Arizona Diabetes Action Plan and Report

January 1, 2021

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, Arizona Diabetes Coalition and Leadership Council and Arizona Diabetes Stakeholders.

~ Health and Wellness for all Arizonans ~

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State of Arizona

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House Bill 2258: Diabetes Action Plan and Report

State of Arizona, January 2021

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Executive Summary

The Arizona Department of Health Services (ADHS) is pleased to release the second Arizona Diabetes Action Plan, a comprehensive report highlighting statewide initiatives and the burden of diabetes on Arizonans. This thorough report is the product of ADHS' collaboration with the Arizona Health Care Cost Containment System (AHCCCS), 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.

Diabetes is now the seventh leading cause of premature death in Arizona and greatly contributes to early disability (1). If improperly managed, diabetes can lead to a multitude of health issues including heart disease, stroke, kidney disease, blindness, nerve damage, lower leg amputation and death (2). In Arizona, the combined yearly direct and indirect costs of diabetes are a staggering $6.8 billion a year (3). With almost 600,000 adults living with diabetes in Arizona, it is also estimated that another 2 million adults (1 in 3 Arizonans) have prediabetes (1; 3). As the numbers increase dangerously, close to 90% of those with prediabetes are not aware they have it, exacerbating the risk of developing type 2 diabetes (1). These numbers are expected to worsen if nothing is done to curtail them. Current population growth trends suggest that by 2050 there could be almost 12 million people living in Arizona, and nearly half of them could be affected by the burden of prediabetes and diabetes (4).

Many people already live in the continuum of diabetes, and the African American, American Indian, and Hispanic/Latino communities are at the greatest risk in Arizona. Greater insulin resistance, decreased insulin secretion, and an increased rate of obesity typically affect these communities, and while genetics play a role in the higher risk reported in these communities, socio-economic disparities equally compound the problem. Historically the lack of access to healthy foods, places to exercise and play, and the ability to receive adequate medical and preventive care all multiply the risk for worse health outcomes in these communities (5). As the State moves to improve health equity, informed by Arizona's 2019 State Health Assessment - which is structured around the goal of Healthy People, Healthy Communities (6), the State can tackle diabetes directly and indirectly, through preventive measures, supporting adequate care, and addressing the social determinants of health.

As Arizonans and diabetes stakeholders, action on the recommendations provided in this report will help reduce the burden of diabetes on all of Arizonans by improving the lives of those affected by this devastating disease.

ADHS would like to extend its most sincere gratitude to each of the collaborators and stakeholders that aided in the production of this report, your assistance is invaluable in this project. Thank you for the dedication and continued collaboration as we work towards reducing the burden of diabetes on the diverse communities of Arizona.

2021 DIABETES IN ARIZONA

IN ARIZONA:

22 CDC-RECOGNIZED NATIONAL DIABETES PREVENTION PROGRAMS

25 ADCES/ADA - ACCREDITED DIABETES PROGRAMS

15 COUNTIES WITH FOOD DESERTS

DIABETES RATES

1 IN 3

estimated 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

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 MILLION** Arizonans 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 600,000 people in Arizona.

There are almost as many people living with diabetes 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 is 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 can develop at any age but is usually diagnosed in children, teenagers and young adults. Nationally, 18,000 youth are diagnosed each year.

Type 1 is estimated at **5%** of all adult diabetes cases.

TREATMENT

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

COMPLICATIONS

Untreated hypoglycemia, or low blood sugar, can lead to seizures, loss of consciousness, and in severe cases death.

Hyperglycemia, or very high blood sugar, can lead to trouble seeing, confusion, drowsiness and comas.

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.

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 of the Second Diabetes Action Plan and Report

The following recommendations were identified by the Planning Team of the Diabetes Action Plan and Report as the most impactful and actionable in addressing the burden of diabetes in Arizona. These recommendations build upon the first report.

Recommendation #1 - Promote access to and coverage for the Centers for Disease Control and Prevention's (CDC) evidence-based lifestyle change program, the National Diabetes Prevention Program (NDPP), across Arizona.

Rationale – CDC estimates that 88 million adults (1 in 3) in the United States have prediabetes. The National DPP has been proven by the Centers for Medicare and Medicaid Services, Office of the Actuary to save $2,650 per Medicare enrollee over a fifteen-month period. The evaluation of results from the Health Care Innovation Award; Centers for Medicaid and Medicare Innovation (CMMI) Project (NDPP report-Appendix 5) indicated the cost savings, but also that participants in the NDPP achieved success with both losing weight and increasing exercise, effectively reducing the incidence of diabetes. CMS estimated that in 2016, Medicare spent $42 billion dollars more on fee-for-service, non-dual eligible, over-the-age of 65 beneficiaries with diabetes than it would have spent if those beneficiaries did not have diabetes. The expenditures included —$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 (7). While the cost saving data is reflective of the CMMI Project, which focused on NDPP interventions in the Medicare eligible population, the NDPP has also been shown to reduce the risk for diabetes in participants between the age of 18 and 65. Therefore, it is reasonable to expect a positive return on investment in that age group.

Since the publication of this report, twenty-two organizations in Arizona offer the NDPP. However, as a state, Arizona does not currently have consistent coverage across all health plans for the NDPP. As the Diabetes Prevention and Control Program at the ADHS supports capacity building, sustainability and reimbursement for the NDPP, it is imperative that capacity is built for NDPP insurance reimbursement across all health plans. Having the NDPP as a covered benefit for all Arizonans; would ensure all eligible participants would have access to this proven cost-savings prevention program.

Recommendation #2 – Provide Diabetes Self-Management Education (DSME) as a covered service (or benefit) by AHCCCS.

Rationale – People with diabetes have to manage the disease every day, and disease management involves complex decisions and care activities that may compound already high healthcare costs. In 2019, AHCCCS reimbursed approximately $251.7 million for primary diagnosis diabetes related services for 144,566 distinct members. Additionally, AHCCCS reimbursed $348.9 million related to co-occurring conditions, $246.4 million for pharmacy, and $22.3 million for diabetic supplies. Diabetes self-management education and support (DSME/S) helps create a toolbox for people with diabetes to properly self-manage their chronic disease with adequate knowledge and appropriate skills to make those important decisions, which can involve sustainable coping skills and healthy behaviors necessary to diabetes care (8). DSME can help individuals with diabetes have better blood sugar control, and according to the National Committee on Quality Assurance, reducing A1C levels by one percentage point (10% to 9%), has demonstrated cost savings of $1,200 - $4,100 per patient (9; 10). Diabetes complications can be expensive and by reducing hospital admissions and readmissions, DSME/S has been shown to be cost effective - fewer complications and fewer hospitalizations save health care costs, and is also an opportunity to save health care costs in a person's lifetime (9).

Recommendation #3 – Encourage AHCCCS health plan contractors 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. It is estimated that 1 out of every 3 Arizonans are considered prediabetic. If prevention and management efforts are not accessible, diabetes rates will increase. The American Diabetes Association estimates that medical expenses for people with diabetes can be 2.3 times more expensive (3). Insulin pumps, blood glucose testing devices, and testing strips are involved in diabetes care, but the costs can be exorbitant and can be inaccessible without health coverage. Reported costs of insulin pumps can be as high as $4,500, with additional testing supplies costing $1,500 per person per year (11, 12). Diabetes prevention should also be considered as a covered benefit thus ensuring all people with diabetes receive adequate support, affordable and adequate coverage for diabetes supplies and medications, the State can address the burden of diabetes. Arizonans can lead healthy and fruitful lives, when diabetes care and management are not cost prohibitive.

Recommendation #4 – Promote efforts that address the social determinants of health that contribute to diabetes burden: increase access to safe and affordable active living; affordable healthy foods and beverage; internet connectivity and technological literacy amidst physical distancing of a pandemic; and affordable healthcare and health education where people work, learn, play and worship in coordination with the Arizona Health Improvement Plan.

Rationale – The 2019 BRFSS data presents that 74.6% of Arizona's adults over the age of 18 did not participate in enough aerobic and muscle strengthening exercises to meet guidelines for optimal health (13). Models estimate that the prevalence of obese adults over the age of 18 in Arizona is 31.4% with the overweight prevalence being close at 34.4% (14). Some counties are showing obesity prevalence in adults by as much as 47.3% in Greenlee, 44.4% in Santa Cruz, 43.5% in La Paz, 42.7% in Apache and 39.1% in Navajo (14).

Poverty is a social determinant of health that can make chronic disease prevention or management inaccessible. Arizona Tribal communities are faced with 35.7% of the population living at or below the federal poverty line (6); Apache and Navajo counties show particularly high rate of poverty (15). Having less resources makes access to adequate management education or care extremely challenging, and with the current COVID health emergency, the connectivity disparities are becoming more evident. With modes of diabetes care, education, and management becoming more virtual and internet-reliant, internet access and technological literacy are increasingly important. Some counties in particular are disparately affected by internet and technology access; Apache county residents have a lack of access to high-speed broadband internet; while the percentages of households in Navajo (37.5%), Gila (33.8%), and La Paz (38.2%) counties have no internet access (15).

Food deserts, as defined by the US Department of Agriculture, are areas in which accessibility to healthy foods are scarce. These areas are identified by the distance or number of stores within a defined area, the neighborhood income level, and access to public transportation. Using these definitions, residents in Arizona's 15 counties experience varying levels of healthy food disparity. Current data delineate that 15.0% of Arizona's census tracts contain food deserts, which is above the national average of 11.1% (15). In 2013, 11.3% of Arizona residents 18 years and older reported eating vegetables at least three times per day and fruits twice daily (16). In addition, there are limited numbers of farmer's markets that accept Supplemental Nutrition Assistance Program (SNAP) and Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) benefits and increasing access to healthy foods and vegetables can contribute to the overall improvement of rates for prediabetes and diabetes in Arizona.

Recommendation #5 – Encourage all Health Plans in Arizona to adopt the new Kidney Health Evaluation for Patients with Diabetes Healthcare Effectiveness Data and Information Set (HEDIS) measures. The HEDIS measure offered by the National Committee on Quality Assurance (NCQA) is used to assess diabetic patients annually for nephropathy using the Kidney Profile (serum creatinine with eGFR and urine albumin-creatinine ratio).

Rationale – Chronic kidney disease (CKD) is a major driver of morbidity, mortality, and healthcare costs in the United States. It is projected that by 2030 approximately 17% of Americans aged 30 years and older will have CKD (17; 18). Furthermore, CKD stemming from diabetes specifically occurs in almost 30% of patients with diabetes (19). In 2017, the total Medicare spending on CKD patients was over $84 billion (20). CKD patients are readmitted to the hospital more

frequently than those with other diagnoses (18) and CKD is the 9th leading cause of death in the U.S. (17). If left untreated, CKD can progress to kidney failure and early cardiovascular disease (20). The most common risk factor for CKD is diabetes (18; 21). The intent of the HEDIS measure is to improve rates of guideline-concordant kidney health evaluation in patients with diabetes to more consistently identify, and potentially treat or delay progression of CKD.

Annual kidney health evaluation using estimated glomerular filtration rate (eGFR) and urine albumin creatinine ratio (uACR) to determine risk of CKD in patients diagnosed with diabetes is recommended by clinical practice guidelines (22; 23; 24) and has been a focus of various local and national health care quality improvement initiatives, including Healthy People 2020 (25). However, performance of these tests in patients with diabetes remains low, with rates that vary across Medicare (41.8%) and private insurers (49.0%) (18). Low rates of detection of CKD in a population of patients with diabetes have been demonstrated to be associated with low patient awareness of their own kidney health status (26). Regular kidney health evaluations, utilizing both eGFR and uACR, provide an opportunity to improve identification and potential reversal of worsening kidney function, particularly in high risk populations, such as those with diabetes. Kidney health evaluation in patients with diabetes, in accordance with clinical guidelines, leads to the identification of CKD patients and the potential treatment and delay of progression of CKD.

Recommendation #6 – Expand diabetes and prevention control activities in Arizona's tribal communities, that include capacity building, technical assistance, and community engagement.

Rationale - Through current CDC 1815 grant funding, ADHS continues to assess the diabetes program support needs of Arizona's Tribal health programs. Throughout 2020, ADHS contacted Tribally-associated health systems and programs to gather information on the gaps in diabetes prevention, care, and management that is unique to Tribal communities. Preliminary findings highlight the following opportunities: staff training and development, program accreditation, and technical support. Anecdotal information from members of the Diabetes Action Plan Planning Report Team also guided the development of this recommendation based on lived-experiences and historical knowledge. Other notable issues that may affect Tribal individuals, especially in light of COVID include internet connectivity and food insecurity. Historically, Tribal communities have increased level of obesity, lack of healthy foods, and communication disparities (15). Addressing these challenges will also assist with addressing the barriers of individuals accessing diabetes support and resources, and the State can support existing Tribal programmatic efforts by increased engagement with Tribal Communities in Arizona. State-level support creates opportunity to build stronger relationships with Tribal and local health departments, and strengthens efforts to coordinate adequately support and funding for Tribal programmatic efforts.

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)

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

2 section 1. Title 36, chapter1, article 2, Arizona Revised

3 Statutes, is amended by adding section 36-142, to read:

4 36-142. Diabetes information: report

5 A. THE DIABETES ACTION PLAN TEAM IS ESTABLISHED IN THE DEPARTMENT

6 OF HEALTH SERVICES. THE TEAM IS COMPOSED OF THE HEAD OF THE FOLLOWING

7 ENTITIES OR THAT PERSON'S DESIGNEE:

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

9 SERVICES.

10 2. THE ARIZONA HEALTH CARE COST CONTAINMENT SYSTEM.

11 3. THE PUBLIC SAFETY PERSONNEL RETIREMENT SYSTEM.

12 4. THE ARIZONA STATE RETIREMENT SYSTEM.

13 5. THE DEPARTMENT OF ADMINISTRATION BENEFITS SERVICES DIVISION.

14 6. DIABETES STAKEHOLDER ORGANIZATIONS, INCLUDING HEALTH INSURERS, A

15 NATIONALLY RECOGNIZED DIABETES ASSOCIATION AND THE ARIZONA DIABETES

16 COALITION.

17 B. THE TEAM SHALL COMPILE A REPORT ONCE EVERY TWO YEARS THAT
18 INCLUDES THE FOLLOWING INFORMATION.
19 1. THE PREVALENCE IN THIS STATE OF:
20 (a) DIABETES BY TYPE.
21 (b) DIABETES BY AGE, RACE AND GENDER.
22 (c) COMPLICATIONS ASSOCIATED WITH DIABETES.
23 (d) PREDIABETES.
24 2. THE COSTS OF DIABETES IN THIS STATE.
25 3. THE ARIZONA DIABETES PROGRAM'S PLAN FOR REDUCING THE INCIDENCE
26 OF DIABETES IN THIS STATE. IMPROVING DIABETES CARE AND REDUCING
27 DIABETES-RELATED HEALTH DISPARITIES, INCLUDING PROPOSED ACTION STEPS.
28 4. A DESCRIPTION OF THE LEVEL OF COORDINATION THAT EXISTS BETWEEN
29 THE DEPARTMENT OF HEALTH SERVICES AND HOSPITALS, THE DEPARTMENT'S
30 CONTRACTED PARTNERS AND OTHER STAKEHOLDERS ON ACTIVITIES AND PROGRAMMATIC
31 ACTIVITIES AND THE LEVEL OF COMMUNICATION ON MANAGING, TREATING OR
32 PREVENTING ALL FORMS OF DIABETES AND ITS COMPLICATIONS.
33 C. THE REQUIREMENTS OF SUBSECTION B, PARAGRAPHS 1 AND 2 OF THIS
34 SECTION ARE LIMITED TO THE DIABETES INFORMATION, DATA, INITIATIVES AND
35 PROGRAMS WITHIN EACH AGENCY BEFORE THE EFFECTIVE DATE OF THIS SECTION,
36 UNLESS THERE IS UNOBLIGATED FUNDING FOR DIABETES IN AN AGENCY THAT MAY BE
37 USED FOR NEW RESEARCH, DATA COLLECTION AND REPORTING FOR THE PURPOSES OF
38 SUBSECTION B, PARAGRAPHS 1 AND 2 OF THIS SECTION.
39 D. ON OR BEFORE JANUARY 1, 2019 AND ONCE EVERY TWO YEARS
40 THEREAFTER, THE DEPARTMENT SHALL PROVIDE THE REPORT REQUIRED BY SUBSECTION
41 B OF THIS SECTION. INCLUDING ITS RECOMMENDATIONS FOR ACTION, TO THE
42 GOVERNOR, THE PRESIDENT OF THE SENATE AND THE SPEAKER OF THE HOUSE OF
43 REPRESENTATIVES AND SHALL SUBMIT A COPY TO THE SECRETARY OF STATE.

Appendix 2: What is Diabetes?

Diabetes Overview:

According to the CDC, in 2018 around 34.2 million Americans had diabetes: roughly 10.5% of the U.S. population (27). One-third of Americans who have diabetes are unaware they have it, and another one-third of Americans have prediabetes (3). To understand diabetes, it is important to understand how your body uses glucose and insulin. The main source of fuel for energy your body needs is glucose, a sugar. Glucose enters the body from the food broken down in digestion. This simple sugar travels through the bloodstream and enters the cells of 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 (5). 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 (28). 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 (29).

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 (30).

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 (5).

Type 2 Diabetes:

Type 2 diabetes accounts for 90%-95% of the total cases of diabetes in the United States (5). 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 (31)	Non-Modifiable (31)	Socially Determined (32)
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 (33). 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 (34).

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% (35). 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%) (35).

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 (36). 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 (37). 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.

A person 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, and American Indians are at higher risk (5).

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% (38; 39).

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 (2; 5; 40):

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 (40). 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 (41)
- People with diabetes are 2 to 3 times more likely to have depressive episodes that those without diabetes.

Appendix 3: Diabetes in Arizona

I. Hospital and Emergency Department Discharges

The number and rates of discharges (per 10,000 county residents) for diabetes specific visits varied by county. While the total number of discharges was highest where population density is highest; the highest rate of discharges per 10,000 county residents were in Gila, Santa Cruz, and La Paz counties (Table 1). A detailed description of diabetes costs by diabetes diagnosis and payer type can be found in Appendix 4.

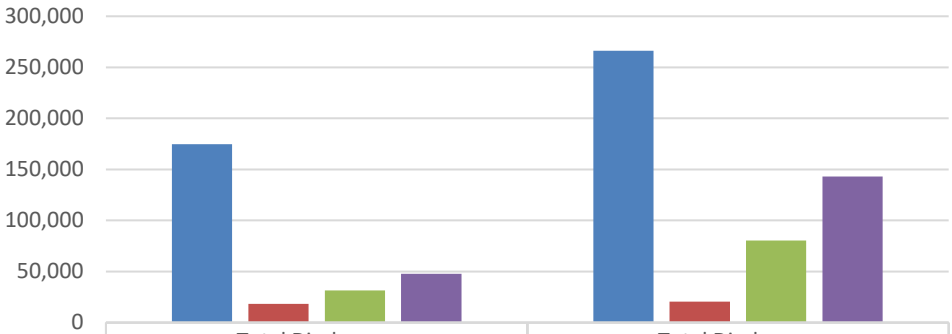
Table 1. Diabetes Hospitalization or Emergency Department Visits and rate per 10,000, by hospital county, Arizona 2019

	Diabetes-Related (any Diagnosis)		Diabetes-Specific (Primary Diagnosis)		
	Total Discharges	Total Charges ($)	Total Discharges	Total Charges ($)	Rate (per 10,000)
TOTAL	440,905	$16,340,544,223	39,017	$1,200,237,689	53.6
Apache	2,519	$105,045,073	380	$8,040,409	52.9
Cochise	9,301	$249,263,908	927	$21,502,277	73.6
Coconino	6,116	$149,164,717	566	$10,345,602	39.4
Gila	5,373	$161,664,588	471	$12,483,348	87.2
Graham	3,127	$67,952,745	232	$6,549,248	59.7
Greenlee	469	$12,589,753	28	$856,110	29.5
La Paz	1,525	$66,542,059	173	$5,481,547	82.0
Maricopa	243,348	$9,499,979,367	22,011	$684,354,566	49.1
Mohave	18,732	$746,208,047	1,297	$45,386,928	61.1
Navajo	8,066	$268,217,089	692	$19,914,618	62.4
Pima	60,198	$2,137,985,088	5,414	$185,441,072	51.7
Pinal	30,952	$1,191,951,013	2,553	$84,551,613	55.2
Santa Cruz	3,305	$92,723,255	373	$9,633,383	80.2
Yavapai	15,216	$455,017,497	1,112	$27,229,977	47.2
Yuma	16,763	$473,678,948	1,380	$38,672,594	64.6

Data Source: Arizona Hospital Discharge Database, 2019; Hospital location (county), includes all encounters (resident and non-residents of Arizona); Diabetes ICD-10 codes included: E08, E09, E10, E11, E13, O24

In 2019, there were 440,905 diabetes-related (diabetes ICD-10 in any diagnostic position) hospitalization or emergency department (ED) discharges in Arizona; and 39,017 diabetes-specific (diabetes ICD-10 as the primary diagnosis, first position) discharges (Figure 1).

