7%	37.7%	39.2%	41.3%	19.7%	20.8%	10.8%	10.3%	39.6%	36.0%	1.3%	1.1%	3.7%	3.3%
Flagstaff	38.4	39.3	39.0	38.6	26.5	27.2	30.1	29.0	14.8	13.2	11.0	13.9	3.4	4.4	4.3	3.2
Phoenix	36.6	37.9	36.9	37.7	37.4	37.3	38.3	39.1	14.2	15.5	17.7	17.3	3.1	3.1	4.1	4.4
Tucson	28.2	27.9	31.0	31.3	35.8	35.5	38.2	39.8	9.1	9.1	22.9	22.0	3.2	3.5	3.5	3.6
Yuma	35.8	34.8	34.2	34.0	26.5	23.7	41.8	43.7	15.1	14.1	12.6	13.5	1.9	1.8	4.8	5.1
Arizona	35.7	36.5	36.1	36.7	36.1	35.9	38.4	39.3	13.5	14.4	17.6	17.3	3.1	3.1	4.0	4.2
NATION	**39.0%**	**38.4%**	**37.8%**	**37.2%**	**32.6%**	**33.3%**	**35.3%**	**35.7%**	**15.6%**	**15.6%**	**17.3%**	**17.5%**	**3.5%**	**3.6%**	**4.0%**	**4.1%**

PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY ACTUAL COMORBIDITY, 2017[3]

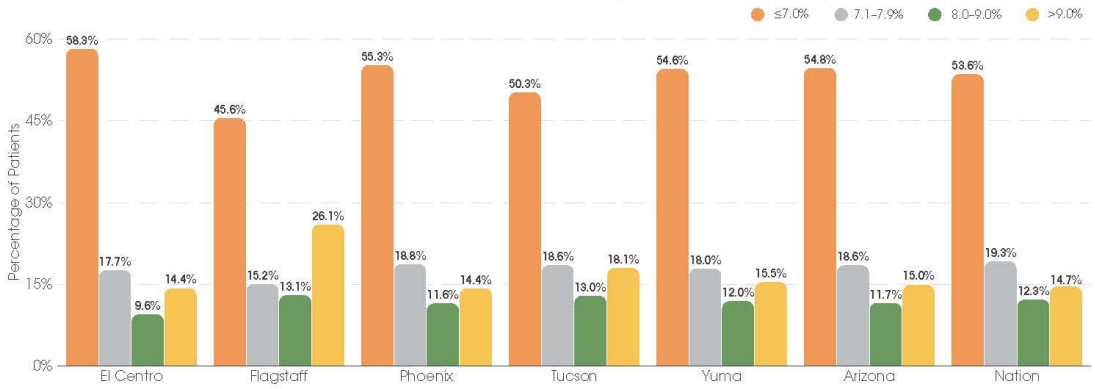
MARKET	Depression	Hyperlipidemia	Hypertension	Obesity	Pneumonia
El Centro	7.7%	74.5%	88.8%	16.3%	3.8%
Flagstaff	8.6	57.2	78.3	20.1	6.5
Phoenix	10.1	65.1	81.0	24.2	7.5
Tucson	12.4	57.2	78.2	24.3	6.7
Yuma	7.7	63.6	77.3	41.2	5.8
Arizona	10.3	63.8	80.5	24.7	7.2
NATION	**10.1%**	**63.9%**	**81.8%**	**23.9%**	**6.3%**

Data source: IQVIA ©2018

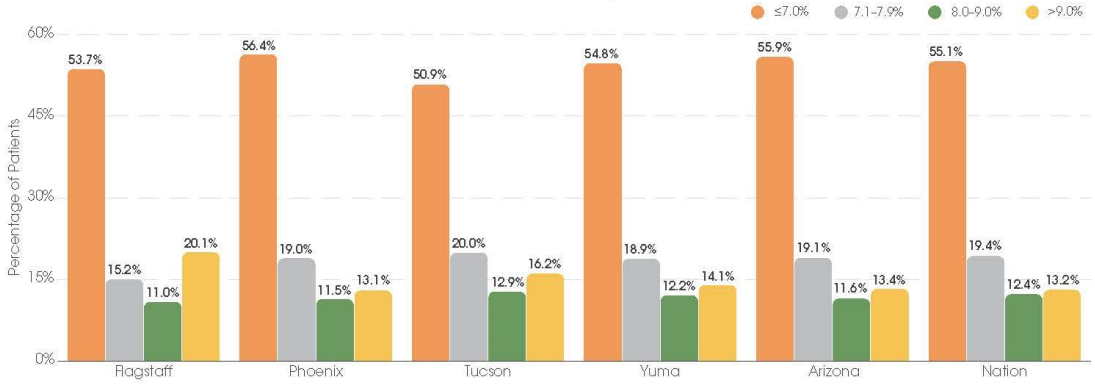
[1] Includes HMOs, PPOs, point-of-service plans, and exclusive provider organizations.
[2] A complication is defined as a patient condition caused by the Type 2 diabetes of the patient. These conditions are a direct result of having Type 2 diabetes. Complications of Type 2 diabetes include, but are not limited to, atherosclerotic cardiovascular disease (ASCVD; includes patients with ACS, AMI, stroke, and other cardiovascular conditions), cardiovascular (CV) disease, nephropathy, neuropathy, peripheral artery disease (PAD), retinopathy, severe hypoglycemia, and stroke.
[3] A comorbidity is a condition a Type 2 diabetes patient may also have, which is not directly related to the diabetes. Comorbidities were narrowed down to a subset of conditions that are typically present in patients with Type 2 diabetes. Comorbidities of Type 2 diabetes may include, but are not limited to, depression, hyperlipidemia, hypertension, obesity, and pneumonia.

LABORATORY

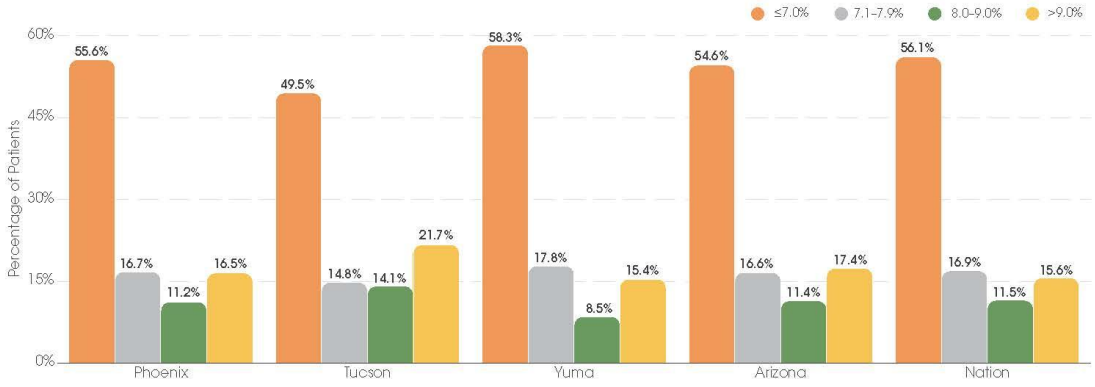
DISTRIBUTION OF TYPE 2 DIABETES PATIENTS, BY A1c LEVEL RANGE, 2017[1]



DISTRIBUTION OF TYPE 2 DIABETES PATIENTS WITH A COMPLICATION OF CARDIOVASCULAR DISEASE, BY A1c LEVEL RANGE, 2017[1,2]



DISTRIBUTION OF TYPE 2 DIABETES PATIENTS WITH A COMORBIDITY OF DEPRESSION, BY A1c LEVEL RANGE, 2017[1,3]



Data source: IQVIA © 2018

[1] The A1c test measures how much glucose has been in the blood during the past 2–3 months. Figures reflect the percentages of Type 2 diabetes patients who have had at least one A1c test in a given year.

[2] A complication is defined as a patient condition caused by the Type 2 diabetes of the patient. These conditions are a direct result of having Type 2 diabetes. Complications of Type 2 diabetes include, but are not limited to, atherosclerotic cardiovascular disease (ASCVD; includes patients with ACS, MI, stroke, and other cardiovascular conditions), cardiovascular (CV) disease, nephropathy, neuropathy, peripheral artery disease (PAD), retinopathy, severe hypoglycemia, and stroke.

[3] A comorbidity is a condition a Type 2 diabetes patient may also have, which is not directly related to the diabetes. Comorbidities were narrowed down to a subset of conditions which are typically present in patients with Type 2 diabetes. Comorbidities of Type 2 diabetes include, but are not limited to, depression, hyperlipidemia, hypertension, obesity, and pneumonia.