Figure 1. Diabetes Hospitalization or Emergency Department Visits, by ICD-10 diagnostic position, Arizona 2019



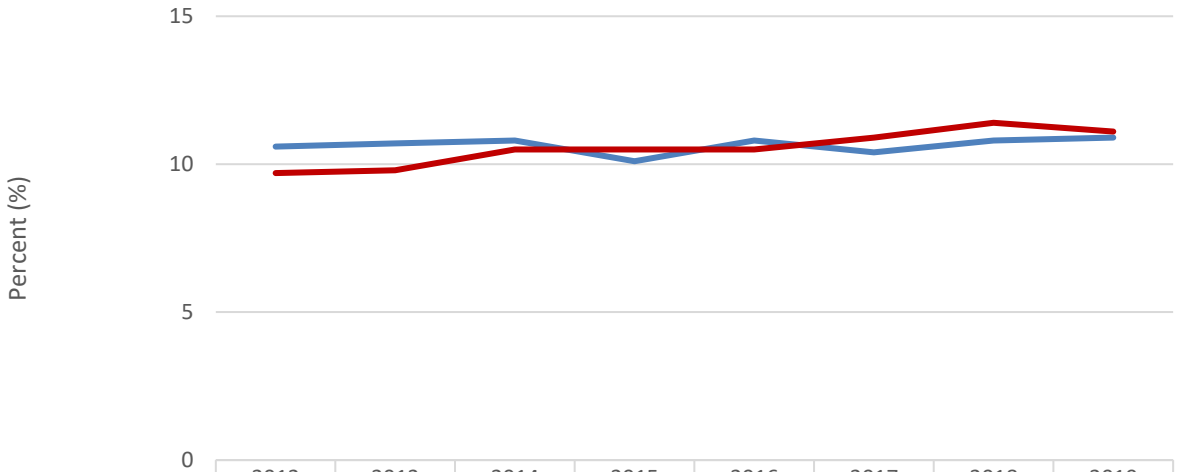
	Total Discharges Hospitalization	Total Discharges Emergency Dept.
Diagnostic Position: Any	174,755	266,150
Diagnostic Position: 1	18,366	20,651
Diagnostic Position: 1-2	31,583	80,322
Diagnostic Position: 1-3	47,767	143,010

Data Source: Arizona Hospital Discharge Database, 2019; Diabetes ICD-10 codes included: E08, E09, E10, E11, E13, O24

II. Morbidity

The percentage of Arizonan adults who reported ever having diabetes has been fairly consistent from 2016 (10.8) to 2019 (10.9) (Figure 2). In 2019, the Arizona rate of diabetes was also similar to the national average (11.1). Diabetes and prediabetes prevalence vary across Arizona counties. The highest stable diabetes rates are in Apache and Navajo counties (Figure 3).

Figure 2. Arizona and United States Respondents Who Reported a Health Care Professional Told Them That They Have Diabetes, BRFSS 2012-2019

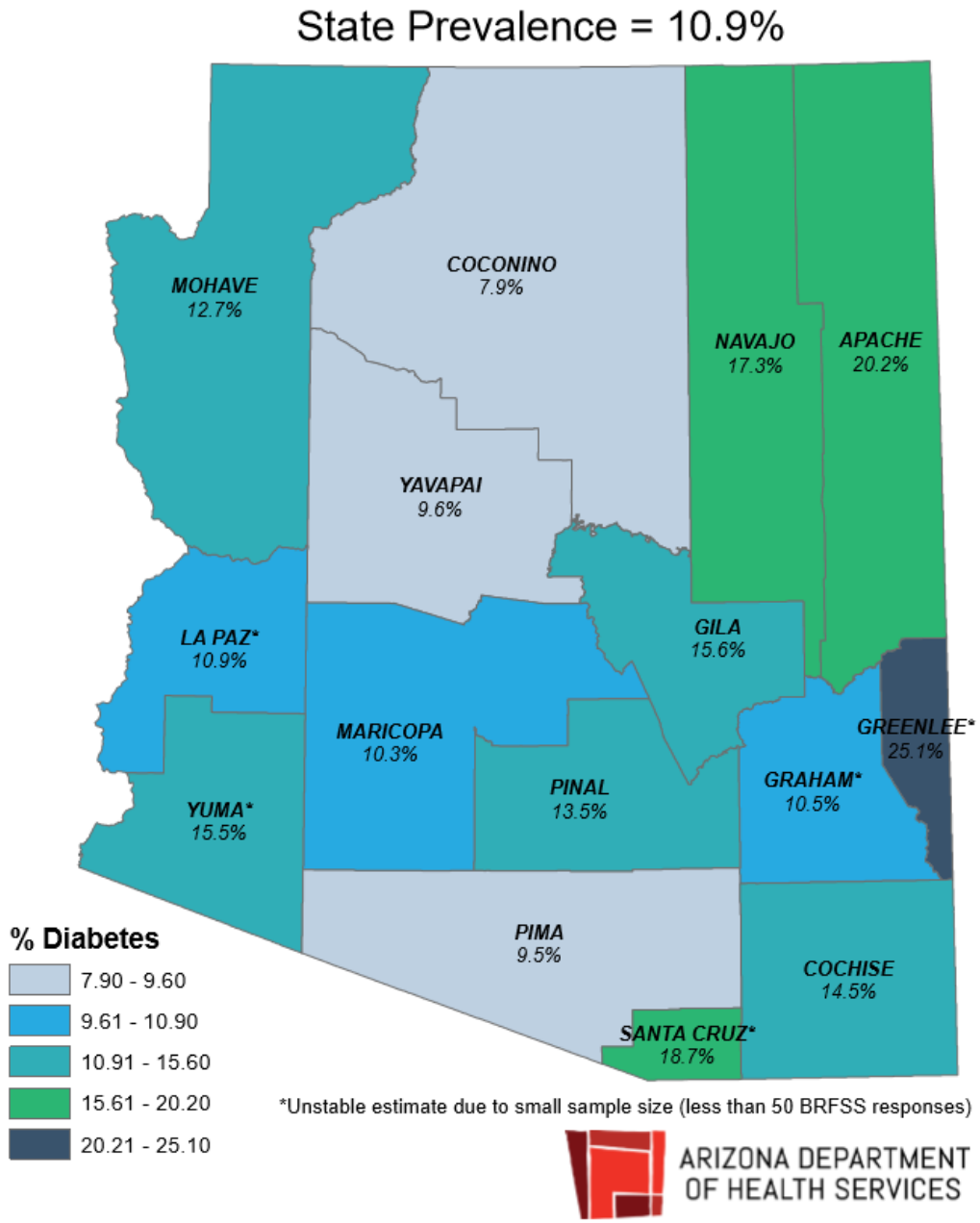


	2012	2013	2014	2015	2016	2017	2018	2019
Arizona	10.6	10.7	10.8	10.1	10.8	10.4	10.8	10.9
United States	9.7	9.8	10.5	10.5	10.5	10.9	11.4	11.1

Data Source: BRFSS, 2012-2019

The highest rate of diabetes was in Pima county (Figure 3). Prevalence rates for some counties are considered unstable due to small sample size.

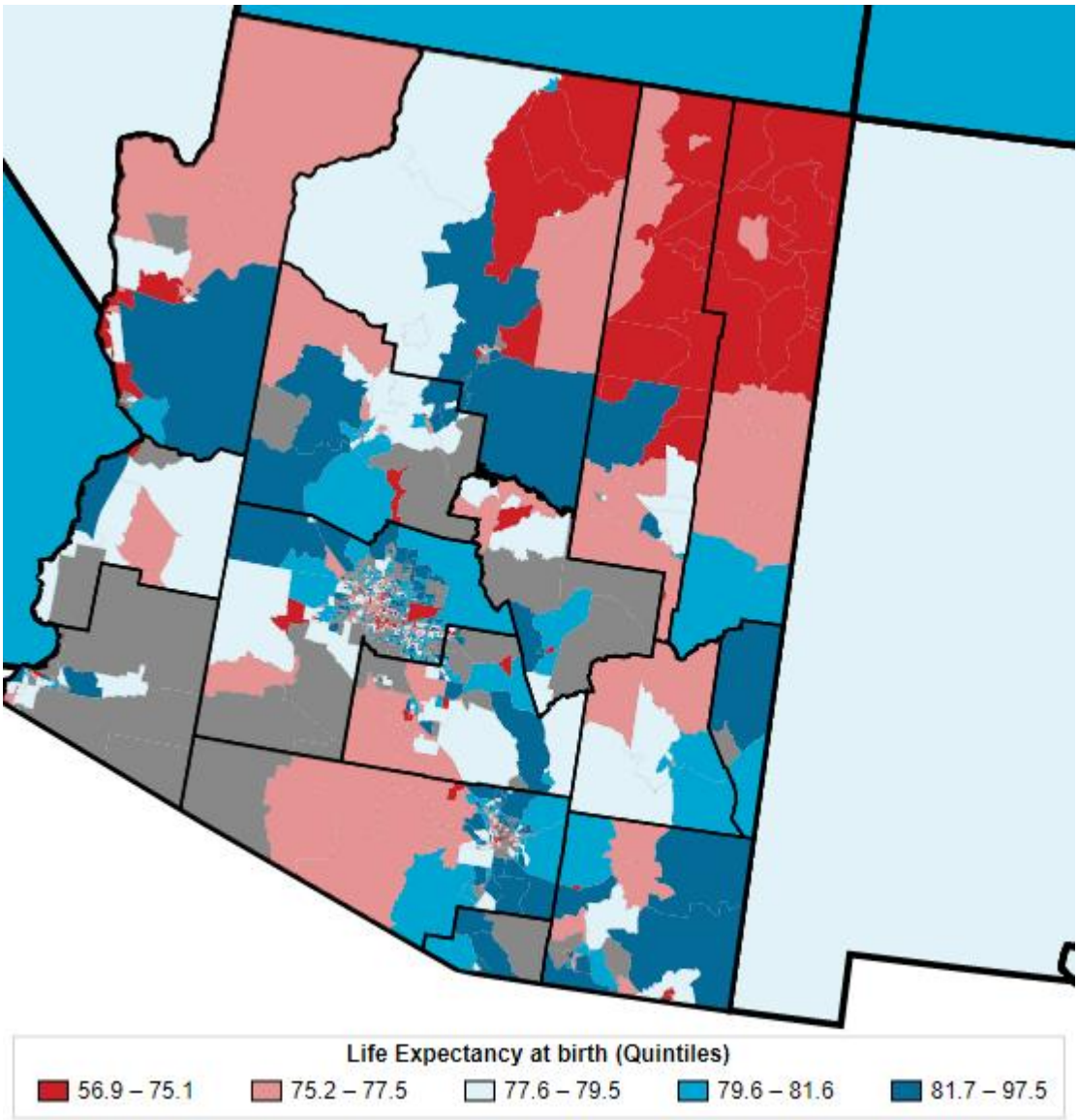
Figure 3: Arizona Respondents Who Reported Being a Health Care Professional Told Them That They Have Diabetes, by County, BRFSS 2019



Data Source: BRFSS, 2019

These differences represent critical health and social issues as related to disease-free quality of life. Individual health is impacted not only by genetic code, but also by zip code; as illustrated by approximate life expectancy within a city (Figure 4) (42).

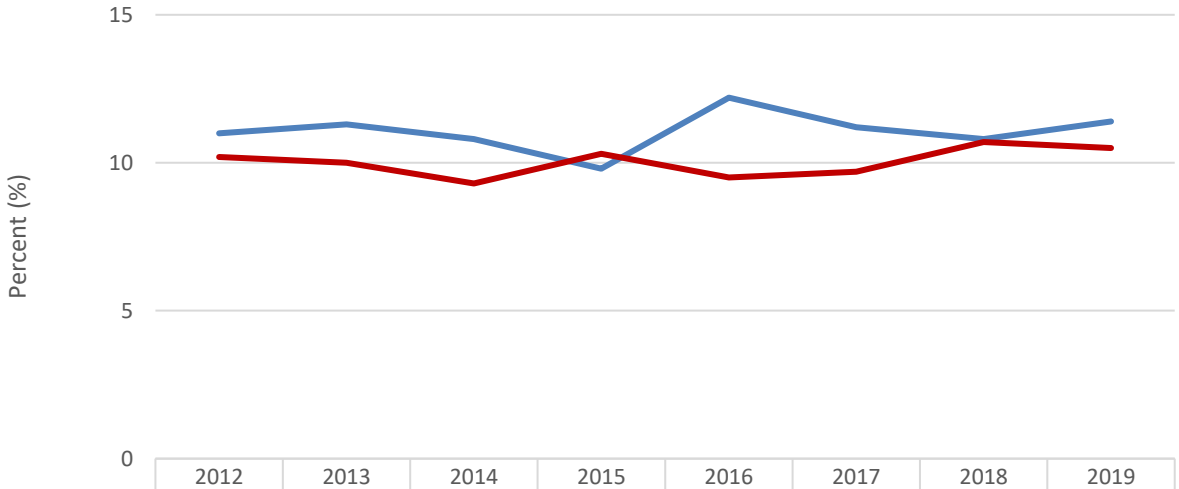
Figure 4. Life Expectancy at Birth by Zip Code, Arizona Census Tracts, 2010-2015



Data Source: National Center for Health Statistics, 2020. https://www.cdc.gov/nchs/data-visualization/life-expectancy/

In 2019, the prevalence of diabetes and prediabetes was similar for males and females (Figure 5, Tables 2-3). The percentage of adults who have ever had diabetes in Arizona are similar between males and females (Figure 5). Trends from 2012-2019 of adults who have ever had diabetes have not consistently increased or decreased.

Figure 5. Arizona and United States Respondents Who Reported a Health Care Professional Told Them That They Have Diabetes, by Gender, BRFSS 2012-2019



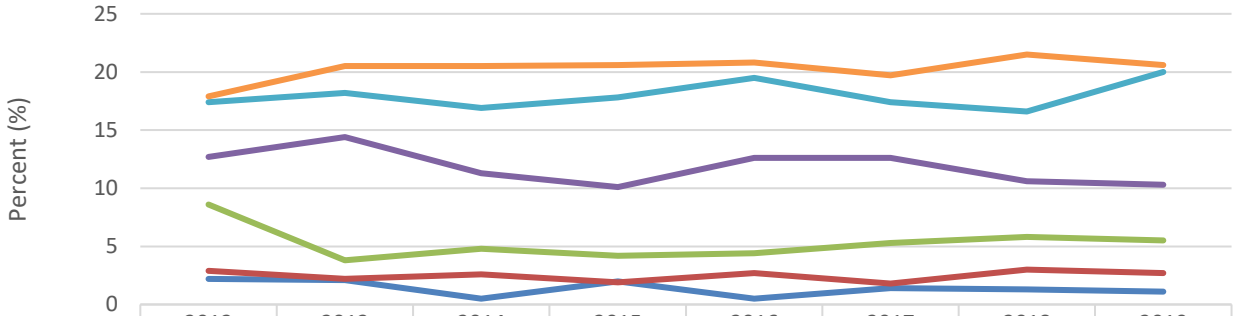
	2012	2013	2014	2015	2016	2017	2018	2019
Male	11.0	11.3	10.8	9.8	12.2	11.2	10.8	11.4
Female	10.2	10.0	9.3	10.3	9.5	9.7	10.7	10.5

Data Source: Arizona BRFSS, 2012-2019

The percentage of adults who have ever had diabetes in Arizona are higher among the oldest age groups (45+) (Figure 6). Trends from 2012-2019 of adults who have ever had diabetes have increased among those 35-44, 55-64, and 65+ years of age. BRFSS does not survey persons younger than 18; therefore, rates for these persons are not included.

In 2019, the prevalence of diabetes and prediabetes was similar for males and females and higher for persons aged 45 years or older than persons younger than 45 years (Figure 6, Tables 2-3).

Figure 6. Arizona and United States Respondents Who Reported a Health Care Professional Told Them That They Have Diabetes, by Age Groups, BRFSS 2012-2019

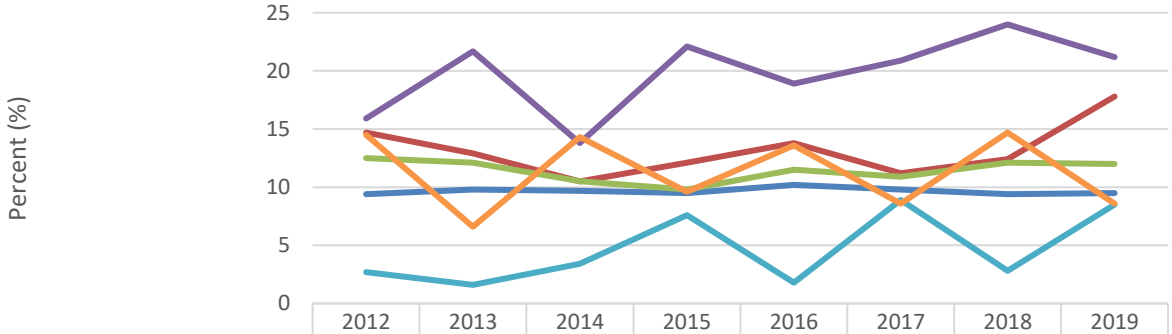


	2012	2013	2014	2015	2016	2017	2018	2019
18-24	2.2	2.1	0.5	2.0	0.5	1.4	1.3	1.1
25-34	2.9	2.2	2.6	1.9	2.7	1.8	3.0	2.7
35-44	8.6	3.8	4.8	4.2	4.4	5.3	5.8	5.5
45-54	12.7	14.4	11.3	10.1	12.6	12.6	10.6	10.3
55-64	17.4	18.2	16.9	17.8	19.5	17.4	16.6	20.0
65+	17.9	20.5	20.5	20.6	20.8	19.7	21.5	20.6

Data Source: Arizona BRFSS, 2012-2019

The percentage of adults who have ever had diabetes in Arizona are higher among American Indians, Black/African Americans, and Hispanics (Figure 7). Trends from 2012-2019 of adults who have ever had diabetes have increased among American Indians, Black/African Americans, and Asian/Pacific Islanders.

Figure 7. Arizona and United States Respondents Who Reported a Health Care Professional Told Them That They Have Diabetes, by Race/Ethnicity, BRFSS 2012-2019

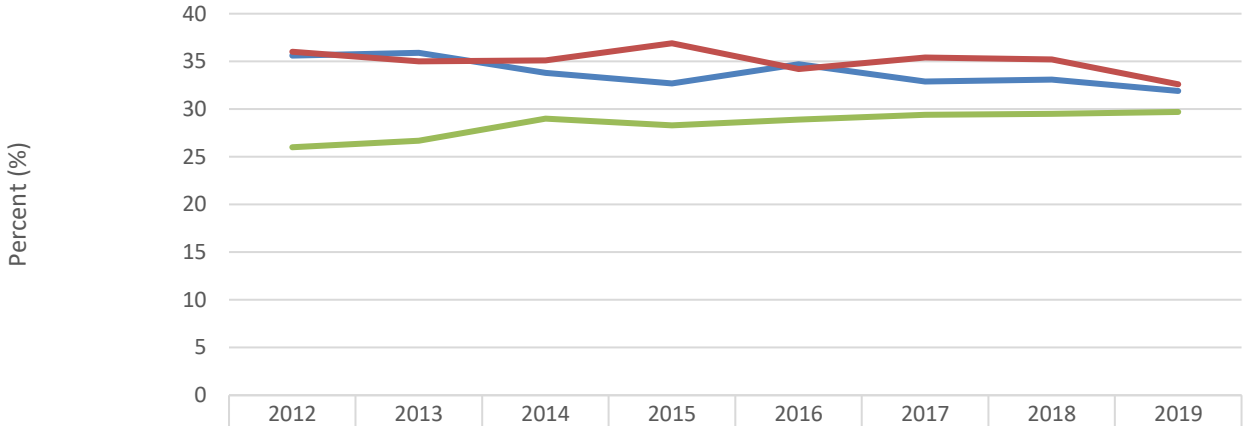


	2012	2013	2014	2015	2016	2017	2018	2019
White Non-Hispanic	9.4	9.8	9.7	9.5	10.2	9.8	9.4	9.5
Black/African American	14.7	12.9	10.5	12.1	13.8	11.2	12.4	17.8
Hispanic	12.5	12.1	10.5	9.8	11.5	10.9	12.1	12.0
American Indian	15.9	21.7	13.8	22.1	18.9	20.9	24.0	21.2
Asian/Pacific Islander	2.7	1.6	3.4	7.6	1.8	8.9	2.8	8.5
Other*	14.5	6.6	14.3	9.6	13.6	8.6	14.7	8.6

Data Source: Arizona BRFSS, 2012-2019

The prevalence of diabetes and prediabetes is highest among persons with a body mass index classified as obese compared to those classified as normal or overweight (Figure 8; Tables 2-3). Figure 8 shows body mass index (BMI) category trends in Arizona from 2012-2019. The percentage of Arizona adults categorized as obese has increased from 2012-2019.

Figure 8. Arizona Adult Body Mass Index, BRFSS 2012-2019



	2012	2013	2014	2015	2016	2017	2018	2019
Normal weight	35.6	35.9	33.8	32.7	34.7	32.9	33.1	31.9
Overweight	36.0	35.0	35.1	36.9	34.2	35.4	35.2	32.6
Obese	26.0	26.7	29.0	28.3	28.9	29.4	29.5	29.7

Data Source: BRFSS, 2012-2019. Notes: BMI is a person's weight in kilograms divided by the square of height in meters. The standard weight status categories associated with BMI ranges for adults are as follows: underweight (<18.5), normal or healthy weight (18.5-24.9), overweight (25.0-29.9), and obese (≥30.0).

Table 2 shows the percentage of Arizonans who were told by a healthcare professional they had diabetes by gender, age, marital status, race/ethnicity, education, income, and employment status.

The prevalence of diabetes and prediabetes was also higher for those without a high school diploma compared with those with have a high school degree or higher; and highest for persons making less than $25,000 than for persons making more than $25,000 (Table 2-3).

Table 2. Arizonan respondents who reported a healthcare professional told them they have diabetes, 2019

Characteristics	%	n[1]	95% Confidence Interval[2]
United States Total	11.1	57,401	
Arizona Total	10.9	1263	9.9 - 12.0
Gender			
Male	11.4	615	9.9 - 12.9
Female	10.5	648	9.1 - 11.9
Age			
18-24	*	*	*
25-34	2.7	23	1.1 - 4.3
35-44	5.5	56	3.3 - 7.8
45-54	10.3	148	7.4 - 13.1
55-64	20.0	307	16.6 - 23.4
65+	20.6	723	18.4 - 22.8
Marital Status			
Married[3]	10.8	643	9.4 - 12.2
Previously Married[4]	14.4	229	11.4 - 17.4
Widowed	23.8	242	19.2 - 28.4
Never Married	5.8	142	4.1 - 7.6
Race/Ethnicity			
White Non-Hispanic	9.5	753	8.5 - 10.6
Black/African American	17.8	42	11.3 - 24.3
Hispanic	12.0	213	9.5 - 14.5
American Indian	21.2	159	14.7 - 27.7
Asian/Pacific Islander	8.5	10	2.3 - 14.6
Other[5]	8.6	53	4.7 - 12.6
Education			
Less than High school graduate	16.5	152	12.2 - 20.7
High school graduate/GED	9.7	318	7.9 - 11.4
Some college/technical school	11.4	420	9.7 - 13.1
College/technical school graduate	8.6	369	7.2 - 10.0
Income			
Less than $15,000	18.5	143	13.5 - 23.5
$15,000 to $24,999	15.4	217	11.9 - 18.9
$25,000 to $34,999	11.1	136	7.8 - 14.4
$35,000 to $49,999	10.5	151	7.6 - 13.5
$50,000 to $74,999	12.7	168	9.7 - 15.7
$75,000 +	6.6	205	5.1 - 8.0
Employment Status			
Employed/Self-Employed	6.2	310	5.1 - 7.4
Out of Work	12.3	57	7.2 - 17.5
Homemaker	7.3	56	3.7 - 11.0
Student	*	*	*
Retired	20.8	632	18.5 - 23.2
Unable to Work	30.3	185	23.6 - 36.9

Data Source: BRFSS, 2019. Use caution when interpreting percent based on less than 50. Notes: *Count and percent based on 6 or less responses have been suppressed; [1]n – number of survey respondents; [2]The confidence interval is the range of values the estimated percent diabetes could exist (e.g., Arizona diabetes percentages 10.9% could be as low as 9.9% or as high as 12.0%); [3]includes members of unmarried couples; [4]Includes divorced and separated; [5]Includes other races and persons reporting multiple races.

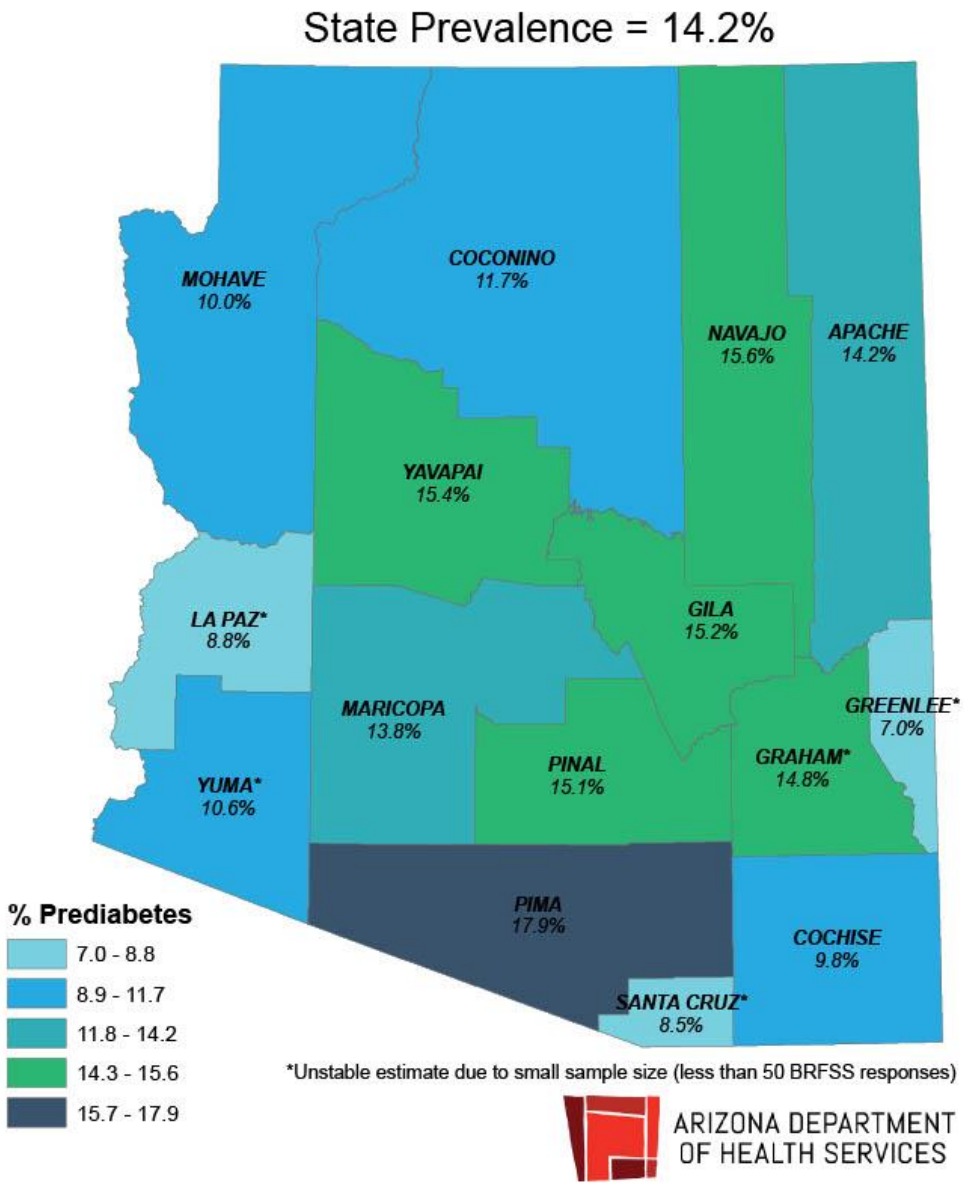
Table 3 shows the percentage of Arizonans who were told by a healthcare professional they had prediabetes by gender, age, marital status, race/ethnicity, education, income, and employment status.

Table 3. Arizonan respondents who reported a healthcare professional told them they have prediabetes, 2018

Characteristics	%	n[1]	95% Confidence Interval[2]
United States Total	12.0	20,485	
Arizona Total	14.2	955	12.7 - 15.7
Gender			
Male	13.2	420	11.3 - 15.2
Female	15.2	535	12.9 - 17.5
Age			
18-24	7.6	20	3.4 - 11.7
25-34	7.6	52	4.6 - 10.6
35-44	13.7	105	9.9 - 17.5
45-54	16.8	140	12.8 - 20.9
55-64	20.8	234	16.1 - 25.6
65+	17.5	404	15.2 - 19.9
Marital Status			
Married[3]	14.7	523	12.6 - 16.8
Previously Married[4]	17.2	190	13.3 - 21.1
Widowed	19.4	110	14.2 - 24.6
Never Married	10.0	127	7.0 - 12.9
Race/Ethnicity			
White Non-Hispanic	12.8	627	11.1 - 14.4
Black/African American	17.7	23	9.3 - 26.1
Hispanic	16.0	145	12.3 - 19.7
American Indian	24.8	103	17.6 - 31.9
Asian/Pacific Islander	10.8	12	2.5 - 19.2
Other[5]	14.8	28	6.8 - 22.7
Education			
Less than High school graduate	18.8	64	12.4 - 25.2
High school graduate/GED	14.9	236	12.0 - 17.8
Some college/technical school	13.6	301	11.3 - 15.9
College/technical school graduate	11.8	352	10.0 - 13.6
Income			
Less than $15,000	21.4	100	12.1 - 30.7
$15,000 to $24,999	14.8	144	10.8 - 18.8
$25,000 to $34,999	15.4	102	10.7 - 20.1
$35,000 to $49,999	17.0	123	12.2 - 21.7
$50,000 to $74,999	14.2	146	10.5 - 18.0
$75,000 +	10.9	203	8.6 - 13.1
Employment Status			
Employed/Self-Employed	12.0	367	10.1 - 13.9
Out of Work	8.5	43	4.3 - 12.6
Homemaker	18.5	49	9.6 - 27.4
Student	9.4	16	2.8 - 16.0
Retired	19.4	381	16.6 - 22.1
Unable to Work	25.3	96	17.9 - 32.6

Data Source: BRFSS, 2018 (prediabetes not asked on 2019 BRFSS). Use caution when interpreting rates based on less than 50. Notes: [1]n – number of survey respondents; [2]The confidence interval is the range of values the estimated percent prediabetes could exist (e.g., Arizona total prediabetes percent of 14.2% could be as low as 12.7% or as high as 15.7%); [3]includes members of unmarried couples; [4]Includes divorced and separated; [5]Includes other races and persons reporting multiple races.

Figure 9. Arizona Respondents Who Reported Being Diagnosed with Prediabetes, by County and Region, BRFSS 2018

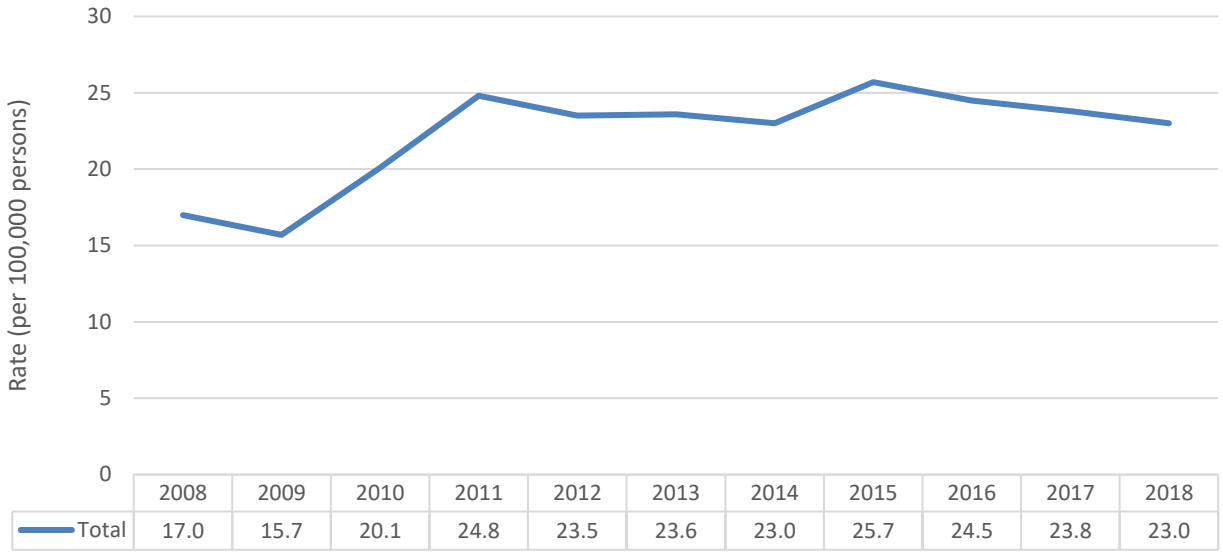


Data Source: Behavioral Risk Factor Surveillance System, 2018

III. Mortality

Arizona has experienced an 11% decrease in diabetes related deaths from 2015 (25.7) to 2018 (23.0) (Figure 10).

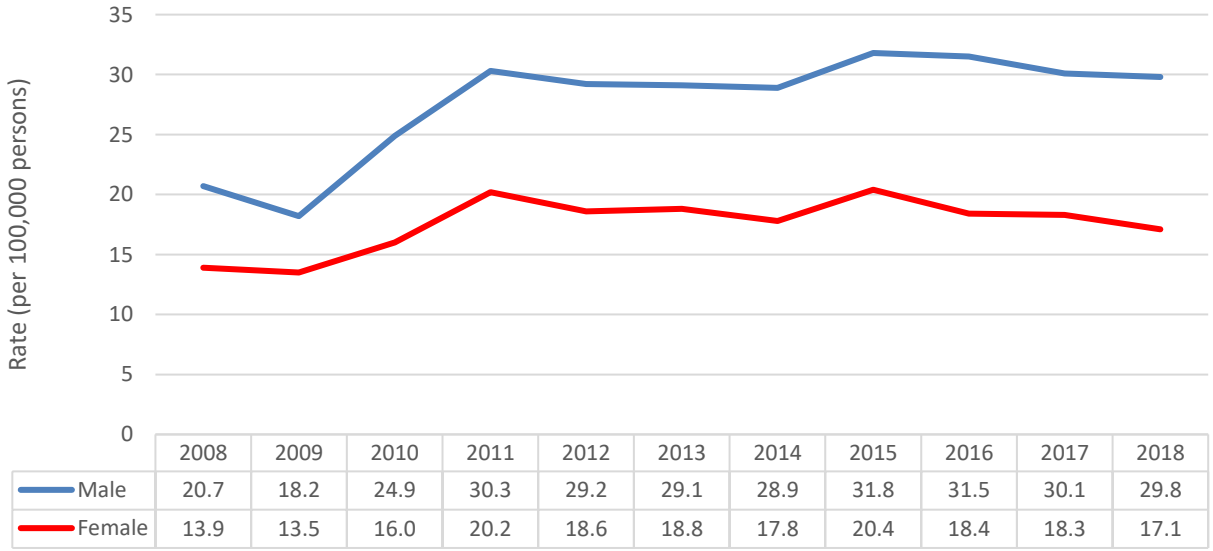
Figure 10. Age-adjusted mortality rates (per 100,000 persons) for diabetes, 2008-2018



Data Source: Arizona Vital Statistics, 2008-2018. Rates are age-adjusted and calculated as a rate per 100,000 persons.

Mortality rates for diabetes are higher for males than females (Figure 11).

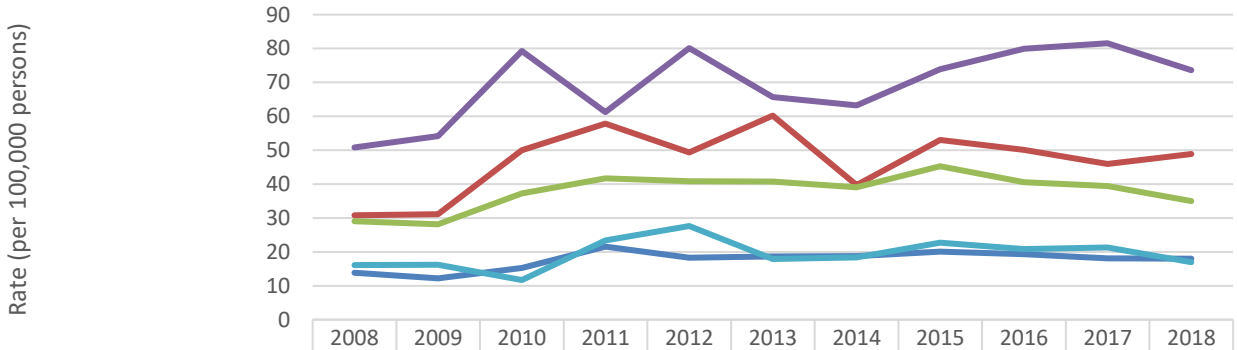
Figure 11. Age-adjusted mortality rates (per 100,000 persons) for diabetes, by gender 2008-2018



Data Source: Arizona Vital Statistics, 2008-2018. Rates are age-adjusted and calculated as a rate per 100,000 persons.

Diabetes mortality rates are higher for American Indian/Alaska Natives, Hispanics, and Black/African Americans than Whites or Asian/Pacific Islanders (Figure 12).