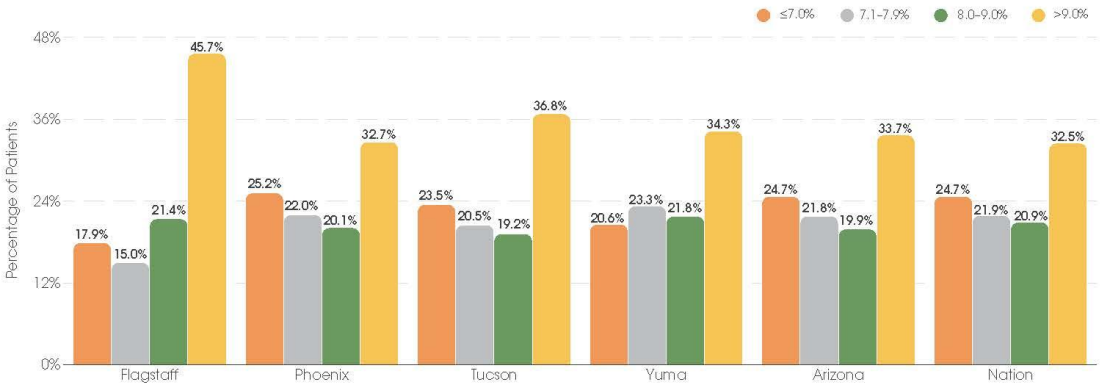
NOTE: Some data were unavailable for El Centro and Flagstaff.

LABORATORY

DISTRIBUTION OF TYPE 2 DIABETES PATIENTS, BY PAYER AND A1c LEVEL RANGE, 2017[1]

	Commercial Insurance[2]				Medicaid				Medicare			
MARKET	≤7.0%	7.1–7.9%	8.0–9.0%	>9.0%	≤7.0%	7.1–7.9%	8.0–9.0%	>9.0%	≤7.0%	7.1–7.9%	8.0–9.0%	>9.0%
El Centro	64.6%	13.5%	10.4%	11.5%	n/a	n/a	n/a	n/a	58.0%	20.5%	8.9%	12.5%
Flagstaff	48.0	19.6	10.7	21.7	45.7%	9.8%	14.1%	30.4%	51.9	17.4	11.0	19.7
Phoenix	57.0	18.8	11.3	12.9	47.7	17.7	12.9	21.7	59.2	19.1	10.9	10.9
Tucson	51.0	19.2	13.2	16.6	46.0	17.1	14.2	22.7	56.2	19.5	11.5	12.8
Yuma	53.7	18.5	12.8	15.0	52.0	17.6	11.9	18.5	60.0	18.5	11.1	10.4
Arizona	56.4	18.8	11.4	13.4	48.0	17.3	13.0	21.8	59.2	19.1	10.8	11.0
NATION	**53.4%**	**19.6%**	**12.5%**	**14.5%**	**48.3%**	**17.2%**	**12.9%**	**21.6%**	**57.8%**	**19.4%**	**11.6%**	**11.3%**

DISTRIBUTION OF TYPE 2 DIABETES PATIENTS RECEIVING ANY INSULIN PRODUCTS, BY A1c LEVEL RANGE, 2017[1,3]



DISTRIBUTION OF TYPE 2 DIABETES PATIENTS, BY LDL-C LEVEL (mg/dL), 2017

MARKET	<100	100–129	130–189	≥190
El Centro	65.5%	22.0%	12.0%	n/a
Flagstaff	68.9	20.1	10.4	0.0%
Phoenix	67.9	20.5	10.6	1.0
Tucson	67.0	20.9	11.2	1.0
Yuma	64.6	22.8	11.7	0.9
Arizona	67.5	20.7	10.9	1.0
NATION	**67.3%**	**20.5%**	**11.1%**	**1.1%**

Data source: IQVIA © 2018

[1] The A1c test measures how much glucose has been in the blood during the past 2–3 months. Figures reflect the percentages of Type 2 diabetes patients who have had at least one A1c test in a given year.
[2] Includes HMOs, PPOs, point-of-service plans, and exclusive provider organizations.
[3] Patients who filled prescriptions for any insulin products may have also filled prescriptions for products in the non-insulin category, and vice versa.
NOTE: Throughout this report, LDL-C is low-density lipoprotein cholesterol. Some data were unavailable for El Centro. An n/a indicates that data were not available for reasons including, but not limited to, insufficient patient samples, non-reporting by the institution that provides the information, and data inapplicability.

HOSPITAL UTILIZATION

NUMBER OF INPATIENT AND OUTPATIENT DIABETES MELLITUS CASES, 2016[1]

	Inpatient		Outpatient	
MARKET	Overall	w/ Severe Hypoglycemia	Overall	w/ Severe Hypoglycemia
El Centro	1,501.5	19.5	17,253.0	101.0
Flagstaff	999.3	52.0	9,696.3	69.7
Phoenix	1,634.4	76.9	6,731.4	54.2
Tucson	2,017.8	59.9	12,791.0	56.1
Arizona	1,270.7	53.5	7,411.3	46.5
NATION	**1,358.2**	**57.5**	**9,259.8**	**49.4**

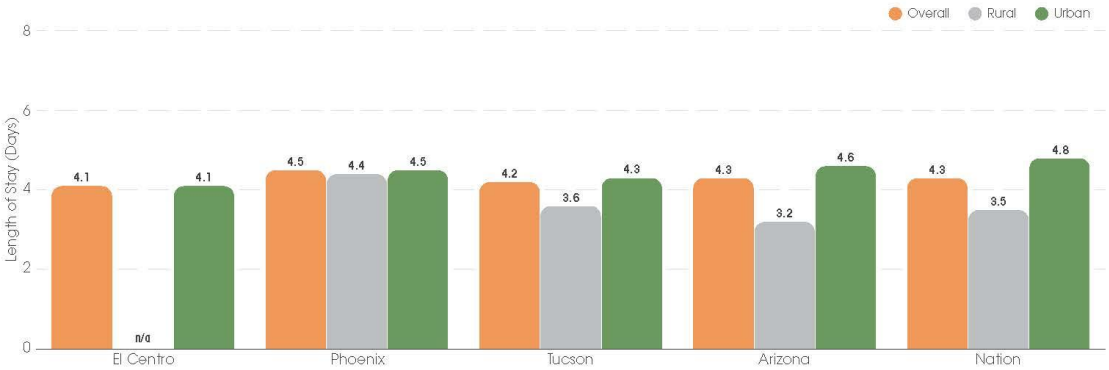
NUMBER OF OUTPATIENT DIABETES MELLITUS CASES PER HOSPITAL PER YEAR, BY PAYER, 2015–2016[1]

	Medicare		Non-Medicare	
MARKET	2015	2016	2015	2016
El Centro	7,071.5	7,310.0	4,417.0	9,943.0
Flagstaff	3,230.0	3,536.3	2,117.7	6,160.0
Phoenix	1,883.8	1,956.9	3,636.1	4,774.5
Tucson	3,667.6	3,648.5	6,894.3	9,142.5
Arizona	2,218.7	2,386.8	3,542.9	5,024.5
NATION	**3,402.5**	**3,590.6**	**3,704.1**	**5,669.2**

AVERAGE NUMBER AND EMERGENCY DEPARTMENT (ED) SHARE OF OUTPATIENT DIABETES MELLITUS CASES, 2016[1]

MARKET	Percentage Treated in ED	Average Number
El Centro	42.0%	7,253.0
Flagstaff	16.3	2,367.6
Phoenix	42.0	3,326.7
Tucson	20.5	3,002.6
Arizona	30.9	2,587.6
NATION	**21.1%**	**2,031.2**

AVERAGE LENGTH OF STAY (DAYS) PER INPATIENT DIABETES MELLITUS CASE, RURAL VERSUS URBAN HOSPITALS, 2016[1]



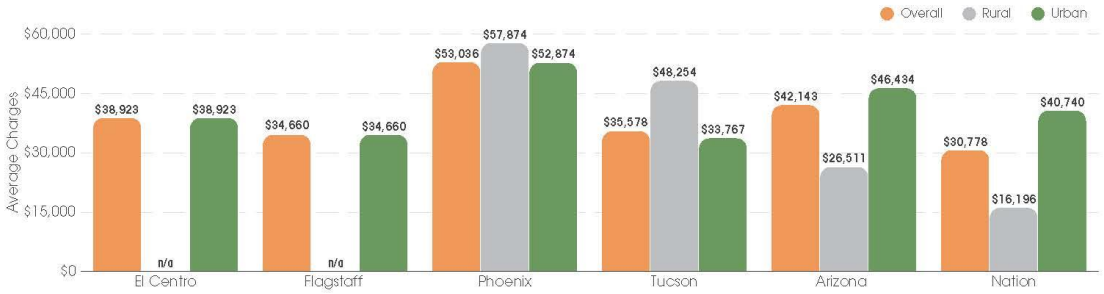
Data source: IQVIA © 2018

[1] Data in 2016 vary from previous years due to (a) the mandatory implementation of ICD-10 coding beginning October 1, 2015, which resulted in additional diagnoses being captured in the 2016 data for some of the disease states shown; and (b) beginning in 2016, outpatient measures also include treatment delivered in locations that are not contiguous with a hospital or located on a hospital campus. Diabetes with severe hypoglycemia is defined as ICD-9 code 250.8 in 2015 and ICD-10 code E11.649 in 2016. This 2016 ICD-10 code is narrower and includes a smaller subset of patients.

NOTE: Case counts, average length of stay (ALOS), and hospital inpatient charge data come from IQVIA's *Hospital Procedure/Diagnosis* (HPD) database and are current as of calendar year 2016. Some data were unavailable for Yuma.