Figure 12. Age-adjusted mortality rates (per 100,000 persons) for diabetes, by race/ethnicity 2008-2018

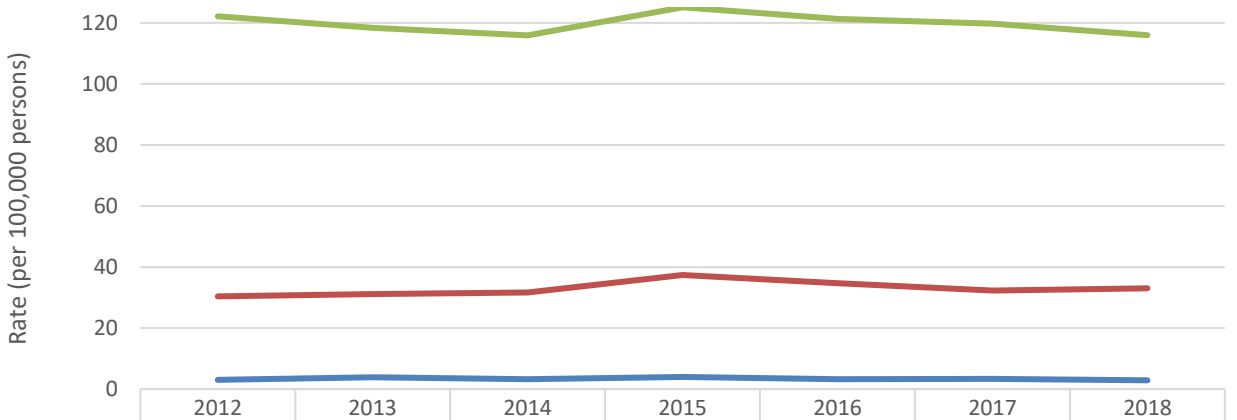


	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
White Non-Hispanic	13.8	12.2	15.2	21.6	18.3	18.6	18.8	20.1	19.3	18.1	18.0
Black/African American	30.8	31.1	50.0	57.8	49.4	60.2	39.7	53.0	50.1	45.9	48.9
Hispanic	29.1	28.1	37.3	41.7	40.8	40.7	39.1	45.3	40.5	39.4	35.0
American Indian	50.8	54.2	79.3	61.3	80.2	65.7	63.2	73.9	79.9	81.6	73.6
Asian/Pacific Islander	16.1	16.2	11.7	23.3	27.6	17.9	18.3	22.7	20.8	21.3	17.0

Data Source: Arizona Vital Statistics, 2008-2018. Rates are age-adjusted and calculated as a rate per 100,000 persons.

Diabetes mortality rates are higher for persons aged 65+ or 45-64 than persons aged 20-44 years of age (Figure 13).

Figure 13. Mortality rates (per 100,000 persons) for diabetes, by selected age groups 2008-2018

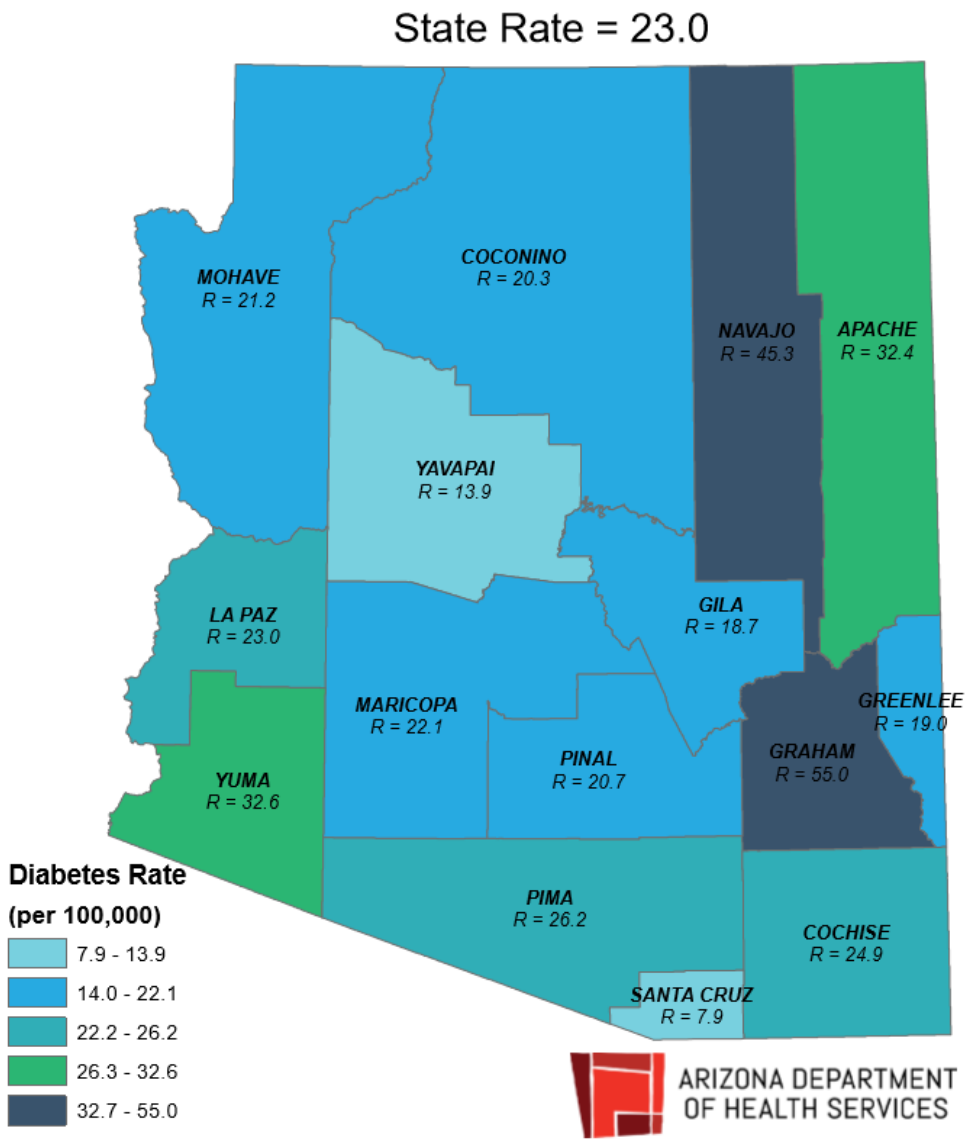


	2012	2013	2014	2015	2016	2017	2018
20-44	3.1	3.9	3.3	4.0	3.3	3.4	2.9
45-64	30.4	31.2	31.7	37.4	34.7	32.3	33.0
65+	122.1	118.4	115.9	125.1	121.3	119.7	116.0

Data Source: Arizona Vital Statistics, 2008-2018. Rates are calculated as a rate per 100,000 persons.

The mortality rate of diabetes varies across counties in Arizona. Compared to the overall state rate of 23.0 (deaths per 100,000 persons), elevated mortality rates were observed in Graham (55.0), Navajo (45.3), Yuma (32.6), and Apache (32.4) counties (Figure 14).

Figure 14. Mortality rates (per 100,000 persons) for diabetes, by county, 2018



Data Source: Arizona Vital Statistics, 2018

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.

Table 4 below identifies eight 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.

Table 4. Data Sources Used to Approximate Diabetes-Related Burden

Organization	Name of Report	Link
Arizona Department of Health Services	Hospital Discharge Database	https://pub.azdhs.gov/health-stats/hip/index.php
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/docs/state-fact-sheets/ADV_2020_State_Fact_sheets_AZ.pdf

UnitedHealth Foundation	America's Health Rankings	https://www.americashealthrankings.org/explore/annual/measure/Diabetes/state/AZ https://www.americashealthrankings.org/learn/reports/2019-senior-report
National Centers for Health Statistics (CDC)	National Health Interview Survey	https://www.cdc.gov/nchs/nhis/data-questionnaires-documentation.htm
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	https://www.countyhealthrankings.org/app/arizona/2020/measure/outcomes/60/data https://gis.cdc.gov/grasp/diabetes/DiabetesAtlas.html
Sanofi: Managed Care Digest Series	Arizona Type 2 Diabetes Report™	Arizona Type 2 Diabetes Report™ - 2020

Diabetes Cost Estimation Resources – not an exhaustive list

Cost Estimation Research/Method

Diabetes costs are typically broken into direct medical or indirect costs. Direct costs are associated with diabetes-related medical billing. Indirect costs may be financial burdens wherein diabetes has contributed to other primary, secondary, and tertiary conditions such as diseases of the heart, kidney disease, blindness, lower leg amputations and arthritis. Indirect costs also include absenteeism, reduced productivity while at work, or inability to work as a result of disease-related disability. These financial costs could also be described as explicit or implicit costs. The ADHS Hospital Discharge Database (HDD) 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.

Arizona Diabetes Operational and Financial Data

The following State of Arizona data sources were used:

1. UnitedHealthcare | ASRS and PSPRS
2. Arizona Department of Administration - Medical Data
3. AHCCCS - Medical Data

The following external data sources were used:

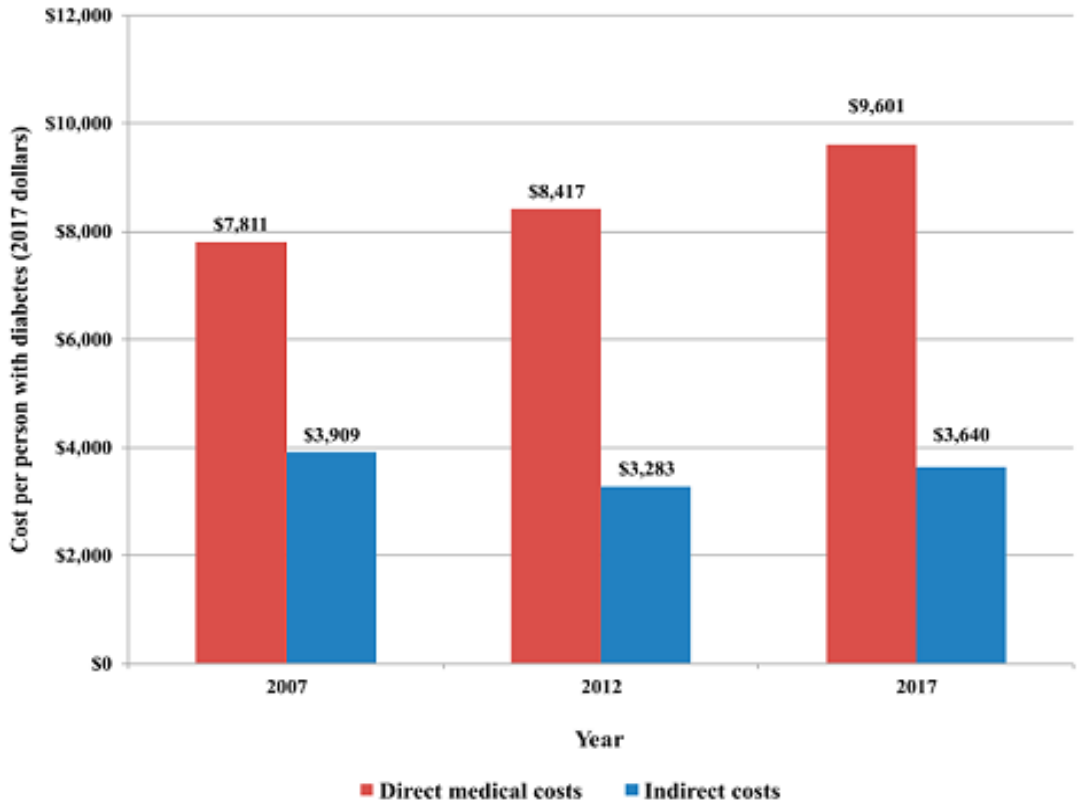
1. American Diabetes Association - Economic Cost of Diabetes
2. Behavioral Risk Factor Surveillance System (BRFSS)
3. Hospital Discharge Data

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.

Until a data framework is developed with a sustainable cost estimation model, Arizona will use the 2017 ADA diabetes per capita cost estimate to reference direct medical and indirect costs for 2019. This will provide a per capita cost estimate for different Arizona populations that lack specific per capita cost.

The average direct medical cost per person, per capita was approximately $9,601 (in 2017 Dollars). The average indirect cost per person, per capita was approximately $3,640 (in 2017 Dollars) (Figure 15).

Figure 15. Average Direct and Indirect Costs Associated with Diabetes, 2007-2017 (in 2017 dollars)



Data Source: American Diabetes Association, Economic Cost of Diabetes in the U.S. 2017

The time frame for the Arizona diabetes cost estimate within this report is based on one year, primarily using data from the 2019 HDD (Tables 5-6). This cost estimate may 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.

State Cost Estimate – Hospital Discharge Data (HDD):

Table 5. Diabetes-related and Diabetes-specific Hospitalization or Emergency Department Discharges and Costs, by Diabetes Type, Arizona 2019

	Diabetes-Related (any Diagnosis)		Diabetes-Specific (Primary Diagnosis)	
	Total Discharges	Total Charges ($)	Total Discharges	Total Charges ($)
Total	440,905	$16,340,544,223	39,017	$1,200,237,689
Underlying Conditions	405	$38,230,767	26	$330,119
Drug or Chemical Induced	444	$54,866,982	46	$1,256,967
Type 1	19,084	$627,528,100	7,158	$197,504,136
Type 2	411,974	$15,388,945,995	27,808	$909,704,066
Pregnancy Related	10,214	$263,065,463	3,834	$86,996,850
Other	651	$28,659,605	145	$4,445,551

Data Source: Arizona Hospital Discharge Database, 2019; Diabetes ICD-10 codes included: E08, E09, E10, E11, E13, O24

Table 6. Diabetes-related and Diabetes-specific Hospitalization or Emergency Department Discharges, Costs, and Length of Stay, by Payer Type, Arizona 2019

	Diabetes-Related (any Diagnosis)			Diabetes-Specific (Primary Diagnosis)		
	Total Discharges	Total Charges ($)	Avg. Length Stay (days)*	Total Discharges	Total Charges ($)	Avg. Length Stay (days)
TOTAL	440,905	$16,340,544,223	2.82	39,017	$1,200,237,689	2.60
AHCCCS/Medicaid	109,636	$3,128,106,874	2.49	14,713	$379,360,598	2.36
Medicare	230,034	$9,756,784,192	3.13	13,044	$526,361,646	3.18
Other Federal	7,982	$299,547,201	2.74	809	$19,495,578	2.45
Private	74,803	$2,661,346,842	2.55	8,217	$230,097,258	2.31
Self-Pay	11,979	$261,754,314	1.80	1,615	$30,315,204	1.73
Charity	275	$16,375,367	4.35	53	$1,733,356	2.70
Other	6180	$216,462,371	2.51	565	$12,869,208	2.08

Data Source: Arizona Hospital Discharge Database, 2019; Diabetes ICD-10 codes included: E08, E09, E10, E11, E13, O24

According to the American Diabetes Association, the total Arizona estimated cost of diagnosed diabetes in 2017 was $6.8 billion (3). $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 2019 ADHS HDD, 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 above (Table 5), there were more than 440,000 discharges from inpatient hospital care or the Emergency Department due to diabetes in 2019, with the majority of hospital stays occurring within the Medicare and Medicaid populations. The average hospital stay for these discharges was 2.5-3.1 days.

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

The Arizona State Legislation directed the Arizona Department of Health Services, the Arizona Department of Administration, Arizona Health Care Cost Containment System, Arizona State Retirement System, Arizona 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 various agency and organizational diabetes initiatives that are currently being implemented to serve the people of Arizona.

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 Chronic Disease and Health Promotions, 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 has been 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, beginning in 2016 and ending in 2020.

Arizona Health Improvement Plan (AzHIP) Future:

In March of 2020, the AzHIP 2020 Summit was hosted to celebrate the accomplishments of the past five years, and an introduction to the future of the Arizona Health Improvement Plan. AzHIP workgroup participants included many different stakeholders from around Arizona and ADHS programmatic staff that met throughout the years to work on their identified tasks were invited to learn more about the AzHIP direction. The strategic issues were more directly tackled by forming the different workgroups, but for the new plan there will only be five workgroups in which the issues that Arizona faces will be more broadly addressed. This will allow for strategies and action that can affect various health and public health issues in novel, cross-cutting ways. The AzHIP Diabetes Workgroup that materialized from the plan met from 2016-2018, and due to the new structuring of the AzHIP workgroups the AzHIP Diabetes Workgroup will merge its efforts with the Arizona Diabetes Coalition starting in January 2021. All of the workgroup participants are invited to continue addressing the issue of diabetes in any of the five new workgroups, or by participating in the Arizona Diabetes Coalition. The future of the diabetes work will now continue to be informed by goals and strategies developed in the 2019 State Engagement Meeting (StEM) Action Plan.

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.

State Engagement Meeting 2019 (StEM)

In order to promote the expansion of the National Diabetes Prevention Program (NDPP), the CDC and the National Association of Chronic Disease Directors (NACDD) developed the NACDD/CDC State Engagement Model based on a partner engagement approach. The model works to maximize stakeholder commitment, action and coordination. NACDD selects and partners with various health departments around the country to convene the State Engagement Meetings which brings stakeholders from all across the diabetes field: health systems, tribal groups, community-based organizations, faith-based organizations, insurers, employers, to gather consensus and develop an

implementation plan to sustain and scale the NDPP. On June 25-26, 2019, the Arizona Department of Health Services, a team of NACDD facilitators, and key stakeholders participated in a State Engagement Meeting. On the first day, presenters updated participants on the "national landscape" of this work and described efforts currently taking place in the state. On the second day, NACDD facilitators led participants through a series of small group exercises to help them draft a National DPP Action Plan for Arizona that addresses four areas: 1. Increasing screening, testing, and referrals; 2. Increasing coverage; 3. Increasing awareness; and 4. Increasing availability. Through this process, participants identified key action steps and resource needs and made commitments to specific action steps their organizations can either support or lead. The plan addresses the four pillars of the NDPP with specific measures, strategies and goals. Although some parts of the plan are not finalized (coverage and availability goals), the Action Plan helps guide diabetes work. Following the StEM event in June 2019, staff changes within the Arizona Department of Health (lack of a Diabetes Program Manager) and COVID19 has hindered progress on the finalization of the action plan. Addressing these issues, the Diabetes Program Manager position was filled in February 2020, and in March 2020 a StEM Workgroup was formed by re-inviting the stakeholder participants and including new members from the Arizona Diabetes Coalition. This workgroup continues to meet and provides updates to the Coalition on the workplan's progress.

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 (8). 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, Association of Diabetes Care and Education Specialists, 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 (8). 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, twenty-two individual organizations offer the NDPP throughout Arizona. Several non-recognized organizations are also offering the Diabetes Prevention Program, including 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.

Previously, under the "*State Public Health Actions to Prevent and Control Diabetes, Heart Disease, Obesity and Associated Risk Factors and Promote School Health (CDC 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

Building upon the CDC 1305 strategies, Arizona continues the great diabetes work through a new five-year funding opportunity; *"Improving the Health of Americans Through Prevention and Management of Diabetes and Heart Disease and Stroke (CDC 1815)",* which began 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.

CDC 1815 Grant – Diabetes

Grantees:

The CDC 1815 grant funds the areas of diabetes, heart, and stroke, and provides the resources for the necessary activities to develop and support the implementation of National Diabetes Prevention Program in Arizona. Current grantees were identified and selected for different capacities. The idea to expand NDPP efforts includes several different parts: increasing the amount of available

accredited prevention or self-management programs; expanding referral capacity and referral systems to these programs; a funding mechanism for the NDPP-providing entities and the actual participants; and the necessary technical assistance and training. Funding can be an issue in the process of a establishing a CDC-recognized diabetes prevention program or in running an accredited diabetes self-management program.

The Diabetes Prevention and Control Program at the Arizona Department of Health Services manage the diabetes contracts of the CDC 1815 grant funding. The grantees were selected from across Arizona to maximize the reach and include high-risk groups in disparate locations. Different direct service organizations working to serve in rural, underserved, and vulnerable populations (including border, refugee, and tribal communities) are currently working on CDC 1815 grant strategies. Current partners include:

- St. Vincent de Paul Family Wellness Center
- North Country HealthCare
- Adelante Healthcare
- University of Arizona; Cooperative Extension
- Valleywise Health
- Yavapai County Health Department
- Yuma County Health Department
- Davidson and Belluso
- VH Cullen Consulting
- Lenartz Consulting
- YM Solutions, LLC.

Prediabetes Media Campaign - Mission Possible / Agents of Change

Today, one in every three 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 (43) 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 (44) 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.

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 2020 MCO performance measures AHCCCS has established related to diabetes care include:

- Comprehensive Diabetes Care: Hemoglobin A1c (HbA1c) Testing (HA1C)-Minimum Performance Standard (MPS)-86%
- Comprehensive Diabetes Care: Hemoglobin A1c (HbA1c) Poor Control (>9.0%) (HPC)- MPS 43%
- PQI 01: Diabetes Short-Term Complications Admission Rate (PQI 01): 16 Per 100,000
- Member Months

- Diabetes Screening for People with Schizophrenia or Bipolar Disorder Who Are Using Antipsychotic Medications (SSD)-Baseline Measurement Year
- Diabetes Care for People with Serious Mental Illness: Hemoglobin A1c (HbA1c) Poor Control (>9.0%) (HPCMI)-Baseline Measurement Year

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 2018, AHCCCS reimbursed approximately $241.6 million for primary diagnosis diabetes related services for 142,384 distinct members. In addition, AHCCCS reimbursed $290 million related to co-occurring conditions, $211.3 million for pharmacy services, and $22 million for diabetic supplies.

In Calendar Year 2019, AHCCCS reimbursed approximately $251.7million for primary diagnosis diabetes related services for 144,566 distinct members. In addition, AHCCCS reimbursed $348.9 million related to co-occurring conditions, $246.4 million for pharmacy, and $22.3 million for diabetic supplies. In 2018 and 2019, the total reimbursement for diabetes primary diagnosis and co-occurring conditions, pharmacy and supplies totaled approximately $1.38 billion.

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

Diabetes in Arizona's American Indian Communities

Background and Efforts

The U.S. Congress established the National Special Diabetes Program for Indians (SDPI) in 1997, providing $30 million per year and authorization of five-year grants. However, Congressional extensions of SDPI have been provided on a shorter-term basis since September 2017. The current extension ends on December 11, 2020. SDPI has been operating at the same level of funding since 2002. "Tribes in Arizona and across the nation recommend increasing SDPI funding to $200 million per year with an inflation adjustment for the over 400 SDPI programs conducted in Tribal and Urban Indian communities in 35 states."

Evidence of the SDPI success is demonstrated by the rates of end-stage renal disease (ESRD) that have begun to decline among the American Indian population which can be attributed to the frontline prevention and educational activities that SDPI programs conduct in Tribal communities. Diabetes mellitus (DM) is the 5th leading cause of death across all ages in the American Indian

population in the West Region that include the states of Arizona, Nevada and Utah served by the Phoenix Area Indian Health Services (IHS). In the West Region DM is the number one reason for ambulatory visits among the Tribes and the second leading cause for inpatient visits (31).

Navajo Nation

The Navajo Nation Special Diabetes Program (NNSDP) is federally funded through the SDPI. There are eight service areas located throughout the Navajo Nation with one serving as the Administration Office working closely with each of the other seven agency offices. The primary objective is to provide diabetes prevention through nutrition education and promoting physical activities to the diabetes program participants. The program puts key efforts to promote healthy lifestyles changes: improving nutrition and diet using cultural and traditional methods while monitoring and engaging individuals to attend exercise classes at wellness centers. The NNSDP sees success in working directly with communities. Efforts began in 2018 with a community assessment regarding diabetes prevention which led to more visibility in communities, including of large community events. These efforts and outreach have received significant feedback from community members and leaders.

The NDPP Lifestyle Intervention has been a recommendation for implementation state-wide. The Native Lifestyle Balance (NLB) Program is recommended for tribal participants because of some of the unique challenges affecting the individuals, such as being unable to participate due to transportation and weather conditions. NLB incorporates cultural and traditional nuances and the program staff does its best to work with the participants to make up missed lessons to ensure they reach the completion of 16 weeks.

ITCA

The Inter Tribal Council of Arizona, Inc. (ITCA) is a 501c3 non-profit Tribal organization in Phoenix, Arizona. The ITCA was established in 1952 to provide a united voice to American Indian Tribal governments in Arizona. The ITCA provides training and technical assistance services to Tribes in the Phoenix and Tucson Indian Health Service Areas through more than thirty programs. Although Tribes in Arizona are members of ITCA, the ITCA Health and Human Services (ITCA HHS), Tribal Epidemiology Center, and the Tribal Water programs provide services to all forty-eight Tribes in the Phoenix and Tucson IHS Areas, which includes Tribes in Arizona (AZ), Nevada (NV), and Utah (UT).

The ITCA HHS was awarded the Center for Disease Control and Prevention's (CDC) Good Health and Wellness in Indian Country (GHWIC) grant in 2014 and 2019. The current GHWIC grant focuses on Chronic Disease prevention targeting 4 Strategy Areas. Those Strategy Areas include:

1. Implement evidence-informed and culturally-adapted Policy, System, and Environmental changes (PSE) to **prevent obesity** by improving Tribal food and beverage programs and systems, improving land use designs to increase physical activity, and increase support

for breastfeeding lactation support services to the community and breastfeeding support training for health care providers.

2. Implement evidence-informed and culturally adapted PSE changes to **prevent and control commercial tobacco use** by implementing or strengthening existing commercial tobacco-free Tribal policies and increase referrals to evidence-based commercial cessation treatment programs.
3. Implement evidence-informed and culturally-adapted community-clinical linkages (CCL) to **support type 2 diabetes prevention** by expanding access to the CDC's NDPP Lifestyle change program.
4. Implement evidence-informed and culturally-adapted CCL to **support heart disease and stroke prevention** by expanding engagement of Community Health Representatives, Community Health Aides, and other paraprofessionals to manage and refer community members to local health and prevention care programs.

As of this writing, the ITCA currently partners through Memorandums of Agreements with 7 Tribes: 5 Tribes in AZ (the Cocopah Indian Tribe, Fort Mojave Indian Tribe (FMIT), Gila River Indian Community (GRIC), Quechan Indian Tribe, and the Yavapai-Apache Nation); 1 Tribe in NV (the Shoshone-Paiute Tribes of the Duck Valley Indian Reservation); and 1 Tribe in UT (the Ute Indian Tribe of the Uintah and Ouray Reservation).

These Tribes have started to recruit community stakeholders to their Health Coalitions, which will be the main driver of the grant's implementation. In addition, all the Tribes have completed an initial GHWIC Policy Survey assessment to determine which Strategy Areas to focus on. As a result of the survey, most Tribes will focus on supporting the expansion of the NDPP program, increase support for breastfeeding within their communities, and develop or strengthen commercial tobacco-free Tribal policies. As an example, the FMIT hosted an Indigenous Breastfeeding Counselor training for their staff and community members in January 2020, and all Tribes were scheduled to attend an NDPP Lifestyle coach training in the first quarter of 2020. At the present time, the principle funds available to Tribes to address the prevention of DM, include these CDC GHWIC grants and SDPI as noted above.

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 160,000 retired members. Nearly 44,000 retirees and their eligible dependents are enrolled in ASRS medical plans.

For the retired members of ASRS, 24% of the Medicare Advantage and 17% of the non-Medicare members were identified to have diabetes. Graham, Mohave, Pinal, and Yuma had high concentrations of Medicare members with diabetes. Greenlee, Pinal, and Yuma have high concentrations of non-Medicare members with diabetes. Note, the majority of members in all Plans diagnosed with diabetes reside in Metro Arizona (Pima or Maricopa counties): 79% for Medicare Advantage, and 83% for non-Medicare.

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 ASRS non-Medicare plan members in 2019, 1,354 (17%) had a diagnosis of diabetes, of these 92% 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 have diabetes. 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 ASRS Medicare Advantage plan members in 2019, 10,229 (24%) had a diagnosis of diabetes. Of these, 98% were diagnosed with type 2 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 - including blood glucose and hemoglobin A1C, 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 and lifestyle management, using simple and manageable measures that can easily be integrated into daily life for long-term health benefits and lasting weight loss. It 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 State of Arizona medical plans.

- **Naturally Slim**

Naturally Slim is an online weight loss and lifestyle management 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. It is currently available and beginning in 2021 will be available at no charge to all benefit eligible employees and dependents 18 years and older who are on one of the State of Arizona medical plans.

- **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 at a discounted fee.

- **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 of diabetes and ways to manage the condition. This 6-week course is offered online and is self-paced. This program is employee paid and offers an opportunity to participate in an ASU Research study whereby a percentage of the cost is refunded to those completing a pre and post survey.

In 2019, ADOA launched the National Diabetes Prevention Program in partnership with the University of Arizona Cooperative Extension to provide NDPP across the state to employees and dependents over the age of 18. The program is designed for those who are at high risk of developing type two diabetes or who have been diagnosed with prediabetes. It is a proven lifestyle change program designed to cut the risk of developing diabetes in half. It provides educational support to teach participants how to develop healthy behaviors to prevent and manage diabetes. Developed by

the Centers for Disease Control (CDC), this lifestyle change program helps you reduce your Type 2 diabetes risk by learning new skills in losing weight, becoming more physically active and reducing stress. This is provided to state employees as part of the UA Cooperative Extension funding.

Format and Tools

ADOA reported 10,015 (7.3%) members of a total 136,560 that had 17,396 visits to a primary care provider and had an ICD-10 code designated for diabetes, prediabetes or a comorbid condition in addition to diabetes during 2019-2020 (as of June 30, 2020). Within this population 88.2% of ADOA members were diagnosed with type 2 diabetes, 8.3% with type 1 diabetes and 3.4% were diagnosed with gestational diabetes. ADOA's healthcare Plan cost was $170,255,462 for its 10,015 diabetic members. In addition to this, of ADOA's diabetic members – 9,255 reported having at least one comorbid condition, Plan cost $15,024,341.

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

Public Safety Personnel Retirement System

Established in 1968, the PSPRS provides retirement benefits for members serving in our communities throughout Arizona as police officers, firefighters, correctional officers, judges, and elected officials. PSPRS serves over 36,000 active members and 22,000 retired members. The data for PSPRS members is incorporated within the ASRS data as ASRS administers the medical plans for PSPRS members. Approximately 5,200 retirees and their eligible dependents are enrolled in ASRS medical plans.

American Diabetes Association; Arizona

The American Diabetes Association's (ADA) 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.

The ADA, the nation's leading organization for all people living with diabetes, the launched of #HealthEquityNow, a national platform to ensure that all people living with diabetes, and the millions of underserved Americans who are at greatest risk for diabetes, have access to health resources that are too often unavailable to them.

The ADA calls on businesses, policymakers, philanthropies and other leaders across the nation to take immediate steps to address systemic inequities in cost, care, cure, community and cuisine faced particularly by people of color and economically disadvantaged citizens.

Diabetes Day at the Arizona Capitol is organized in coordination with statewide diabetes stakeholders and advocates. This yearly event will be virtual due to COVID with the Arizona State

Capitol and diabetes related information and opportunities to educate legislators about diabetes. This one-day event allows diabetes advocates and constituents to connect 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* (46; 47). 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.

From the nutrition experts at the ADA, *Diabetes Food Hub* is the premier food and cooking destination for people living with diabetes and their families. Providing free, meal planning, recipes, grocery lists and tips for healthy eating.

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.

ADA *Project Power* brings all the fun and excitement of a virtual afterschool program right to you and your family. Kids ages 7–13 will make new friends and participate in age-appropriate physical activity challenges and nutrition education, so they're prepared to make healthy lifestyle choices. This free, at-home afterschool experience is designed to keep our community healthy no matter what. It starts with a special Project Power box and Activity Journal delivered right to your door. Kids can participate in fun, interactive activities they'll love, including:

- Participating in chants, interactive discussions, games and friendly competitions
- Connecting with their friends and counselors for an hour twice a week

- Being part of a virtual "group" with youth from around the country
- Coordinating fun activities for the whole family—there is something for everyone!

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) historically has included participants and 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, 2020*

3 Mavens Consulting LLC

Abrazo Health Systems

Adelante Healthcare

Aetna

American Diabetes Association

Area Agency on Aging

Arizona Community Health Workers Association

Arizona Department of Health Services

Arizona Department of Administration

Arizona Living Well Institute

Arizona Public Health Association

Arizona State University: Southwest Interdisciplinary Research Center

Banner Health System

Blue Cross Blue Shield of Arizona

Campesinos Sin Fronteras

Carondelet Health Network

Celerion

Chandler Regional Medical Center

Cigna Medical Group

Desert Senita Community Health Center

Cochise County Health Department

ConTrías Policy Associates, LLC

El Rio Community Health Center

Equality Health

Flagstaff Medical Center

Ft. McDowell Yavapai Nation

Gila River Indian Community

Health Choice Arizona

Health Net Access

Health Services Advisory Group

Hualapai Tribe

Humana

Indian Health Services: Phoenix

Integrated Wellness Club

Inter Tribal Council of Arizona

Mariposa Community Health Center

Navajo Area Indian Health Services

Navajo Nation Special Diabetes Program

NIH, NIDDK; Phoenix Office

North Country Healthcare

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.

Pascua Yaqui Tribe

Phoenix Indian Medical Center

Pima County Department of Public Health

Regional Center for Border Health

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

Sun Health Center for Health and Wellbeing

Sun Life Family Health Center

Vitalyst Health Foundation

Tabula Rasa HealthCare	Northern Arizona VA Health Care System	White River Indian Health Service
Tohono O'odham Nation	MercyCare Health Plan	Winslow Indian Health Center
Tuba City Regional Healthcare Corporation	Mountain Park Health Center	Yavapai County Community Health Services
University of Arizona; College of Pharmacy	Unlimited Potential	Yavapai Regional Medical Center
University of Arizona; Mel and Enid Zuckerman College of Public Health	University of Arizona; Cooperative Extension	Yuma County Public Health Services District
United Healthcare	Valleywise	

*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 (43; 44).

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.

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)		

Add up your score.

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).

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.

For more information, visit us at

DoIHavePrediabetes.org

Ad Council | American Diabetes Association. | AMA | 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.

Arizona Department of Health, Hospital Discharge Database, 2019

2020 Sanofi - Arizona Type 2 Diabetes Report™

Arizona State Retirement System | UnitedHealth Group Diabetes Data Request 2020

2019 State Health Assessment - Arizona

ASRS 2019 Results from Requested Data Gathered on Diabetes Population

Medicare Advantage Plans

Non-Medicare Plans

United Healthcare

Executive Summary

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, the Diabetes Action Plan Team is tasked to gather and report bi-annually on the health and well being of Arizona residents diagnosed with diabetes. Specifically, the Bill outlines such items as reporting on diabetes prevalence, it's costs and an action plan for reducing its prevalence, diabetes related health disparities, and improving and managing care for Arizona residents with a diabetes diagnosis.

ASRS is a participant of this Diabetes Action Plan Team. ASRS has requested its medical plan provider, United Healthcare (UHC), to gather information as requested by the Diabetes Action Plan Team on its members on behalf of the ASRS Plans. As part of this effort, ASRS via the Diabetes Action Plan Team, has requested various data elements on ASRS membership who have been identified with a diabetes diagnosis. The data presented in this report has been updated to incorporate 2019 calendar year information and is based on diagnosis codes provided by the Diabetes Action Plan Team Chair. 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 and the Non-Medicare Plans, respectively. These plans are fully insured through UHC. While the PPO Medicare Advantage plan covers members who reside outside of Arizona, we have focused this report only on those members residing in Arizona. The data elements presented in this report are based upon 2019 calendar year incurred data, paid through June 2020 and on information relayed to UHC by providers (physicians, hospitals, etc.) via charting, coding and DRG codes.

In some cases, like foot exams for example, the metrics presented in this document may not accurately reflect the actual prevalence since our results are predicated on the physician including the pertinent code in a medical claim to UHC. A portion of the ASRS Medicare Advantage membership participates in an capitated arrangement. As a result, detailed diagnosis might be relayed not be relayed to UHC even if performed, particularly if it is not specifically required for coding in the Centers for Medicare and Medicaid Services (CMS) file feeds for Risk Adjustment (RAF)or for claims adjudication. We have relied on information gathered. We have highlighted in this document areas where metrics may not be credible given data limitations.

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Executive Summary (continued)

For the retired members, 24% of the Medicare Advantage and 17% of the Non-Medicare members were identified to have diabetes. Yuma and Pinal counties had high concentrations of diabetics in both the Non-Medicare (20% of more) and Medicare (30-25%) memberships. In addition, Greenlee was also identified for Non-Medicare members with a relatively high concentration of diabetics. The counties of Mohave and Graham present relatively high concentrations (30-35%) of diabetics for the Medicare population. Note the majority of members in all Plans diagnosed with diabetes reside in Metro Arizona (Pima or Maricopa counties): 79% for Medicare Advantage, and 83% for Non-Medicare Plan.

In a separate study, the 2019 Health Rankings Study published by United Health Foundation found that there is a 11% prevalence of diabetes amongst adults living in Arizona. This ranks Arizona as 23rd amongst all states (lowest to highest) with diabetes prevalence. Additional information on diabetes and other areas that affect health for Arizona residents 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 Plans

The data available to UCH for Medicare Advantage (MA) plans varies due to the nature of these plans. About half of ASRS Medicare membership resides in a MA HMO plan. In this arrangement, some providers are contracted in a capitated arrangement and as a result, UHC may not be supplied with claim coding details. This information is reliable to the extent the coding and/or charting is sent to UHC by providers. The PPO MA plan covers members nationally while the HMO MA plan only covers Arizona residents. The results shown in this report is representative of Arizona membership.

Demographic results

2019 ASRS Medicare Advantage members with diabetes diagnosis

Age Category	Male	Female	Total	% of Total
Less than age 65	147	210	357	27%
Age 65 and older	4,537	5,335	9,872	24%
Total	**4,684**	**5,545**	**10,229**	**24%**

2019 ASRS Medicare Advantage members with diabetes

Condition	% of diabetics
Underlying conditions	0.2%
Drug or chemical induced	0.3%
Type 1	1.3%
Type 2	97.7%
Pregnancy, childbirth	0%
Gestational	0%
Other types	0.5%
Total	**100%**

54% Of diabetic members are female.

24% Of ASRS MA members were identified with diabetes, a 3 percentage point decrease from previous study.

98% Of diabetics in ASRS MA membership are Type II.

There is a larger proportion of male diabetics as compared to percentage of males in the total MA membership. While males represent 46% of the diabetics, they only represent 39% of the total MA membership. Details of diabetic members by race are shown below:

Starting in 2019, CMS ceased reporting on race. Therefore, the race results shown represent the information based on data provided to UHC and available for MA members residing in Arizona. The unknown represents 21%, the second largest race category. Whites represent the largest race category.