CHARGES

CHARGES PER INPATIENT DIABETES MELLITUS CASE, RURAL VERSUS URBAN HOSPITALS, 2016[1,2]



PROFESSIONAL CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, BY SETTING, 2016–2017[3]

	Ambulatory Surgery		Emergency Department		Hospital Inpatient		Hospital Outpatient		Office/ Clinic	
MARKET	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017
El Centro	$1,521	$1,362	$1,477	$1,306	$2,775	$2,572	$1,711	$1,971	$3,084	$3,069
Flagstaff	3,524	3,494	1,722	1,648	3,982	4,235	1,182	1,211	1,941	1,863
Phoenix	3,842	4,014	2,710	2,878	4,667	4,873	1,773	1,905	3,232	3,326
Tucson	3,756	3,586	2,018	2,618	4,461	4,857	1,654	2,038	2,527	2,676
Yuma	4,871	4,803	1,334	805	2,753	2,716	1,441	1,129	2,655	2,578
Arizona	3,827	3,974	2,552	2,739	4,485	4,737	1,662	1,832	2,995	3,090
NATION	**$3,176**	**$3,265**	**$1,971**	**$2,116**	**$3,975**	**$4,084**	**$1,526**	**$1,583**	**$2,484**	**$2,475**

PROFESSIONAL INPATIENT CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, BY PAYER, 2016–2017[3]

	Commercial Insurance[4]		Medicaid		Medicare	
MARKET	2016	2017	2016	2017	2016	2017
El Centro	$2,340	$2,372	$4,875	$3,337	$2,192	$2,158
Flagstaff	2,496	2,910	3,559	3,981	3,524	3,498
Phoenix	3,972	4,163	4,449	4,482	3,393	3,355
Tucson	3,319	3,694	4,255	4,719	3,533	3,695
Yuma	2,427	1,560	2,567	2,585	1,932	2,106
Arizona	3,802	3,990	4,240	4,371	3,296	3,353
NATION	**$3,510**	**$3,546**	**$3,830**	**$3,837**	**$3,112**	**$3,219**

PROFESSIONAL EMERGENCY DEPARTMENT CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, BY A1c LEVEL RANGE, 2016–2017[3,5]

	≤7.0%		7.1–7.9%		8.0–9.0%		>9.0%	
MARKET	2016	2017	2016	2017	2016	2017	2016	2017
El Centro	$456	n/a	$592	n/a	$1,581	n/a	$414	n/a
Flagstaff	1,969	$1,304	1,671	$2,158	1,579	$1,698	2,320	$1,684
Phoenix	2,327	2,475	2,206	2,489	2,354	2,632	2,781	3,009
Tucson	2,076	2,817	2,109	2,422	1,877	2,554	2,262	2,917
Yuma	1,758	650	1,955	600	989	497	1,388	458
Arizona	2,244	2,436	2,152	2,401	2,267	2,507	2,626	2,867
NATION	**$2,017**	**$2,143**	**$1,957**	**$2,070**	**$2,082**	**$2,219**	**$2,319**	**$2,488**

Data source: IQVIA © 2018

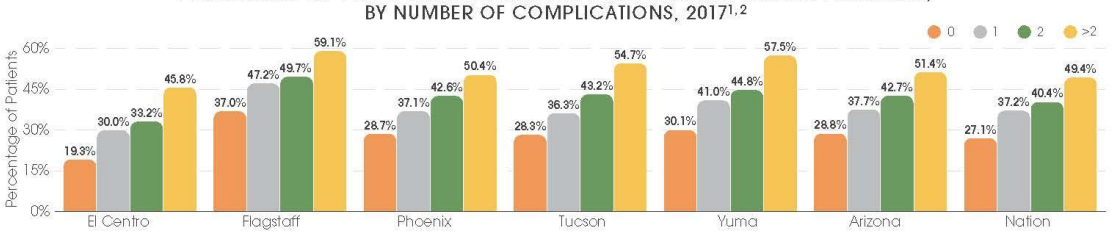
[1] Data in 2016 vary from previous years due to the mandatory implementation of ICD-10 coding beginning October 1, 2015, which resulted in additional diagnoses being captured in the 2016 data for some of the disease states shown.
[2] Charge data are per-case averages for inpatients with a particular diagnosis of interest. Charges may be for treatment related to other diagnoses. Data reflect the total charges billed by the hospital for the entire episode of care, and may include accommodation, pharmacy, laboratory, radiology, and other charges not billed by the physician. Data do not necessarily indicate final amounts paid.
[3] Professional charges are those generated by the providers delivering care to Type 2 diabetes patients in various settings.
[4] Includes HMO, PPOs, point of service plans, and exclusive provider organizations.
[5] The A1c test measures how much glucose has been in the blood during the past 2–3 months. Figures reflect the percentages of Type 2 diabetes patients who have had at least one A1c test in a given year.

PHARMACOTHERAPY

PERCENTAGE OF TYPE 2 DIABETES PATIENTS RECEIVING VARIOUS INSULIN AND COMBINATION THERAPIES, 2016–2017[1]

	Any Insulin Products		Long-Acting Basal Category 1		Long-Acting Basal Category 2		Rapid-Acting Insulin		Mixed Insulin		GLP-1 + Long-Acting Insulin (Fixed Ratio)	
MARKET	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017
El Centro	31.0%	31.6%	23.5%	22.6%	4.5%	6.4%	13.4%	13.9%	3.9%	4.2%	n/a	0.5%
Flagstaff	43.3	45.2	32.8	33.6	2.5	3.5	23.0	26.4	3.3	2.2	n/a	n/a
Phoenix	38.3	38.7	29.2	28.8	2.7	3.7	19.1	19.6	3.3	2.9	n/a	0.2
Tucson	38.2	38.1	28.5	27.8	2.1	2.6	16.1	15.7	4.5	4.6	n/a	0.1
Yuma	39.8	41.0	29.5	29.3	3.2	3.7	18.1	18.9	6.1	5.6	n/a	n/a
Arizona	38.4	38.8	29.2	28.7	2.7	3.5	18.6	19.0	3.6	3.3	n/a	0.2
NATION	**36.5%**	**36.7%**	**26.2%**	**25.0%**	**3.4%**	**4.9%**	**18.1%**	**18.3%**	**4.2%**	**3.8%**	**n/a**	**0.2%**

PERCENTAGE OF TYPE 2 DIABETES PATIENTS RECEIVING ANY INSULIN PRODUCTS, BY NUMBER OF COMPLICATIONS, 2017[1,2]



PERCENTAGE OF TYPE 2 DIABETES PATIENTS RECEIVING ANY INSULIN OR NON-INSULIN ANTIDIABETIC PRODUCTS, BY PRESCRIBING SPECIALIST, 2017[1]

	Endocrinology		Internal Medicine		Primary Care[3]	
MARKET	Insulin	Non-Insulin	Insulin	Non-Insulin	Insulin	Non-Insulin
El Centro	58.7%	75.0%	35.5%	92.0%	32.8%	92.3%
Flagstaff	79.3	43.4	48.6	68.5	41.6	80.9
Phoenix	72.8	65.1	40.1	84.7	36.7	87.3
Tucson	78.0	61.0	39.3	85.7	36.9	87.8
Arizona	73.8	64.2	40.3	84.6	37.0	87.0
NATION	**66.6%**	**68.8%**	**35.8%**	**86.3%**	**34.3%**	**87.8%**

PERCENTAGE OF TYPE 2 DIABETES PATIENTS RECEIVING VARIOUS NON-INSULIN ANTIDIABETIC THERAPIES, 2016–2017[1]

	Any Non-Insulin Antidiabetic Product		Biguanides		DPP-4 Inhibitors		GLP-1 Receptor Agonists		Insulin Sensitizing Agents		SGLT-2 Inhibitors	
MARKET	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017
El Centro	89.8%	91.6%	64.7%	66.4%	23.3%	25.2%	13.3%	14.9%	8.4%	8.7%	10.8%	12.1%
Flagstaff	76.9	75.5	61.8	59.4	7.8	6.8	8.5	11.2	5.7	6.3	5.3	6.0
Phoenix	83.6	83.6	64.0	64.1	10.9	11.2	6.4	7.8	6.8	7.5	7.1	8.0
Tucson	84.2	84.6	68.5	69.0	9.7	9.4	5.4	6.3	6.2	6.5	4.3	4.4
Yuma	83.0	83.9	65.2	66.1	10.8	10.2	5.5	7.6	4.5	4.8	4.7	5.6
Arizona	83.4	83.6	64.8	64.9	10.5	10.7	6.1	7.5	6.3	7.0	6.3	7.1
NATION	**83.8%**	**84.1%**	**61.6%**	**61.9%**	**12.2%**	**12.4%**	**7.2%**	**8.6%**	**5.1%**	**5.3%**	**7.2%**	**8.0%**

Data source: IQVIA © 2018

Biguanides: Decrease the production of glucose by the liver, decrease intestinal absorption of glucose, and increase the peripheral uptake and use of circulating glucose.

Dipeptidyl Peptidase 4 (DPP-4) Inhibitors: Inhibit DPP-4 enzymes and slow inactivation of incretin hormones, helping to regulate glucose homeostasis through increased insulin release and decreased glucagon levels.