ASRS Medicare Advantage 2019 members with diabetes by race and gender

Race	Male	Female	Total	% of Total	% Female
Asian	37	49	86	1%	57%
Black	93	168	261	3%	64%
Hispanic	203	241	444	4%	54%
Native American	19	39	58	1%	67%
White	3,169	3,823	6,992	68%	55%
Other types	114	114	228	2%	50%
Unknown	1,049	1,111	2,160	21%	51%
Total	**4,684**	**5,545**	**10,229**	100%	54%

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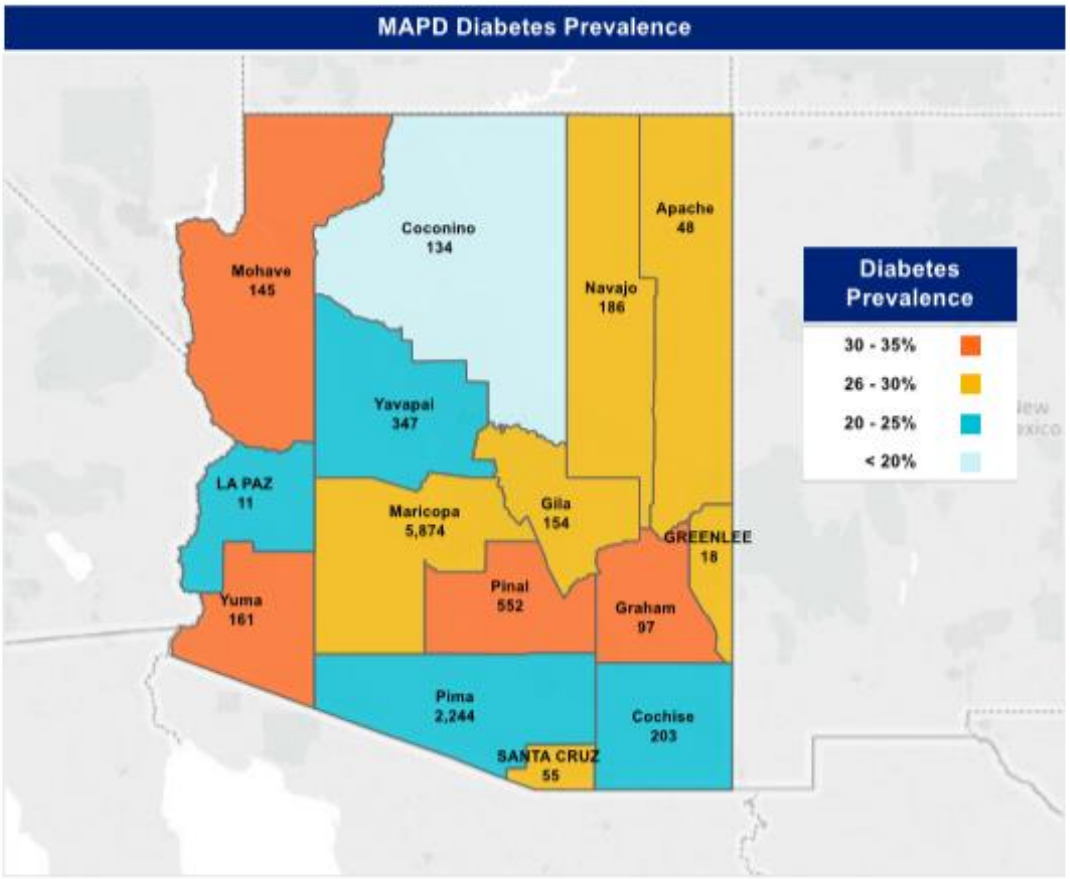
Diabetes data request results Medicare Advantage Plans

Demographic results (continued)

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



Since Type II diabetes represent 98% of the diabetic membership, the remainder of the MA results are not segregated by Diabetes type. In addition, UHC has attempted to isolate the MA members who have been diagnosed with Pre-diabetes and metabolic syndrome. For the PPO MA membership 1,010 or 5% of the membership in Arizona has been identified with pre-diabetes. All other results for these two conditions are not reliable.

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Diabetes data request results Medicare Advantage Plans

Clinical Results for MA Members Identified as Diabetic

There were a number of metrics requested by the Diabetes Action Plan Team. This section presents the requested data elements for the Medicare Advantage (MA) Plans. Some of the MA membership participate in HMO or capitated arrangements within in the state. For the entire MA membership, UHC gathered specific conditions and diagnosis codes. UHC may not receive some of the requested elements for the HMO members if they are not tied to CMS condition coding or for which UHC has not gathered on the MA population.

2019 MA clinical outcomes for diabetc members

Clinical measure	Count	% of Total MA Diabetic Members	% Female
Stroke	129	1%	59%
Major Adverse Cadiovascular Event (MACE)	500	5%	47%
Ischemic Heart Disease	263	3%	38%
Kidney Dissease	4,187	41%	54%
End Stage Renal Disease (ESRD)	224	2%	47%
Diabetic Retinopathy	599	6%	3%
Blindness	42	0%	62%
Amputation	145	1%	41%
Ketoacidosis	31	0%	61%
Hypoglycemia	307	3%	52%
Hyperglycemic Crisis	74	1%	65%
Congestive Heart Failure	1,563	15%	49%
Hypertension	8,885	87%	54%
Coronoary Artery Disease	3,051	30%	40%
Peripheral Vasular Disease	1,426	14%	49%
Co-mobidities (one or more condition listed)	9,446	92%	54%
A1C Levels 5.7-6.4 (pre-diabetes)*	263	7%	57%
A1C Levels 6.5%-8.9%*	127	1%	51%
A1C Levels 9% or Greater	3,387	33%	54%
Pre-diabetes*	1,010	26%	62%

*PPO membership only, limed data available

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Diabetes data request results Medicare Advantage Plans

Clinical Results for MA Members Identified as Diabetic (continued)

2019 MA clinical outcomes for diabetc members			
Clinical measure*	Count	% of Total MA Diabetic Members	% Female
Evidence of DSME Education	86	2%	63%
Members received eye exam	1,805	46%	54%
Prediabetes education	Data is unavailable		
Members with at least two PR visits	3,716	95%	53%
Members who had at least two A1C screenings	2,526	65%	52%
Foot exam	Data is limited and not credible		
Urine protein measurement	2,147	55%	54%
Blood pressure measurement	Data is unavailable		
Lipid level measurement	3,231	83%	53%
Evidenceof DSME	86	2%	63%
Renal function exam	3,611	92%	53%

*PPO membership only, limed data available

Note: The clinical metrics are based on claims data provided to UHC by providers. Often services may have been performed by a provider but not coded on a claim to UHC.

Measuring outcomes based on medical claims can underestimate performance. For example, in the above table we report an eye exam rate of 46% and an urine protein measurement rate of 55%. Diabetes eye exam and diabetes medical attention for nephropathy (urine protein) are Healthcare Effectiveness Data and Information Set (HEDIS) measures that we collect and submit data to the National Committee for Quality Assurance. For measurement year 2019, our results on the ASRS Medicare Advantage membership using the HEDIS measure specifications was 81% for diabetes eye exam and 96% for diabetes medical attention for nephropathy.

Diabetes clinical programs

Support from our diabetes program is based on the member's risk level and needs, and can include interventions such as education, coaching, care management with a nurse, consultation with a dietician, and in home monitoring with biometric devices.

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Diabetes data request results Medicare Advantage Plans

Financial Results MA Members Identified with diabetes

Given different financial arrangements between the ASRS PPO and the HMO plans, we have focused on the PPO plan medical costs to highlight the differences between diabetic and nondiabetic medical costs. For pharmacy costs, the results represent the total MA membership (PPO and HMO combined). Comparison in costs on a percentage basis between diabetic and non-diabetic members are shown below.

65%
Difference in 2019 medical allowed PMPM costs between diabetics and all other MA PPO members.

98%
Difference in 2019 pharmacy allowed PMPM costs between diabetics and all MA other members.

74%
Difference in 2019 total allowed PMPM costs between diabetics and all other members.

Medical costs represent incurred 2019 claims paid through August 2020 and do not include any ancillary costs such as clinical programs, HouseCalls, dental or vision. The medical cost difference represent the cost difference between those members identified with diabetics compared to all other members. Many times retired members with diabetes also have other conditions.

While diabetics in the 2019 PPO membership represent about 24% of the total membership, they represent 33% of total allowed medical spend. Similarly, diabetics represent 42% of the total pharmacy allowed costs.

The top three antidiabetic drugs by allowed costs in the MA membership are Lantus, Humalog and Januvia. The total allowed costs for the sum of these three drugs represents $10.3 million.

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Non-Medicare Plan Results

Diabetes data request results Non-Medicare Plans Total

UnitedHealthcare
EMPLOYER & INDIVIDUAL

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

Demographic results

ASRS Non-Medicare members with diabetes

Condition	% of members	% of diabetics
Underlying conditions	<1%	<1%
Drug or chmical induced	<1%	<1%
Type 1	1%	6%
Type 2	13%	92%
Pregnacy, childbirth and puerperioum	0%	0%
Gestational	0%	0%
Other types	<1%	<1%
Total	17%	100%

Of the 7,882 unique ASRS members in 2019, 1,354 or 17% were identified with a diabetes diagnosis. The percentage of females with of which 60.7% are female. Statistics on this group by gender, age brackets and race are shown below

ASRS Non-Medicare 2019 members with diabetes diagnosis by age category

Age Category	Male	Female	Total	% of Total
Less than age 50	8	14	22	2%
50-59	141	214	355	26%
60-64	382	595	977	72%
65+	0	0	0	0
Total	531	823	1,354	100%

60.7%
Of diabetic members are female

ASRS Non-Medicare 2019 members with diabetes by race

Race	Diabetic Members	% of Total
West European	718	53%
Unknown/Uncoded	291	21%
Hispanic	213	16%
Eastern European	40	3%
Mediterranean	22	2%
Scandinavean	40	3%
African American	30	2%
Total	1354	100%

Western Europeans account for 53% of the Non-Medicare Diabetics. About 21% of the diabetics are of a uncoded or unknown race. Hispanics account for 16% of the Non-Medicare Diabetics. Eastern European, Mediterranean, Scandinavian, and African American account for 3% or less as shown in the table.

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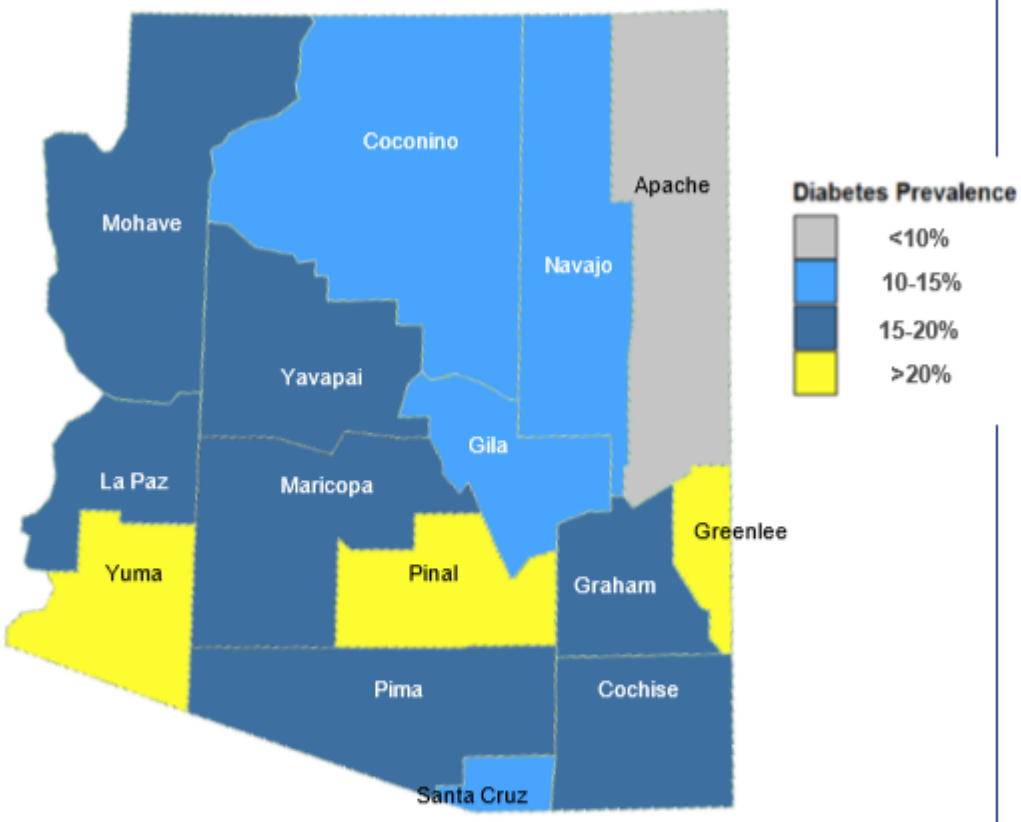
Diabetes Data Request Results Non-Medicare Plan

Demographic Results

The diabetic membership is mapped by county are shown below:



Metro Counties (Maricopa, Pima, Pinal): 1,118 diabetic members / 7,882 total members

Rural Counties (All other counties): 236 diabetic members / 1,354 total members

Notes specific to the data include the Demographic results as well as the Map by County which 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 Plans

Clinical Results for Members Identified as Diabetic

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

Complications Diabetes	Female	Male	Total	% of Total Diabetics
--->9	213	170	383	28%
----5.7-6.4 (prediabetes)	10	3	13	1%
CAD	29	54	83	6%
Chronic Kidney Disease	29	45	74	5%
diabetic retinopathy	5	3	8	1%
ESRD	10	10	20	1%
hyperglycemic crisis	8	8	16	1%
hypertension	177	179	356	26%
hypoglycemia	14	6	20	1%
Ischemic Heart disease	1	3	4	0%
ketoacidosis	4	5	9	1%
kidney disease	34	47	81	6%
lower-extremity/amputation		1	1	0%
MACE	3	4	7	1%
Metabolic Syndrome	3	1	4	0%
peripheral vascular disease	10	9	19	1%
Pre-Diabetes (no ICD-10 codes)	10	3	13	1%
Stroke	2	2	4	0%
Total:	562	553	1,115	

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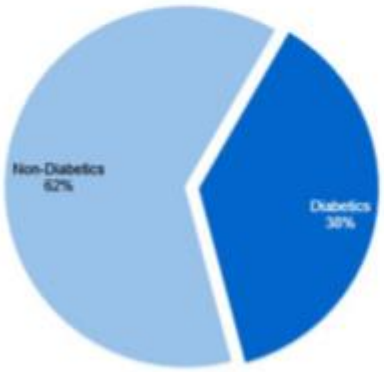
Diabetes Data Request Results Non-Medicare Total Diabetic Cost Analysis

Total Costs for Diabetics		Change
Medical Net Paid PMPM	▲	19.3%
Diabetes Diagnosis	▲	30.4%
Other Diagnosis	▲	18.8%
Pharmacy Net Paid PMPM	▲	34.6%
Diabetes Therapy	▲	37.6%
Other Prescriptions	▲	31.6%

Cost Comparison		Change
Diabetics as a % of All Claimants		0.3
Average Net Paid per Diabetic		0.5%
Medical		-2.7%
Pharmacy		9.8%
Average Net Paid per Non-Diabetic	▲	13.0%
Medical		9.4%
Pharmacy	▲	26.4%
Costs for Diabetics as % of Total		-2.1
Medical		-2.0
Non-Catastrophic		0.2
Catastrophic	▼	-5.1
Pharmacy		-2.7

Percent of Catastrophic Spend Attributed to Diabetics



Catastrophic is those members with over $100,000 in paid claims

* for the analysis, diabetics are defines as those claimants having at least one diabetes diagnosis or prescription within the study period.

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Diabetes Data Request Results Non-Medicare - Pharmacy Cost Analysis

Measure	Change
Pharmacy Members	-10.1%
Pharmacy Benefits Utilization	0.8 pts
Pharmacy Allowed	-2.1%
Pharmacy Paid	-0.1%
Pharmacy Paid PMPY	11.1%
Pharmacy Paid PEPY	10.0%
Prescriptions	-12.6%
Prescriptions PMPY	-2.7%
Paid per Prescription	14.3%
Paid per Days Supply	13.6%

The information below was pulled from the Pharmacy Claims tables for the Therapeutic

Class Code = DIABETIC THERAPY for the filled dates of 01/01/2019-12/31/2019

and adjudication dates of 01/01/2019-07/31/2020.

Age Range	Percent of Total
10-19	1%
20-24	0%
25-29	0%
35-39	0%
40-44	0%
45-49	0%
50-54	3%
55-59	30%
60-64	66%
65-69	0%
70-74	0%
75 +	0%
Grand Total	**100%**

Top Drugs by Drug Name by Pharmacy Paid > All

	Prescriptions			% of Pharmacy Paid		
Drug Name	Prior	Current	Change	Prior	Current	Change
Basaglar Kwikpen U-100	848	805	-5.1%	6.7%	5.8%	-0.9 pts
Trulicity	436	424	-2.8%	4.8%	5.2%	0.4 pts
Korlym	1	12	1100.0%	0.2%	4.9%	4.7 pts
Aubagio	18	39	116.7%	1.9%	4.5%	2.6 pts
Jardiance	360	468	30.0%	2.8%	3.9%	1.1 pts

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Diabetes Data Request Results –Non-Medicare – Real Appeal

Weight issues in the U.S. have reached epidemic proportions. It's estimated that nearly seven out of ten adults (69 percent) are considered overweight or obese. Health care costs directly related to excess pounds are estimated at $190 billion per year and will continue to rise. Being overweight increases the risk of developing diseases, such as heart disease, type 2 diabetes, hypertension, high blood pressure and sleep apnea.
UnitedHealthcare's Real Appeal can help reverse this trend, with tools and support to help employees lose weight, feel good and prevent weight-related health conditions.

Real Appeal takes an evidence-based approach to support weight loss. The program helps people make small changes necessary for larger long-term health results, based on weight-loss research studies commissioned by the National Institutes of Health. Real Appeal uses a highly interactive internet show, videos and live online coaching to drive small behavior changes. The program is designed to support members who are obese (body mass index or BMI over 30), overweight (BMI of 25 to 29.9) or simply ready to lose weight.

Real Appeal Executive Summary

Enrolled	756
% At-Risk *Diabetes, Cardiovascular or other related conditions*	87%
Members Lost Weight	522
	6,173

Real Appeal At-Risk Outcomes

Total No. of members with weight (lbs.) loss	Total Amt. of weight (lbs.) loss	Average weight loss (Members began 16+ weeks ago & attended 4+ sessions)	Bott avg. weight loss (Members began 16+ weeks ago & attended 4+ sessions)	4+ Attended Sessions with 5%+ Loss (RA Expectations 33% with 5%+ Loss)
522	6,173	5.4%	3.5%	52%

Your Results

	All Weeks 1+ Attended	Began 16+ Weeks Ago 1+	4+	9+
Engaged	564	512	449	392
2%+	51%	52%	59%	64%
5%+	36%	38%	43%	48%
Total Weight Loss	5,242	4,952	4,906	4,715
Avg. Start lbs.	202.7	202.2	201.3	202.4
Avg. lbs. Loss	9.3	9.7	10.9	12.0
Avg. % lbs. Loss	4.6%	4.8%	5.4%	5.9%

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COVID-19 impact on diabetes

United Healthcare

Impact of COVID-19 on diabetes

In 2020, COVID-19 pandemic created dramatic disruptions in our country as well as in the healthcare systems. To address the needs of our members and ensure best possible care during these times, UHC implemented the following:

As a response to the COVID-19 pandemic, UHC implemented the following:

- Waiver of member cost share for testing and treatment of COVID-19*.
- Waiver of member cost share for primary care professional services, including non-COVID-19visits*.
- Waiver of member cost share for office-based professional services, including non-COVID-19 visits*.
- Expansion of telehealth access*.
- Waiver of member cost share for telehealth services, including non-COVID-19visits*.
- Allowed an one-time prescription prefill, to enable members to have an extra supply of medications on hand.
- For Medicare Advantage members identified to have a care need, mailed home collection kits for A1C (diabetes sugar), urine protein, and/or colorectal cancer screening tests.

*Because the dates of these waivers and expanded telehealth access vary, please refer to www.uhcprovider.com or contact the member services department for specific details.

Based on our COVID-19 reporting, 20% of MA members in the ASRS MA PPO plan that have been identified with COVID-19 also have diabetes. During April, the height of the country's shut down, 43% of physician visits from PPO MA members were via telehealth. Since April, PPO MA telehealth visits as a percentage of total physician visits averaged around 20%.