GLP-1 Receptor Agonists: Increase glucose-dependent insulin secretion and pancreatic beta-cell sensitivity, reduce glucagon production, slow rate of absorption of glucose in the digestive tract by slowing gastric emptying, and suppress appetite. "GLP-1 + long-acting insulin (fixed ratio)" refers to the two therapies combined in a single product. "GLP-1 + long-acting insulin (free ratio)" refers to the two therapies taken separately and concurrently.

Insulin Sensitizing Agents: Increase insulin sensitivity by improving response to insulin in liver, adipose tissue, and skeletal muscle, resulting in decreased production of glucose by the liver and increased peripheral uptake and use of circulating glucose.

Long-Acting Basal Category 1/Category 2: Insulin replacement product with a long duration of action. "Category 1" refers to long-acting basal insulins approved through 2014 and follow-on long-acting insulins approved after 2014. "Category 2" refers to non-follow-on long-acting basal insulins approved in or after 2015.

Mixed Insulin: Insulin replacement product combining a short-acting and an intermediate-acting insulin product.

Rapid-Acting Insulin: Insulin replacement product with a rapid onset and shorter duration of action than short-acting insulin.

Sodium/Glucose Cotransporter 2 (SGLT-2) Inhibitors: Lower blood glucose concentration so that glucose is excreted instead of reabsorbed.

1 Patients who filled prescriptions for any insulin products may have also filled prescriptions for products in the non-insulin category, and vice versa.
2 A complication is defined as a patient condition caused by the Type 2 diabetes of the patient. These conditions are a direct result of having Type 2 diabetes. Complications of Type 2 diabetes include, but are not limited to, atherosclerotic cardiovascular disease (ASCVD; includes patients with ACS, AMI, stroke, and other cardiovascular conditions), cardiovascular (CV) disease, nephropathy, neuropathy, peripheral artery disease (PAD), retinopathy, severe hypoglycemia, and stroke.
3 "Primary care" consists of both general and family practitioners.
NOTE: Some data were unavailable for Yuma.

PHARMACOTHERAPY

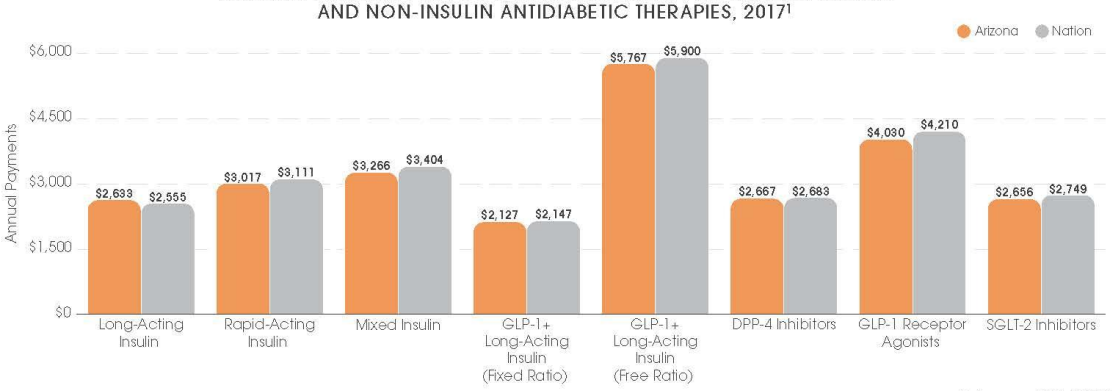
PERCENTAGE OF TYPE 2 DIABETES PATIENTS RECEIVING VARIOUS ANTIDIABETIC COMBINATION THERAPIES, 2016–2017

	Use of 1 Product		Use of 2 Products						Use of 3 Products							
	Use of 1 Non-Insulin Product		Use of 2 Non-Insulin Products		Use of 2 Products: 1 Insulin, 1 Non-Insulin		Use of 2 Insulin Products		Use of 3 Non-Insulin Products		Use of 3 Products: 1 Insulin, 2 Non-Insulins		Use of 3 Products: 2 Insulins, 1 Non-Insulin		Use of 3 Insulin Products	
MARKET	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017
El Centro	35.5%	35.8%	22.5%	21.6%	5.3%	4.8%	4.8%	4.7%	10.6%	10.7%	7.2%	8.0%	7.4%	9.5%	0.7%	0.7%
Flagstaff	37.8	37.6	14.3	13.1	6.7	6.9	10.6	13.0	4.2	3.3	5.2	4.8	7.1	7.4	n/a	n/a
Phoenix	37.8	37.5	17.4	16.9	7.1	6.8	8.6	8.6	6.3	6.6	6.4	6.8	7.5	7.8	0.8	0.7
Tucson	38.7	39.0	17.3	17.1	8.2	8.5	7.6	7.4	5.6	5.6	5.9	6.2	7.2	6.9	1.2	1.2
Yuma	37.3	36.9	17.4	16.9	8.0	7.8	7.7	7.7	5.4	5.0	5.9	7.7	7.9	8.4	0.9	0.7
Arizona	38.1	37.9	17.4	16.9	7.2	7.1	8.4	8.4	6.0	6.2	6.2	6.6	7.5	7.7	0.9	0.8
NATION	**38.9%**	**38.7%**	**17.9%**	**17.7%**	**6.5%**	**6.6%**	**8.2%**	**8.2%**	**6.5%**	**6.6%**	**5.8%**	**6.0%**	**7.0%**	**7.2%**	**0.7%**	**0.7%**

AVERAGE ANNUAL PAYMENTS PER TYPE 2 DIABETES PATIENT RECEIVING VARIOUS ANTIDIABETIC COMBINATION THERAPIES, 2016–2017[1]

	Use of 1 Product		Use of 2 Products						Use of 3 Products							
	Use of 1 Non-Insulin Product		Use of 2 Non-Insulin Products		Use of 2 Products: 1 Insulin, 1 Non-Insulin		Use of 2 Insulin Products		Use of 3 Non-Insulin Products		Use of 3 Products: 1 Insulin, 2 Non-Insulins		Use of 3 Products: 2 Insulins, 1 Non-Insulin		Use of 3 Insulin Products	
MARKET	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017
El Centro	$709	$839	$1,727	$2,265	$3,299	$3,723	$5,277	$5,144	$3,636	$4,010	$5,429	$6,355	$8,228	$8,649	$10,760	$9,517
Flagstaff	439	593	1,489	1,806	3,250	3,869	4,590	5,604	3,608	3,561	4,213	6,631	7,196	6,334	8,200	5,928
Phoenix	372	433	1,174	1,390	3,313	3,813	5,199	5,611	2,978	3,458	4,633	5,120	6,930	7,697	6,639	6,978
Tucson	260	304	899	1,035	3,234	3,493	4,780	5,352	2,653	2,949	4,500	4,619	6,048	6,828	5,862	6,247
Yuma	353	406	1,103	1,326	3,274	3,750	4,929	5,239	2,592	2,609	3,839	4,719	6,273	7,014	5,828	6,279
Arizona	340	406	1,097	1,312	3,296	3,739	5,103	5,585	2,902	3,349	4,549	5,034	6,725	7,546	6,461	6,695
NATION	**$438**	**$505**	**$1,334**	**$1,571**	**$3,531**	**$3,953**	**$5,301**	**$5,758**	**$3,269**	**$3,739**	**$4,806**	**$5,356**	**$7,218**	**$7,933**	**$6,776**	**$7,273**

ANNUAL PAYMENTS PER TYPE 2 DIABETES PATIENT FOR VARIOUS INSULIN AND NON-INSULIN ANTIDIABETIC THERAPIES, 2017[1]



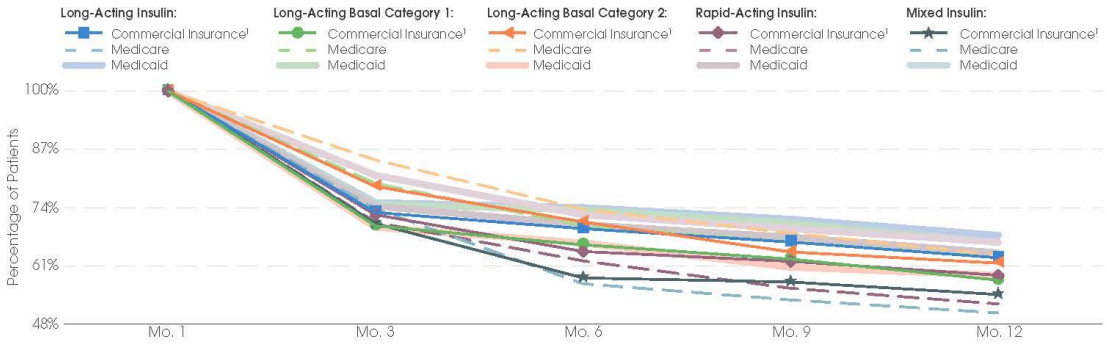
Data source: IQVIA © 2018

[1] Figures reflect the per-patient yearly costs for Type 2 diabetes patients receiving a particular type of therapy.

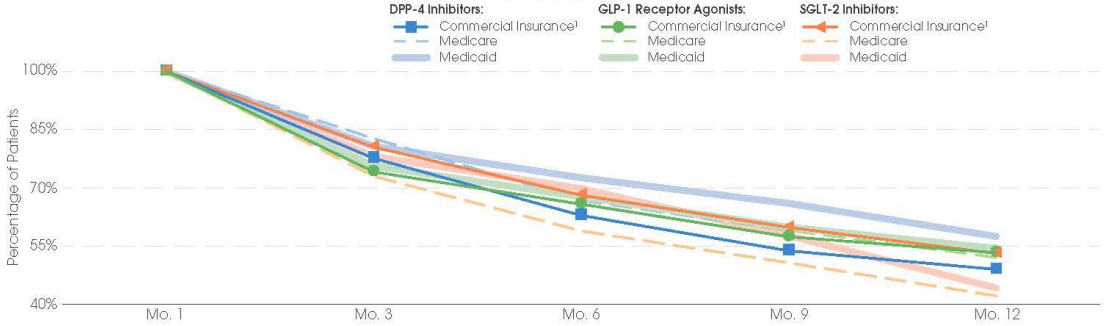
NOTE: "GLP-1 + long-acting insulin (fixed ratio)" refers to the two therapies combined in a single product. "GLP-1 + long-acting insulin (free ratio)" refers to the two therapies taken separately and concurrently.

PERSISTENCY/READMISSIONS

PERSISTENCY: TYPE 2 DIABETES PATIENTS RECEIVING VARIOUS INSULIN THERAPIES, BY PAYER, ARIZONA, 2017



PERSISTENCY: TYPE 2 DIABETES PATIENTS RECEIVING VARIOUS NON-INSULIN ANTIDIABETIC THERAPIES, BY PAYER, ARIZONA, 2017



PROFESSIONAL CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS RECEIVING LONG-ACTING BASAL CATEGORY 1 VS. CATEGORY 2, BY SETTING, 2017[1]

	Ambulatory Surgery		Emergency Department		Hospital Inpatient		Hospital Outpatient		Office/ Clinic	
MARKET	Cat. 1	Cat. 2	Cat. 1	Cat. 2	Cat. 1	Cat. 2	Cat. 1	Cat. 2	Cat. 1	Cat. 2
El Centro	$2,229	$785	$1,407	$1,727	$2,358	$1,516	$2,263	$2,387	$3,940	$4,231
Flagstaff	3,687	2,289	1,889	938	4,876	1,717	1,203	506	2,497	1,560
Phoenix	4,659	4,027	3,751	2,788	5,869	4,804	2,008	2,002	4,018	3,938
Tucson	3,667	2,743	3,348	3,927	5,513	4,249	2,338	2,194	3,107	2,796
Yuma	4,628	5,427	1,165	n/a	2,927	1,389	1,576	531	3,108	2,814
Arizona	4,513	3,881	3,581	2,840	5,666	4,548	1,993	1,943	3,742	3,664
NATION	**$3,448**	**$3,228**	**$2,633**	**$2,301**	**$4,697**	**$3,767**	**$1,753**	**$1,611**	**$2,718**	**$2,844**

READMISSION RATES FOR PATIENTS DIAGNOSED WITH TYPE 2 DIABETES, BY TYPE OF THERAPY, 2015–2017[2,3]

	Three-Day Readmissions				30-Day Readmissions			
MARKET	Any Insulin Products	Long-Acting Basal Category 1	Long-Acting Basal Category 2	Three Non-Insulin Antidiabetic Products	Any Insulin Products	Long-Acting Basal Category 1	Long-Acting Basal Category 2	Three Non-Insulin Antidiabetic Products
NATION	**11.1%**	**13.4%**	**12.6%**	**16.2%**	**24.3%**	**29.4%**	**27.7%**	**30.3%**

Data source: IQVIA © 2018

[1] Includes HMOs, PPOs, point-of-service plans, and exclusive provider organizations.
[2] Figures reflect the percentages of and the visits and charges for Type 2 diabetes patients who visited an emergency department in the three-year period between 2014 and 2016. These include patients who filled multiple prescriptions.
[3] Patients who filled prescriptions for any insulin products may have also filled prescriptions for products in the non-insulin category, and vice versa.
[4] Figures reflect the percentages of Type 2 diabetes patients who were readmitted to an inpatient facility in the three-year period between 2014 and 2016. These percentages include patients who filled multiple prescriptions. Readmissions are not necessarily due to Type 2 diabetes. Readmission rates are available down to the regional level only.

NOTE: Persistency* measures whether patients maintain their prescribed therapy. It is calculated by identifying patients who filled a prescription for the reported drug class in the six months prior to the reported year, and then tracking prescription fills for those same patients in each of the months in the current reported year. If patients fill a prescription in a month, they are reported among the patients who have continued or restarted on therapy. Continued means that the patient has filled the drug group in each of the preceding months. Restarted means that the patient did not fill in one or more of the preceding months. Continuing and restarting patients are reported together.

POSITION STATEMENT

2018 ADA Guidelines for Adults With Type 2 Diabetes

⇨ At diagnosis, initiate lifestyle management, set A1c target, and initiate pharmacologic therapy based on A1c:

- A1c is less than 9%, consider Monotherapy.
- A1c is greater than or equal to 9%, consider Dual Therapy.
- A1c is greater than or equal to 10%, blood glucose is greater than or equal to 300 mg/dL, or patient is markedly symptomatic, consider Combination Injectable Therapy.

MONOTHERAPY

Initiate metformin therapy if no contraindications

Lifestyle Management + Metformin

A1c at target after 3 months of Monotherapy?

Yes: Monitor A1c every 3–6 months

No: Assess medication-taking behavior, consider Dual Therapy

DUAL THERAPY

Atherosclerotic cardiovascular disease (ASCVD)?

Yes: Add agent proven to reduce major adverse cardiovascular events and/or cardiovascular mortality*

No: Add second agent after consideration of drug-specific effects and patient factors

Lifestyle Management + Metformin + Additional Agent

A1c at target after 3 months of Dual Therapy?

Yes: Monitor A1c every 3–6 months

No: Assess medication-taking behavior, consider Triple Therapy

TRIPLE THERAPY

Add third agent based on drug-specific effects and patient factors‡

Lifestyle Management + Metformin + Two Additional Agents

A1c at target after 3 months of Triple Therapy?

Yes: Monitor A1c every 3–6 months

No: Assess medication-taking behavior, consider Combination Injectable Therapy

COMBINATION INJECTABLE THERAPY

* If patient does not tolerate or has contraindications to metformin, consider agents from another class.

‡ Glucagon-like peptide-1 (GLP-1) receptor agonists and dipeptidyl peptidase 4 (DPP-4) inhibitors should not be prescribed in combination. If a patient with ASCVD is not yet on an agent with evidence of cardiovascular risk reduction, consider adding.

NOTE: A1c is glycated hemoglobin.

Source: American Diabetes Association Standards of Care 2018;41:S73–S85

METHODOLOGY

IQVIA generated the Type 2 diabetes data for this report out of health care professional (837p) and institutional (837i) insurance claims, representing nearly 11.7 million unique patients nationally in 2017 with a diagnosis of Type 2 diabetes (E08, E09, E11, E13; data in 2015 include ICD-9 codes 249.00–250.92, and ICD-10 codes E08, E09, E11, E13). Data from physicians of all specialties and from all hospital types are included. Substate markets represent core-based statistical areas (CBSAs).

IQVIA also gathers data on prescription activity from the National Council for Prescription Drug Programs (NCPDP). These data account for some 2 billion prescription claims annually, or more than 86% of the prescription universe. These prescription data represent the sampling of prescription activity from a variety of sources, including retail chains, mass merchandisers, and pharmacy benefit managers. Cash, Medicaid, and third-party transactions are tracked.

Proprietary lab data derive from one of the largest independent commercial lab companies in the U.S. Patient information is de-identified, matched, and linked with other patient data assets (e.g., medical claims data). The most common attributes used are the de-identified patient ID, observation date, diagnosis, test name, test code, and test result.

DATA INTEGRITY

Data arriving into IQVIA are put through a rigorous process to ensure that data elements match to valid references, such as product codes, ICD-9/10 (diagnosis) and CPT-4 (procedure) codes, and provider and facility data.

Claims undergo a careful de-duplication process to ensure that when multiple, voided, or adjusted claims are assigned to a patient encounter, they are applied to the database, but only for a single, unique patient.

Through its patient encryption methods, IQVIA creates a unique, random numerical identifier for every patient, and then strips away all patient-specific health information that is protected under the Health Insurance Portability and Accountability Act (HIPAA). The identifier allows IQVIA to track disease-specific diagnosis and procedure activity across the various settings where patient care is provided (hospital inpatient, hospital outpatient, emergency rooms, clinics, doctors' offices, and pharmacies), while protecting the privacy of each patient.

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CDC BEHAVIORAL RISK FACTOR SURVEILLANCE SYSTEM (BRFSS)

The BRFSS is the nation's premier system of health-related telephone surveys that collects state data about residents regarding their behaviors that influence individual health, chronic conditions and their use of preventive services. The BRFSS is an ongoing data collection system gathering information on adult health-related behaviors of non-institutionalized residents 18 years of age and older. Only one adult per household is interviewed and the participants are not compensated for their time.