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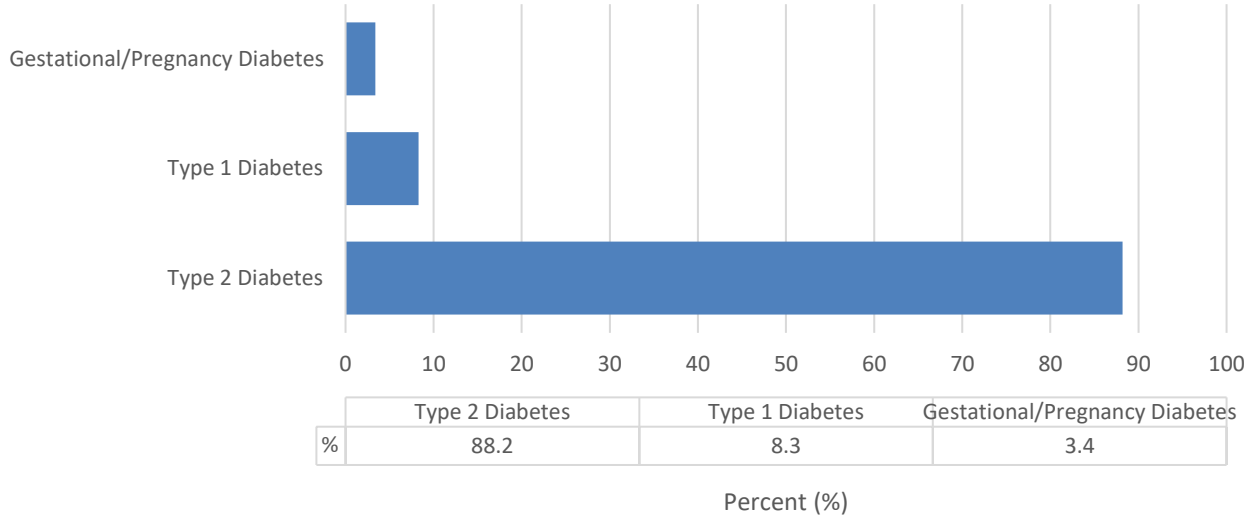
Diabetes Related Reimbursement for ADOA

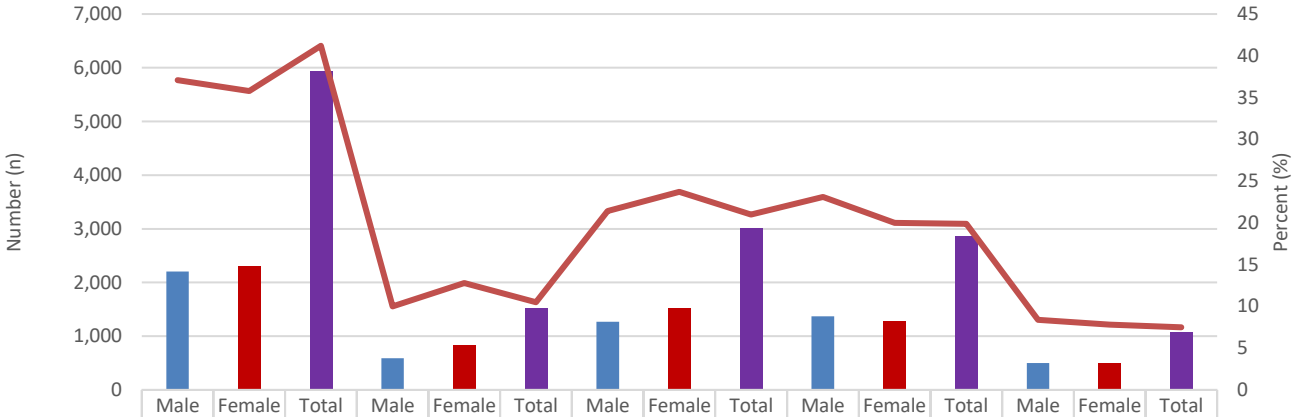
ADOA reported 10,015 (7.3%) members of a total 136,560 that had 17,396 visits to a primary care provider and had an ICD-10 code designated for diabetes, prediabetes or a comorbid condition in addition to diabetes. Within this population of members with diabetes, 88.2% of ADOA members were diagnosed with type 2 diabetes, 8.3% with type 1 diabetes and 3.4% were diagnosed with gestational diabetes (Figure 16).

Figure 16. Diabetes Type among ADOA members reported as having diabetes, 2019-2020 (as of June 30, 2020)



Among ADOA members that were reported as having an ICD-10 code associated with diabetes, 7.5% had an A1C greater than 9%, 19.9% had an A1C between 6.5-8.9% and 21.0% were considered prediabetic (Figure 17). An unknown A1C level was present for 41.2% of these members. ADOA's healthcare plan cost was $170,255,462 for its 10,015 diabetic members. In addition to this, of ADOA's diabetic members - 9,255 reported having at least one comorbid condition - plan cost $15,024,341.

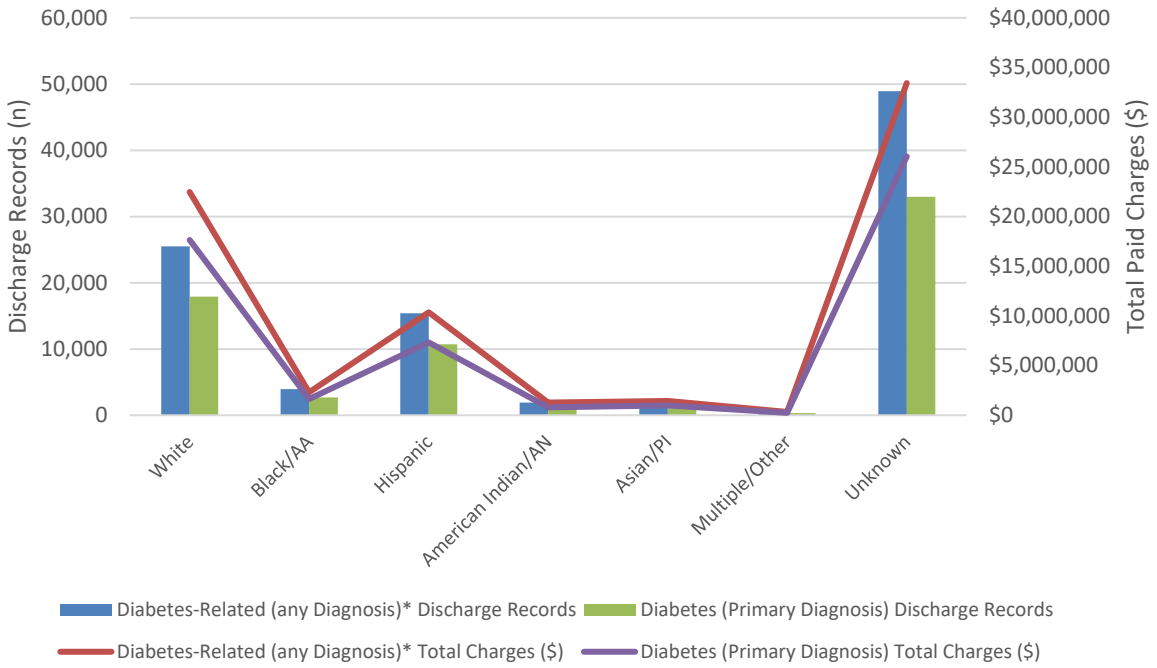
Figure 17. A1C Laboratory results for ADOA members reported as having diabetes, by gender, 2019-2020 (as of June 30, 2020)



	Unknown			Normal: <5.7%			Prediabetes: 5.7-6.4%			Diabetes: 6.5-8.9%			Diabetes: >9.0%		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Lab Results n	2,204	2,296	5,923	591	824	1,509	1,272	1,521	3,014	1,371	1,281	2,856	501	498	1,078
Lab Results %	37.1	35.8	41.2	10.0	12.8	10.5	21.4	23.7	21	23.1	20.0	19.9	8.4	7.8	7.5

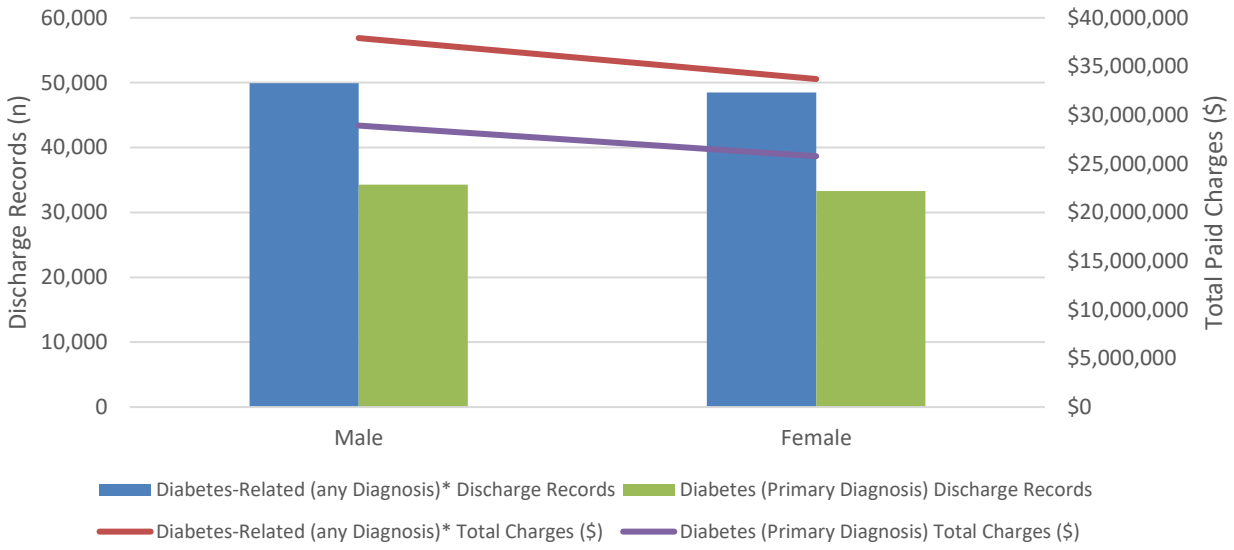
Data Source: ADOA, 2019-2020 (as of June 30, 2020)

Figure 18. Number and Cost of Discharge Records* for ADOA members reported as having diabetes, by race/ethnicity, 2019-2020 (as of June 30, 2020)



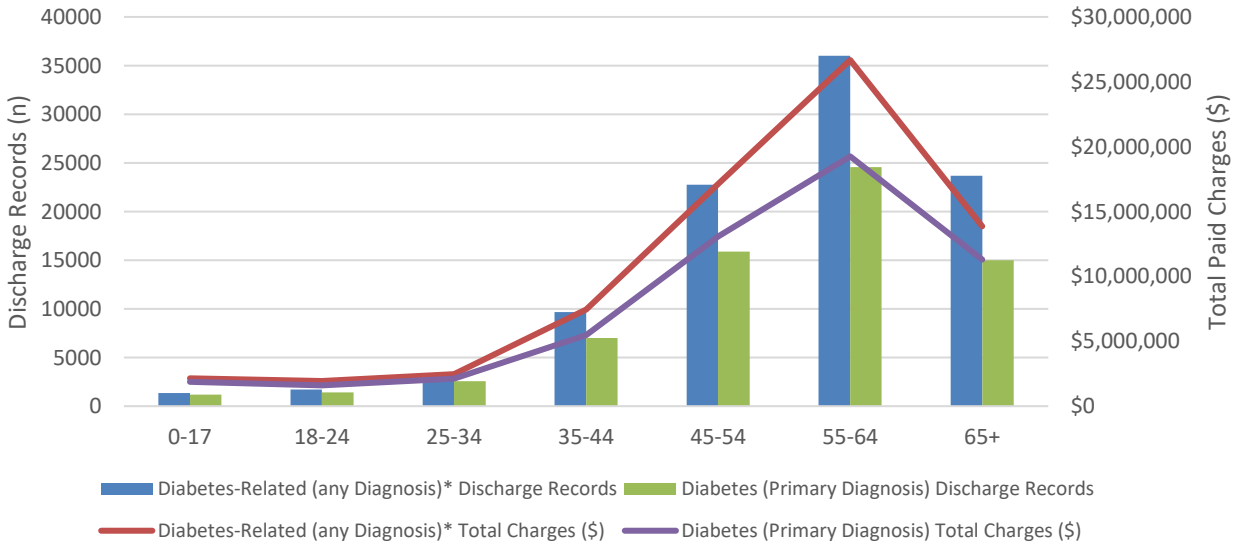
Data Source: ADOA, 2019-2020 (as of June 30, 2020); Discharge records for medical encounters and antidiabetic prescription medications, ICD-10 diagnostic positions 1 thru 3; AA-African American; AN-Alaska Native; PI-Pacific Islander

Figure 19. Number and Cost of Discharge Records* for ADOA members reported as having diabetes, by gender, 2019-2020 (as of June 30, 2020)



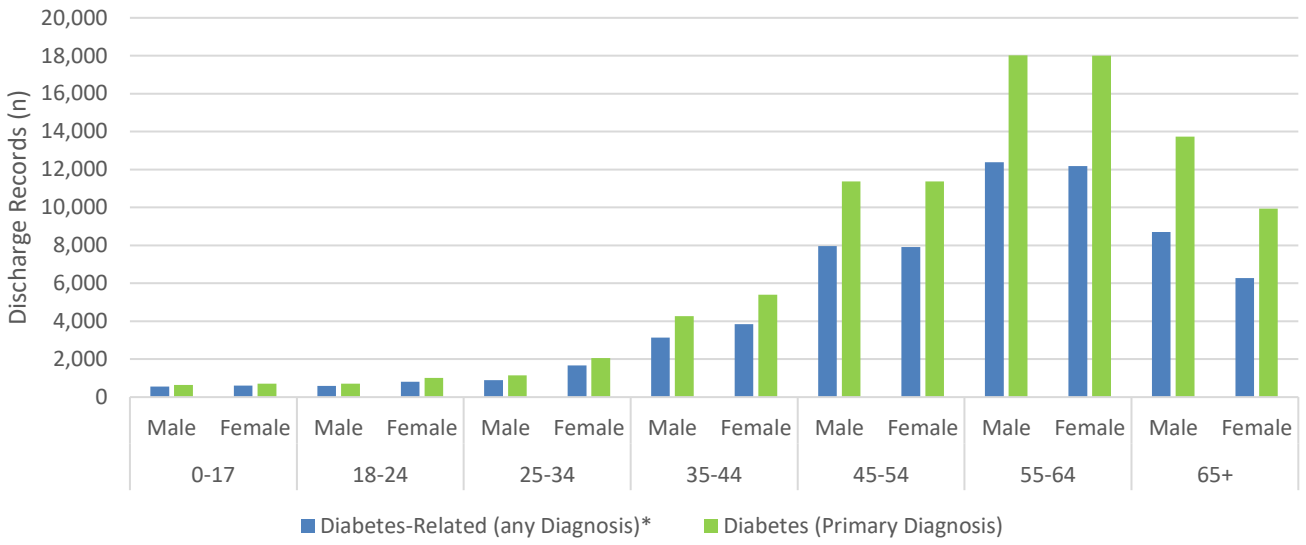
Data Source: ADOA, 2019-2020 (as of June 30, 2020); Discharge records for medical encounters and antidiabetic prescription medications, ICD-10 diagnostic positions 1 thru 3

Figure 20. Number and Cost of Discharge Records* for ADOA members reported as having diabetes, by age groups, 2019-2020 (as of June 30, 2020)



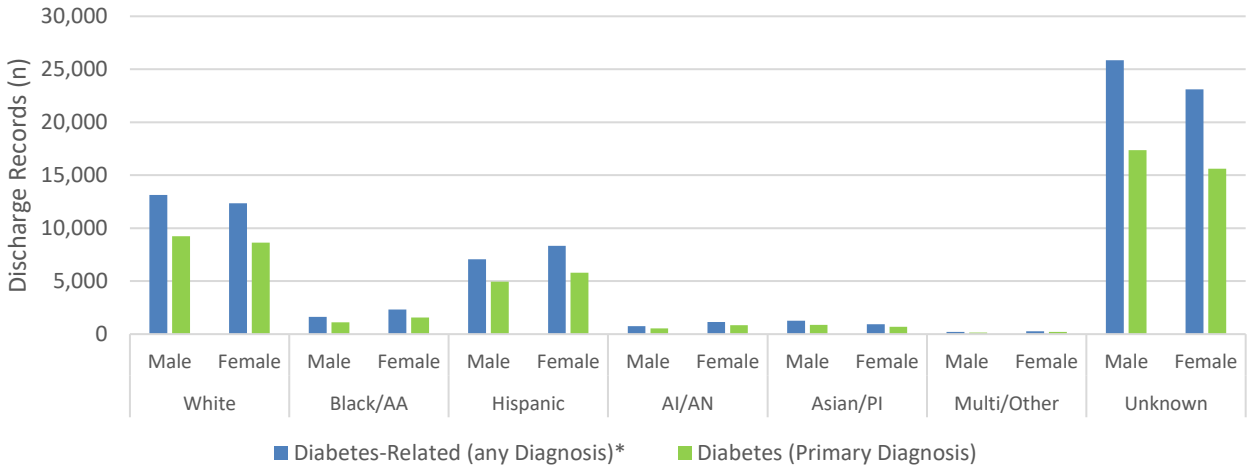
Data Source: ADOA, 2019-2020 (as of June 30, 2020); Discharge records for medical encounters and antidiabetic prescription medications, ICD-10 diagnostic positions 1 thru 3; Member age as of June 30, 2020

Figure 21. Number of Discharge Records* for ADOA members reported as having diabetes, by gender and age groups, 2019-2020 (as of June 30, 2020)



Data Source: ADOA, 2019-2020 (as of June 30, 2020); Discharge records for medical encounters and antidiabetic prescription medications, ICD-10 diagnostic positions 1 thru 3; Member age as of June 30, 2020

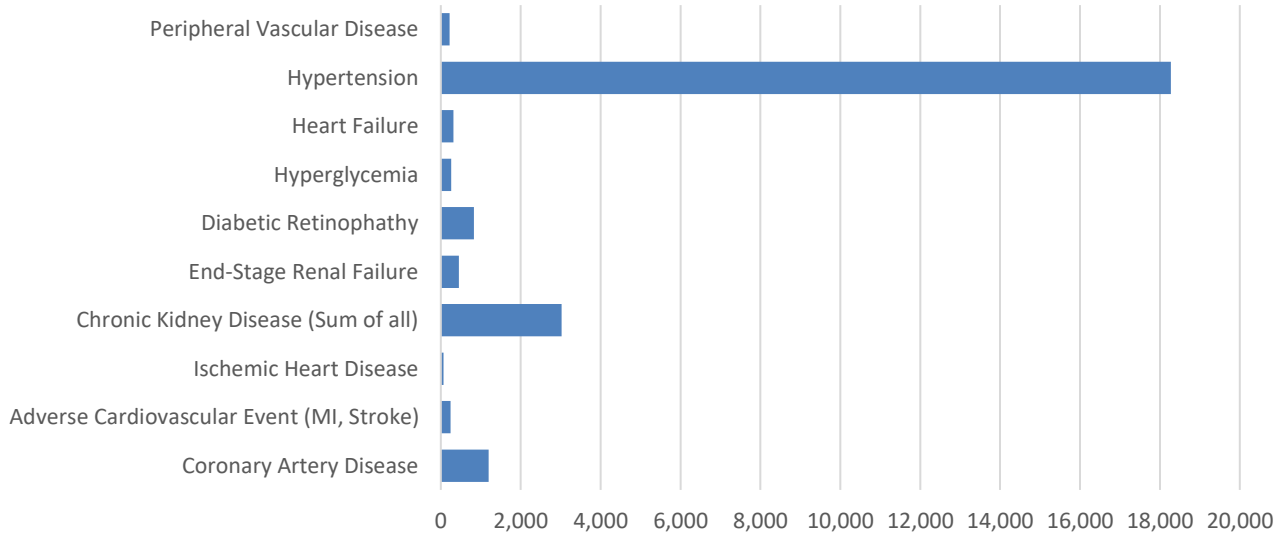
Figure 22. Number of Discharge Records* for ADOA members reported as having diabetes, by gender and age groups, 2019-2020 (as of June 30, 2020)



Data Source: ADOA, 2019-2020 (as of June 30, 2020); Discharge records for medical encounters and antidiabetic prescription medications, ICD-10 diagnostic positions 1 thru 3; AA-African American; AI/AN-American Indian/Alaska Native; PI-Pacific Islander

ADOA reported 9,255 members reported having at least one comorbid condition in addition to diabetes, Plan cost $15,024,341. Comorbid 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 (Figure 23).