A standardized questionnaire (~75 questions) is used with questions determined by the state BRFSS coordinator and the CDC. Participants of the survey are determined by random sampling telephone survey, using disproportionate stratified sampling, random digit dialing, and a Computer Assisted Telephone Interviewing (CATI) system using a sample size of 4,700 over a 12 month survey period (sample size 95 percent confidence interval of ±3 percent). Each survey has the potential to represent 96.3 percent of all households that have landline telephones and cell phones. Monthly data files are sent to the Arizona BRFSS program and reports are prepared. Data is weighted based on Arizona population demographics and 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)

Q. Has a doctor, nurse, or other health professional EVER told you that you have diabetes?

A.
- 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 Diabetes in Arizona:

MODULE 1: PRE-DIABETES (LAST TIME ASKED IN 2014)

Q. Have you had a test for high blood sugar or diabetes within the past three years?

A.
- 1 Yes
- 2 No
- 7 Don’t know / Not sure
- 9 Refused

ICD-10 Codes: International Classification of Diseases Codes:

The International Classification of Diseases (ICD) codes are used to classify diseases and other health problems recorded on many types of health and vital records, including death certificates and health records. In this report, the ICD-10 were used. Additional information on these codes from the National Center for Health Statistics can be found here: http://www.cdc.gov/nchs/icd.htm Mortality: ICD-10 Diagnosis Codes

Diabetes: E10-E14
A full description of the ICD-10 codes can be found here:
http://apps.who.int/classifications/icd10/browse/2015/e

ICD-10 Codes for Diabetes Due to an Underlying Condition

- Diabetes mellitus due to underlying condition: E08
  - Diabetes mellitus due to underlying condition with hyperosmolarity: E08.0
    - …… without nonketotic hyperglycemic-hyperosmolar coma (NKHHC): E08.00
    - …… with coma: E08.01
  - Diabetes mellitus due to underlying condition with ketoacidosis: E08.1
    - …… without coma: E08.10
    - …… with coma: E08.11
  - Diabetes mellitus due to underlying condition with kidney complications: E08.2
    - Diabetes mellitus due to underlying condition with diabetic nephropathy: E08.21
    - Diabetes mellitus due to underlying condition with diabetic chronic kidney disease: E08.22
    - Diabetes mellitus due to underlying condition with other diabetic kidney complication: E08.29
  - Diabetes mellitus due to underlying condition with ophthalmic complications: E08.3
    - Diabetes mellitus due to underlying condition with unspecified diabetic retinopathy: E08.31
      - …… with macular edema: E08.311
      - …… without macular edema: E08.319
    - Diabetes mellitus due to underlying condition with mild nonproliferative diabetic retinopathy: E08.32
      - …… with macular edema: E08.321
      - …… without macular edema: E08.329
    - Diabetes mellitus due to underlying condition with moderate nonproliferative diabetic retinopathy: E08.33
      - …… with macular edema: E08.331
      - …… without macular edema: E08.339
    - Diabetes mellitus due to underlying condition with severe nonproliferative diabetic retinopathy: E08.34
      - …… with macular edema: E08.341
      - …… without macular edema: E08.349
    - Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy: E08.35
      - …… with macular edema: E08.351
      - …… without macular edema: E08.359
    - Diabetes mellitus due to underlying condition with diabetic cataract: E08.36
    - Diabetes mellitus due to underlying condition with other diabetic ophthalmic complication: E08.39
  - Diabetes mellitus due to underlying condition with neurological complications: E08.4
    - Diabetes mellitus due to underlying condition with diabetic neuropathy, unspecified: E08.40

        - Diabetes mellitus due to underlying condition with diabetic mononeuropathy: E08.41
        - Diabetes mellitus due to underlying condition with diabetic polyneuropathy: E08.42
        - Diabetes mellitus due to underlying condition with diabetic autonomic (poly)neuropathy: E08.43
        - Diabetes mellitus due to underlying condition with diabetic amyotrophy: E08.44
        - Diabetes mellitus due to underlying condition with other diabetic neurological complication: E08.49
    - Diabetes mellitus due to underlying condition with circulatory complications: E08.5
        - Diabetes mellitus due to underlying condition with diabetic peripheral angiopathy without gangrene: E08.51
        - Diabetes mellitus due to underlying condition with diabetic peripheral angiopathy with gangrene: E08.52
        - Diabetes mellitus due to underlying condition with other circulatory complications: E08.59
    - Diabetes mellitus due to underlying condition with other specified complications: E08.6
        - Diabetes mellitus due to underlying condition with diabetic arthropathy: E08.61
            - Diabetes mellitus due to underlying condition with diabetic neuropathic arthropathy: E08.610
            - Diabetes mellitus due to underlying condition with other diabetic arthropathy: E08.618
        - Diabetes mellitus due to underlying condition with skin complications: E08.62
            - Diabetes mellitus due to underlying condition with diabetic dermatitis: E08.620
            - Diabetes mellitus due to underlying condition with foot ulcer: E08.621
            - Diabetes mellitus due to underlying condition with other skin ulcer: E08.622
            - Diabetes mellitus due to underlying condition with other skin complications: E08.628
        - Diabetes mellitus due to underlying condition with oral complications: E08.63
            - Diabetes mellitus due to underlying condition with periodontal disease: E08.630
            - Diabetes mellitus due to underlying condition with other oral complications: E08.638
        - Diabetes mellitus due to underlying condition with hypoglycemia: E08.64
            - …… with coma: E08.641
            - …… without coma: E08.649
        - Diabetes mellitus due to underlying condition with hyperglycemia: E08.65
        - Diabetes mellitus due to underlying condition with other specified complication: E08.69
    - Diabetes mellitus due to underlying condition with unspecified complications: E08.8
    - Diabetes mellitus due to underlying condition without complications: E08.9

ICD-10 Codes for Drug or Chemical Induced Diabetes

- Drug or chemical induced diabetes mellitus: E09
    - Drug or chemical induced diabetes mellitus with hyperosmolarity: E09.0
        - …… without nonketotic hyperglycemic-hyperosmolar coma (NKHHC): E09.00
        - …… with coma: E09.01
    - Drug or chemical induced diabetes mellitus with ketoacidosis: E09.1
        - …… without coma: E09.10
        - …… with coma: E09.11
    - Drug or chemical induced diabetes mellitus with kidney complications: E09.2
        - Drug or chemical induced diabetes mellitus with diabetic nephropathy: E09.21
        - Drug or chemical induced diabetes mellitus with diabetic chronic kidney disease: E09.22
        - Drug or chemical induced diabetes mellitus with other diabetic kidney complication: E09.29
    - Drug or chemical induced diabetes mellitus with ophthalmic complications: E09.3
        - Drug or chemical induced diabetes mellitus with unspecified diabetic retinopathy: E09.31

- …… with macular edema: E09.311
- …… without macular edema: E09.319

- Drug or chemical induced diabetes mellitus with mild nonproliferative diabetic retinopathy: E09.32
  - …… with macular edema: E09.321
  - …… without macular edema: E09.329
- Drug or chemical induced diabetes mellitus with moderate nonproliferative diabetic retinopathy: E09.33
  - …… with macular edema: E09.331
  - …… without macular edema: E09.339
- Drug or chemical induced diabetes mellitus with severe nonproliferative diabetic retinopathy: E09.34
  - …… with macular edema: E09.341
  - …… without macular edema: E09.349
- Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy: E09.35
  - …… with macular edema: E09.351
  - …… without macular edema: E09.359
- Drug or chemical induced diabetes mellitus with diabetic cataract: E09.36
- Drug or chemical induced diabetes mellitus with other diabetic ophthalmic complication: E09.39

- Drug or chemical induced diabetes mellitus with neurological complications: E09.4
  - …… with diabetic neuropathy, unspecified: E09.40
  - …… with diabetic mononeuropathy: E09.41
  - …… with diabetic polyneuropathy: E09.42
  - …… with diabetic autonomic (poly)neuropathy: E09.43
  - …… with diabetic amyotrophy: E09.44
  - …… with other diabetic neurological complication: E09.49
- Drug or chemical induced diabetes mellitus with circulatory complications: E09.5
  - Drug or chemical induced diabetes mellitus with diabetic peripheral angiopathy without gangrene: E09.51
  - Drug or chemical induced diabetes mellitus with diabetic peripheral angiopathy with gangrene: E09.52
  - Drug or chemical induced diabetes mellitus with other circulatory complications: E09.59
- Drug or chemical induced diabetes mellitus with other specified complications: E09.6
  - Drug or chemical induced diabetes mellitus with diabetic arthropathy: E09.61
    - Drug or chemical induced diabetes mellitus with diabetic neuropathic arthropathy: E09.610
    - Drug or chemical induced diabetes mellitus with other diabetic arthropathy: E09.618
  - Drug or chemical induced diabetes mellitus with skin complications: E09.62
    - Drug or chemical induced diabetes mellitus with diabetic dermatitis: E09.620
    - Drug or chemical induced diabetes mellitus with foot ulcer: E09.621
    - Drug or chemical induced diabetes mellitus with other skin ulcer: E09.622
    - Drug or chemical induced diabetes mellitus with other skin complications: E09.628
  - Drug or chemical induced diabetes mellitus with oral complications: E09.63
    - Drug or chemical induced diabetes mellitus with periodontal disease: E09.630
    - Drug or chemical induced diabetes mellitus with other oral complications: E09.638
  - Drug or chemical induced diabetes mellitus with hypoglycemia: E09.64
    - …… with coma: E09.641
    - …… without coma: E09.649

        - Drug or chemical induced diabetes mellitus with hyperglycemia: E09.65
        - Drug or chemical induced diabetes mellitus with other specified complication: E09.69
    - Drug or chemical induced diabetes mellitus with unspecified complications: E09.8
    - Drug or chemical induced diabetes mellitus without complications: E09.9

ICD-10 Codes for Type 1 (Juvenile) Diabetes

- Type 1 diabetes mellitus: E10
    - Type 1 diabetes mellitus with ketoacidosis: E10.1
        - …… without coma: E10.10
        - …… with coma: E10.11
    - Type 1 diabetes mellitus with kidney complications: E10.2
        - Type 1 diabetes mellitus with diabetic nephropathy: E10.21
        - Type 1 diabetes mellitus with diabetic chronic kidney disease: E10.22
        - Type 1 diabetes mellitus with other diabetic kidney complication: E10.29
    - Type 1 diabetes mellitus with ophthalmic complications: E10.3
        - Type 1 diabetes mellitus with unspecified diabetic retinopathy: E10.31
            - …… with macular edema: E10.311
            - …… without macular edema: E10.319
        - Type 1 diabetes mellitus with mild nonproliferative diabetic retinopathy: E10.32
            - …… with macular edema: E10.321
            - …… without macular edema: E10.329
        - Type 1 diabetes mellitus with moderate nonproliferative diabetic retinopathy: E10.33
            - …… with macular edema: E10.331
            - …… without macular edema: E10.339
        - Type 1 diabetes mellitus with severe nonproliferative diabetic retinopathy: E10.34
            - …… with macular edema: E10.341
            - …… without macular edema: E10.349
        - Type 1 diabetes mellitus with proliferative diabetic retinopathy: E10.35
            - …… with macular edema: E10.351
            - …… without macular edema: E10.359
        - Type 1 diabetes mellitus with diabetic cataract: E10.36
        - Type 1 diabetes mellitus with other diabetic ophthalmic complication: E10.39
    - Type 1 diabetes mellitus with neurological complications: E10.4
        - Type 1 diabetes mellitus with diabetic neuropathy, unspecified: E10.40
        - Type 1 diabetes mellitus with diabetic mononeuropathy: E10.41
        - Type 1 diabetes mellitus with diabetic polyneuropathy: E10.42
        - Type 1 diabetes mellitus with diabetic autonomic (poly)neuropathy: E10.43
        - Type 1 diabetes mellitus with diabetic amyotrophy: E10.44
        - Type 1 diabetes mellitus with other diabetic neurological complication: E10.49
    - Type 1 diabetes mellitus with circulatory complications: E10.5
        - Type 1 diabetes mellitus with diabetic peripheral angiopathy without gangrene: E10.51
        - Type 1 diabetes mellitus with diabetic peripheral angiopathy with gangrene: E10.52
        - Type 1 diabetes mellitus with other circulatory complications: E10.59
    - Type 1 diabetes mellitus with other specified complications: E10.6
        - Type 1 diabetes mellitus with diabetic arthropathy: E10.61
            - Type 1 diabetes mellitus with diabetic neuropathic arthropathy: E10.610
            - Type 1 diabetes mellitus with other diabetic arthropathy: E10.618
        - Type 1 diabetes mellitus with skin complications: E10.62
            - Type 1 diabetes mellitus with diabetic dermatitis: E10.620

- Type 1 diabetes mellitus with foot ulcer: E10.621
- Type 1 diabetes mellitus with other skin ulcer: E10.622
- Type 1 diabetes mellitus with other skin complications: E10.628

■ Type 1 diabetes mellitus with oral complications: E10.63
- Type 1 diabetes mellitus with periodontal disease: E10.630
- Type 1 diabetes mellitus with other oral complications: E10.638

■ Type 1 diabetes mellitus with hypoglycemia: E10.64
- …… with coma: E10.641
- …… without coma: E10.649

■ Type 1 diabetes mellitus with hyperglycemia: E10.65
■ Type 1 diabetes mellitus with other specified complication: E10.69

○ Type 1 diabetes mellitus with unspecified complications: E10.8
○ Type 1 diabetes mellitus without complications: E10.9

ICD-10 Codes for Type 2 Diabetes

➢ Type 2 diabetes mellitus: E11
○ Type 2 diabetes mellitus with hyperosmolarity: E11.0
■ …… without non-ketotic hyperglycemic-hyperosmolar coma (NKHHC): E11.00
■ …… with coma: E11.01

○ Type 2 diabetes mellitus with kidney complications: E11.2
■ Type 2 diabetes mellitus with diabetic nephropathy: E11.21
■ Type 2 diabetes mellitus with diabetic chronic kidney disease: E11.22
■ Type 2 diabetes mellitus with other diabetic kidney complication: E11.29

○ Type 2 diabetes mellitus with ophthalmic complications: E11.3
■ Type 2 diabetes mellitus with unspecified diabetic retinopathy: E11.31
- …… with macular edema: E11.311
- …… without macular edema: E11.319

■ Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy: E11.32
- …… with macular edema: E11.321
- …… without macular edema: E11.329

■ Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy: E11.33
- …… with macular edema: E11.331
- …… without macular edema: E11.339

■ Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy: E11.34
- …… with macular edema: E11.341
- …… without macular edema: E11.349

■ Type 2 diabetes mellitus with proliferative diabetic retinopathy: E11.35
- …… with macular edema: E11.351
- …… without macular edema: E11.359

■ Type 2 diabetes mellitus with diabetic cataract: E11.36
■ Type 2 diabetes mellitus with other diabetic ophthalmic complication: E11.39

○ Type 2 diabetes mellitus with neurological complications: E11.4
■ Type 2 diabetes mellitus with diabetic neuropathy, unspecified: E11.40
■ Type 2 diabetes mellitus with diabetic mononeuropathy: E11.41
■ Type 2 diabetes mellitus with diabetic polyneuropathy: E11.42
■ Type 2 diabetes mellitus with diabetic autonomic (poly)neuropathy: E11.43
■ Type 2 diabetes mellitus with diabetic amyotrophy: E11.44
■ Type 2 diabetes mellitus with other diabetic neurological complication: E11.49

○ Type 2 diabetes mellitus with circulatory complications: E11.5

        - Type 2 diabetes mellitus with diabetic peripheral angiopathy without gangrene: E11.51
        - Type 2 diabetes mellitus with diabetic peripheral angiopathy with gangrene: E11.52
        - Type 2 diabetes mellitus with other circulatory complications: E11.59
    - Type 2 diabetes mellitus with other specified complications: E11.6
        - Type 2 diabetes mellitus with diabetic arthropathy: E11.61
            - Type 2 diabetes mellitus with diabetic neuropathic arthropathy: E11.610
            - Type 2 diabetes mellitus with other diabetic arthropathy: E11.618
        - Type 2 diabetes mellitus with skin complications: E11.62
            - Type 2 diabetes mellitus with diabetic dermatitis: E11.620
            - Type 2 diabetes mellitus with foot ulcer: E11.621
            - Type 2 diabetes mellitus with other skin ulcer: E11.622
            - Type 2 diabetes mellitus with other skin complications: E11.628
        - Type 2 diabetes mellitus with oral complications: E11.63
            - Type 2 diabetes mellitus with periodontal disease: E11.630
            - Type 2 diabetes mellitus with other oral complications: E11.638
        - Type 2 diabetes mellitus with hypoglycemia: E11.64
            - …… with coma: E11.641
            - …… without coma: E11.649
        - Type 2 diabetes mellitus with hyperglycemia: E11.65
        - Type 2 diabetes mellitus with other specified complication: E11.69
    - Type 2 diabetes mellitus with unspecified complications: E11.8
    - Type 2 diabetes mellitus without complications: E11.9

ICD-10 Codes for Diabetes Related to Pregnancy and Childbirth

- Diabetes mellitus in pregnancy, childbirth, and the puerperium: 024
    - Pre-existing diabetes mellitus, type 1, in pregnancy, childbirth and the puerperium: 024.0
        - Pre-existing diabetes mellitus, type 1, in pregnancy: 024.01
            - …… first trimester: 024.011
            - …… second trimester: 024.012
            - …… third trimester: 024.013
            - …… unspecified trimester: 024.019
        - Pre-existing diabetes mellitus, type 1, in childbirth: 024.02
        - Pre-existing diabetes mellitus, type 1, in the puerperium: 024.03
    - Pre-existing diabetes mellitus, type 2, in pregnancy, childbirth and the puerperium: 024.1
        - Pre-existing diabetes mellitus, type 2, in pregnancy: 024.11
            - …… first trimester: 024.111
            - …… second trimester: 024.112
            - …… third trimester: 024.113
            - …… unspecified trimester: 024.119
        - Pre-existing diabetes mellitus, type 2, in childbirth: 024.12
        - Pre-existing diabetes mellitus, type 2, in the puerperium: 024.13
    - Unspecified pre-existing diabetes mellitus in pregnancy, childbirth and the puerperium: 024.3
        - Unspecified pre-existing diabetes mellitus in pregnancy: 024.31
            - …… first trimester: 024.311
            - …… second trimester: 024.312
            - …… third trimester: 024.313
            - …… unspecified trimester: 024.319

        - Unspecified pre-existing diabetes mellitus in childbirth: 024.32
        - Unspecified pre-existing diabetes mellitus in the puerperium: 024.33
    - Gestational diabetes mellitus: 024.4
        - Gestational diabetes mellitus in pregnancy: 024.41
            - …… diet controlled: 024.410
            - …… insulin controlled: 024.414
            - …… unspecified control: 024.419
        - Gestational diabetes mellitus in childbirth: 024.42
            - …… diet controlled: 024.420
            - …… insulin controlled: 024.424
            - …… unspecified control: 024.429
        - Gestational diabetes mellitus in the puerperium: 024.43
            - …… diet controlled: 024.430
            - …… insulin controlled: 024.434
            - …… unspecified control: 024.439
    - Other pre-existing diabetes mellitus in pregnancy, childbirth, and the puerperium: 024.8
        - Other pre-existing diabetes mellitus in pregnancy: 024.81
            - …… first trimester: 024.811
            - …… second trimester: 024.812
            - …… third trimester: 024.813
            - …… unspecified trimester: 024.819
        - Other pre-existing diabetes mellitus in childbirth: 024.82
        - Other pre-existing diabetes mellitus in the puerperium: 024.83
    - Unspecified diabetes mellitus in pregnancy, childbirth and the puerperium: 024.9
        - Unspecified diabetes mellitus in pregnancy: 024.91
            - …… first trimester: 024.911
            - …… second trimester: 024.912
            - …… third trimester: 024.913
            - …… unspecified trimester: 024.919
        - Unspecified diabetes mellitus in childbirth: 024.92
        - Unspecified diabetes mellitus in the puerperium: 024.93

ICD-10 Codes for Other Types of Diabetes

- Other specified diabetes mellitus: E13
    - Other specified diabetes mellitus with hyperosmolarity: E13.0
        - …… without nonketotic hyperglycemic-hyperosmolar coma (NKHHC): E13.00
        - …… with coma: E13.01
    - Other specified diabetes mellitus with ketoacidosis: E13.1
        - …… without coma: E13.10
        - …… with coma: E13.11
    - Other specified diabetes mellitus with kidney complications: E13.2
        - Other specified diabetes mellitus with diabetic nephropathy: E13.21
        - Other specified diabetes mellitus with diabetic chronic kidney disease: E13.22
        - Other specified diabetes mellitus with other diabetic kidney complication: E13.29
    - Other specified diabetes mellitus with ophthalmic complications: E13.3
        - Other specified diabetes mellitus with unspecified diabetic retinopathy: E13.31
            - …… with macular edema: E13.311
            - …… without macular edema: E13.319
        - Other specified diabetes mellitus with mild nonproliferative diabetic retinopathy: E13.32

- …… with macular edema: E13.321
- …… without macular edema: E13.329

- Other specified diabetes mellitus with moderate nonproliferative diabetic retinopathy: E13.33
  - …… with macular edema: E13.331
  - …… without macular edema: E13.339
- Other specified diabetes mellitus with severe nonproliferative diabetic retinopathy: E13.34
  - …… with macular edema: E13.341
  - …… without macular edema: E13.349
- Other specified diabetes mellitus with proliferative diabetic retinopathy: E13.35
  - …… with macular edema: E13.351
  - …… without macular edema: E13.359
- Other specified diabetes mellitus with diabetic cataract: E13.36
- Other specified diabetes mellitus with other diabetic ophthalmic complication: E13.39

- Other specified diabetes mellitus with neurological complications: E13.4
  - Other specified diabetes mellitus with diabetic neuropathy, unspecified: E13.40
  - Other specified diabetes mellitus with diabetic mononeuropathy: E13.41
  - Other specified diabetes mellitus with diabetic polyneuropathy: E13.42
  - Other specified diabetes mellitus with diabetic autonomic (poly)neuropathy: E13.43
  - Other specified diabetes mellitus with diabetic amyotrophy: E13.44
  - Other specified diabetes mellitus with other diabetic neurological complication: E13.49
- Other specified diabetes mellitus with circulatory complications: E13.5
  - Other specified diabetes mellitus with diabetic peripheral angiopathy without gangrene: E13.51
  - Other specified diabetes mellitus with diabetic peripheral angiopathy with gangrene: E13.52
  - Other specified diabetes mellitus with other circulatory complications: E13.59
- Other specified diabetes mellitus with other specified complications: E13.6
  - Other specified diabetes mellitus with diabetic arthropathy: E13.61
    - Other specified diabetes mellitus with diabetic neuropathic arthropathy: E13.610
    - Other specified diabetes mellitus with other diabetic arthropathy: E13.618
  - Other specified diabetes mellitus with skin complications: E13.62
    - Other specified diabetes mellitus with diabetic dermatitis: E13.620
    - Other specified diabetes mellitus with foot ulcer: E13.621
    - Other specified diabetes mellitus with other skin ulcer: E13.622
    - Other specified diabetes mellitus with other skin complications: E13.628
  - Other specified diabetes mellitus with oral complications: E13.63
    - Other specified diabetes mellitus with periodontal disease: E13.630
    - Other specified diabetes mellitus with other oral complications: E13.638
  - Other specified diabetes mellitus with hypoglycemia: E13.64
    - …… with coma: E13.641
    - …… without coma: E13.649
  - Other specified diabetes mellitus with hyperglycemia: E13.65
  - Other specified diabetes mellitus with other specified complication: E13.69
- Other specified diabetes mellitus with unspecified complications: E13.8
- Other specified diabetes mellitus without complications: E13.9
- Diabetes mellitus due to underlying condition with hypoglycemia without coma: E08.649
- Use Additional code to identify site of ulcer (L97.1-L97.9, L98.41-L98.49)

Appendix 7: Glossary of Terms and Abbreviations

Glossary of Terms:

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 arteria 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.

Confidence Interval – A confidence interval is a range of values that a person can be 95% certain contain the true average of a population.

Diagnosed Diabetes – participant were classified as having diagnosed diabetes if they answered "yes" to the question: "Other than during pregnancy, have you ever been told by a doctor or health professional that you have diabetes or sugar diabetes?"

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.

Hemoglobin A1c – a component of hemoglobin that binds with glucose. Abbreviated, HbA1c or A1c. A1c levels depend on glucose concentration in the blood, the higher the concentration, the higher the A1c levels. A1c levels are not influenced by daily nutritional intake or daily blood sugar fluctuations, but reflective of 6-8 weeks prior to measurement. A1c levels are reliable indicators of insulin efficiency and is used to measure the effectiveness of diet, exercise and medication in the glucose control in those with diabetes. A1c is also monitored for those at an elevated risk of developing diabetes. A1c levels between 5.7- 6.4 are considered to be prediabetic and above 6.5 to be diabetic.

Hospital Discharges – the number of inpatients discharged 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.

Total Diabetes – combined overall prevalence of diagnosed and undiagnosed diabetes.

Undiagnosed Diabetes – participants were classified as having undiagnosed diabetes if they did not report a diagnosis of diabetes by a health care provider and their fasting (8-12 hours) plasma glucose was greater than or equal to 126 mg/dL or their hemoglobin A1c was greater than or equal to 6.5%.

Weight Status – body mass index (BMI) was calculated as measured weight in kilograms divided by measured height in meters squared and rounded to one decimal place. Overweight was defined as a BMI greater than or equal to 25 or less than 30. Obesity was defined as a BMI greater than or equal to 30. Normal or underweight was defined as a BMI less than 25.

Abbreviations:

A1c – Hemoglobin A1c

AHCCCS – Arizona Health Care Cost Containment System (Arizona's Medicaid Program)

ADA – American Diabetes Association

ADHS – Arizona Department of Health Services

BMI – Body Mass Index

BRFSS – Behavioral Risk Factor Surveillance System

CDC – Centers for Disease Control and Prevention

CDE – Certified Diabetes Educator

CVD – Cardiovascular Disease

DM – Diabetes Mellitus

EHR – Electronic health records

ESRD – End-stage Renal Disease

FPG – Fasting Plasma Glucose

GDM – Gestational Diabetes Mellitus

HDD – Hospital Discharge Data

HIE – Health Information Exchange

IFG – Impaired Fasting Glucose

IGT – Impaired Glucose Tolerance

LEAs – Lower Extremity Amputations

NDPP – National Diabetes Prevention Program

NHANES – National Health and Nutrition Examination Survey

NHIS – National Health Interview Survey

NIH – National Institutes of Health

USDA – United States Department of Agriculture

VS – Vital Statistics

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