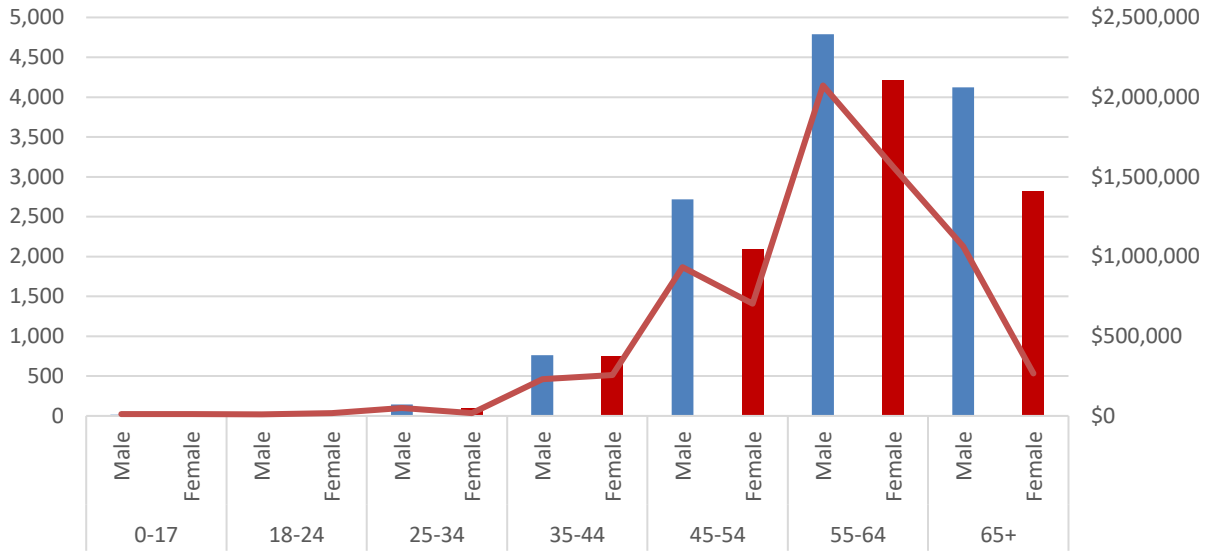
Figure 23. Number of Comorbidity Discharge Records* for ADOA members reported as having diabetes, 2019-2020 (as of June 30, 2020)



Data Source: ADOA, 2019-2020 (as of June 30, 2020); Discharge records for medical encounters and antidiabetic prescription medications, ICD-10 diagnostic positions 1 thru 3; Comorbidity categories and encounters may not be mutually exclusive

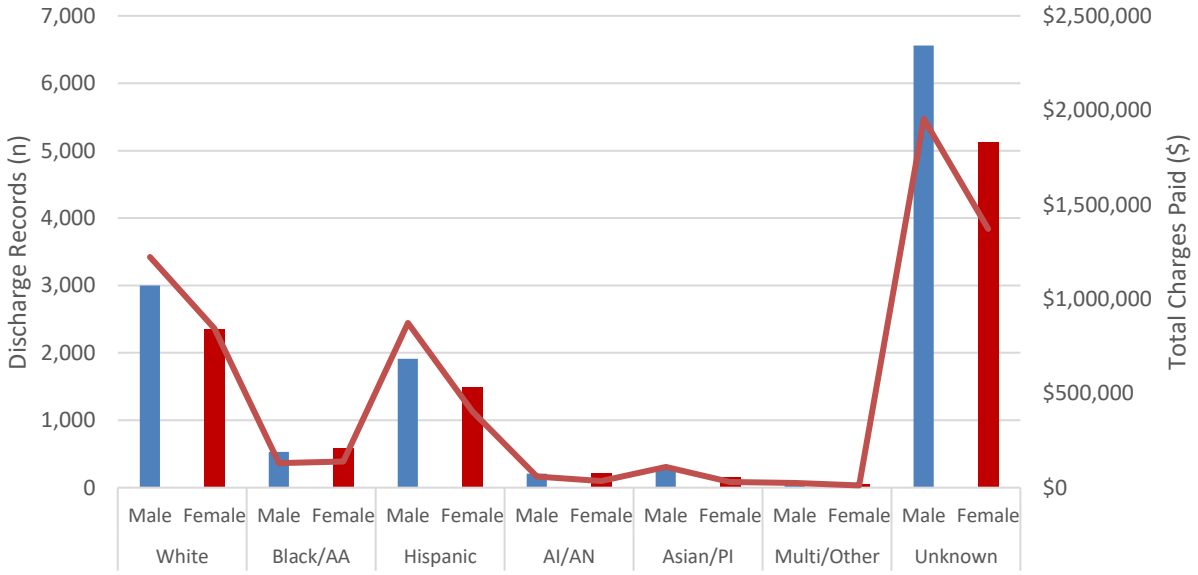
The majority of members with these conditions were between the ages 35-84 (Figure 24).

Figure 24. Number and Cost of Comorbidity Discharge Records* for ADOA members reported as having diabetes, by age and gender, 2019-2020 (as of June 30, 2020)



Data Source: ADOA, 2019-2020 (as of June 30, 2020); Discharge records for medical encounters and antidiabetic prescription medications, ICD-10 diagnostic positions 1 thru 3; Co-morbidity categories and encounters may not be mutually exclusive

Figure 25. Number and Cost of Comorbidity Discharge Records* for ADOA members reported as having diabetes, by ethnicity/race and gender, 2019-2020 (as of June 30, 2020)



Data Source: ADOA, 2019-2020 (as of June 30, 2020); Discharge records for medical encounters and antidiabetic prescription medications, ICD-10 diagnostic positions 1 thru 3; Co-morbidity categories and encounters may not be mutually exclusive; AA-African American; AI/AN-American Indian/Alaska Native; PI-Pacific Islander

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Diabetes Related Reimbursement for AHCCCS

In 2018 and 2019, the total reimbursement for diabetes primary diagnosis and co-occurring conditions, pharmacy and supplies, and other education/exams totaled approximately $1.55 billion.

In Calendar Year 2018, AHCCCS reimbursed approximately $241.6.7 million for primary diagnosis diabetes related services for 142,384 distinct members (Table 7). In addition, AHCCCS reimbursed $290.1 million related to co-occurring conditions, and $211.9 million for diabetic medications and supplies.

Table 7. Detail for AHCCCS Members with Primary Diagnosis Diabetes or Prediabetes (2018)

Arizona Health Care Cost Containment System

Detail for AHCCCS Members with Primary Diagnosis Diabetes or Prediabetes [1][2] [3] [4]

Dates of Service Between 1/1/2018 and 12/31/2018

As of 11/13/20

Utilization for Members with a Primary Diagnosis of Diabetes or Prediabetes [1]

Diabetic Category	Distinct Member Count	Paid Amount
Abnormal Glucose	19,794	$4,200,639
Diabetes Due to an Underlying Condition	934	$1,225,748
Diabetes Related to Pregnancy and Childbirth	5,006	$13,089,362
Drug or Chemical Induced Diabetes	122	$135,567
Other Types of Diabetes	3,653	$2,995,472
Prediabetes	10,897	$1,858,981
Type 1 (Juvenile) Diabetes	9,351	$22,014,293
Type 2 Diabetes	111,098	$196,055,973
Overall - Summary	**142,384**	**$241,576,034**

Cohort Summary for Supplemental Data

	Distinct Member Count	Paid Amount
DSME education, MNT & Eye Exams [2]	2,960	$503,983
Diabetic Supplies and Medications (UB and Form C) [3]	96,895	$211,931,592
Co-Occurring Conditions [4]	110,967	$290,051,158
		$744,062,767

Notes:

[1] The claim or encounter has a the primary diagnosis in the diabetes diagnosis list. The members associated with this utilization make up the Diabetes Member Cohort.

[2] See Page 5 for Detail on DSME, MNT, and Eye Exam utilization.

[3] See Page 6 for Pharmacy Detail

[4] See Page 7 for Details on Co-Occurring Conditions

In Calendar Year 2019, AHCCCS reimbursed approximately $251.7 million for primary diagnosis diabetes related services for 144,566 distinct members (Table 8). In addition, AHCCCS reimbursed $304.1 million related to co-occurring conditions, and $249.9 million for diabetic medications and supplies.

Table 8. Detail for AHCCCS Members with Primary Diagnosis Diabetes or Prediabetes (2019)

Arizona Health Care Cost Containment System

Detail for AHCCCS Members with Primary Diagnosis Diabetes or Prediabetes [1][2] [3] [4]

Dates of Service Between 1/1/2019 and 12/31/2019

As of 11/13/20

Utilization for Members with a Primary Diagnosis of Diabetes or Prediabetes [1]

Diabetic Category	Distinct Member Count	Paid Amount
Abnormal Glucose	18,686	$3,821,966
Diabetes Due to an Underlying Condition	737	$818,909
Diabetes Related to Pregnancy and Childbirth	5,033	$12,791,591
Drug or Chemical Induced Diabetes	105	$115,820
Other Types of Diabetes	2,956	$2,981,649
Prediabetes	13,293	$2,241,177
Type 1 (Juvenile) Diabetes	9,125	$25,241,438
Type 2 Diabetes	111,913	$203,663,274
Overall - Summary	**144,566**	**$251,675,824**

Cohort Summary for Supplemental Data

	Distinct Member Count	Paid Amount
DSME education, MNT & Eye Exams [2]	3,929	$562,020
Diabetic Supplies and Medications (UB and Form C) [3]	101,486	$249,928,471
Co-Occurring Conditions [4]	113,627	$304,100,775
		$806,267,089

Notes:

[1] The claim or encounter has a the primary diagnosis in the diabetes diagnosis list. The members associated with this utilization make up the Diabetes Member Cohort.

[2] See Page 6 for Detail on DSME, MNT, and Eye Exam utilization.

[3] See Page 7&8 for Pharmacy Detail

[4] See Page 9 for Details on Co-Occurring Conditions

Table 9. Reference Co-Occurring Diagnosis Cost List

Arizona Health Care Cost Containment System

Reference- Co-Occurring Diagnosis Code List

Diagnosis Code	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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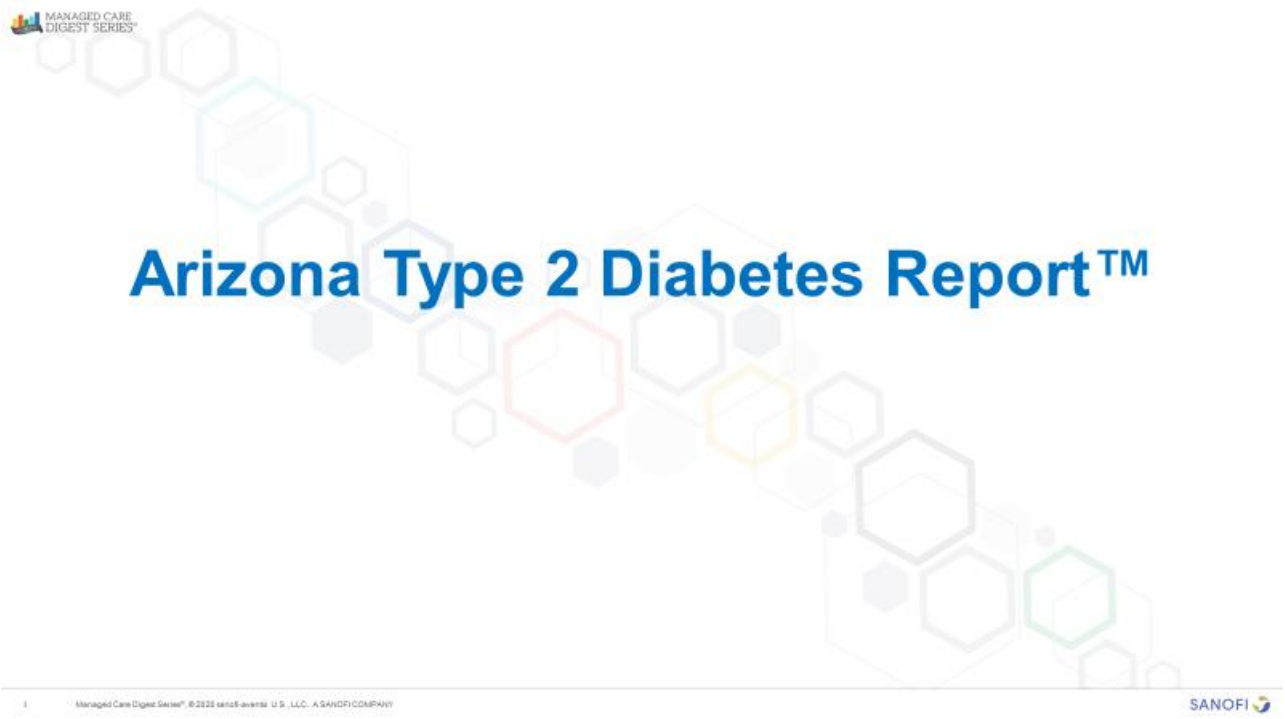
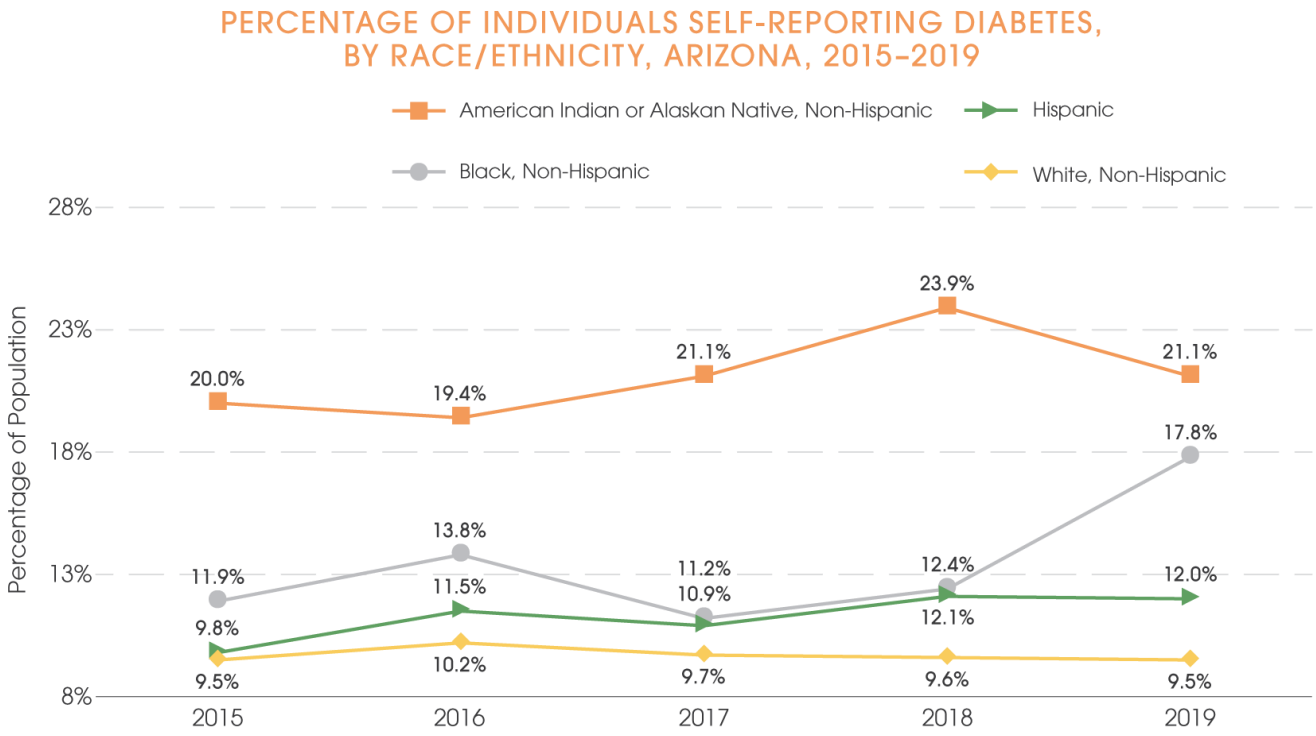


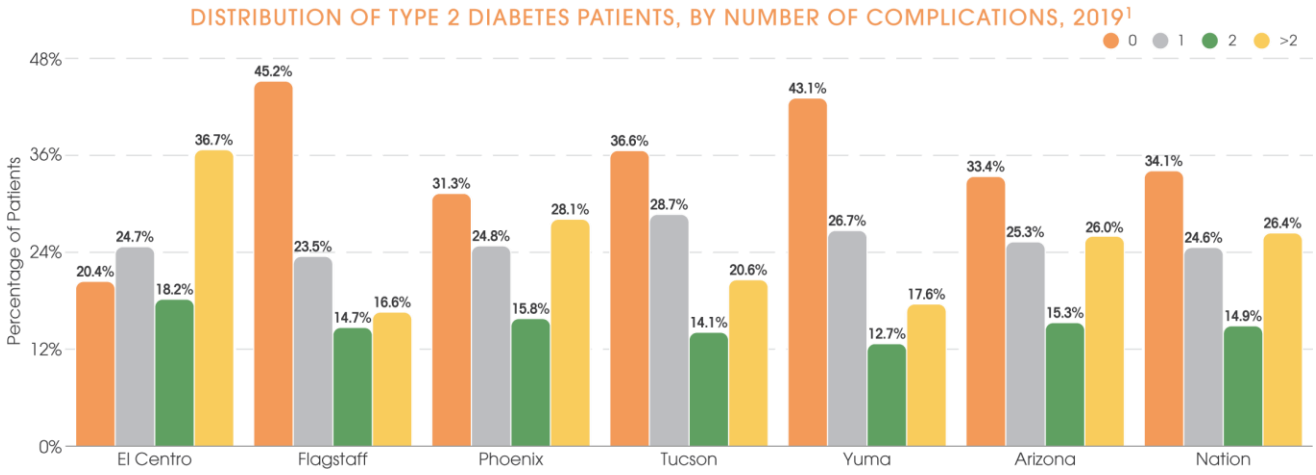
NOTE: Throughout this report, the Phoenix market includes Mesa and Scottsdale. In calendar year 2019, the numbers of patients with diabetes tracked were as follows: El Centro (7,816), Flagstaff (3,267), Phoenix (170,395), Tucson (28,903), Yuma (7,860), Arizona (235,255), and nation (11,741,143). The percentages are representative of the universe of patients with diabetes for whom claims data have been collected in a given year. An n/a indicates that data were not available. Behavioral Risk Factor Surveillance System (BRFSS) data on diabetes are based on responses to the survey question, “Have you ever been told by a doctor that you have diabetes?”



DISTRIBUTION OF TYPE 2 DIABETES PATIENTS, BY AGE, 2018–2019										
	0–17		18–35		36–64		65–79		80+	
MARKET	2018	2019	2019	2019	2018	2019	2018	2019	2018	2019
El Centro	0.4%	0.2%	2.1%	2.1%	38.1%	37.2%	41.2%	43.1%	18.3%	17.3%
Flagstaff	n/a	n/a	2.4	3.3	46.6	45.8	40.8	40.6	10.0	10.2
Phoenix	0.3	0.2	2.3	2.3	41.3	40.3	42.6	43.4	13.4	13.8
Tucson	0.2	0.2	2.0	2.0	37.8	38.3	45.5	45.1	14.6	14.4
Yuma	0.2	0.2	2.4	2.4	40.3	39.9	43.0	43.3	14.2	14.3
Arizona	**0.2**	**0.2**	**2.2**	**2.2**	**40.2**	**39.6**	**43.6**	**44.0**	**13.7**	**14.0**
NATION	**0.3%**	**0.3%**	**1.9%**	**1.9%**	**39.6%**	**38.8%**	**43.0%**	**43.7%**	**15.3%**	**15.4%**

DISTRIBUTION OF TYPE 2 DIABETES PATIENTS, BY PAYER, 2018–2019						
	Commercial Insurance[1]		Medicare		Medicaid[2]	
MARKET	2018	2019	2018	2019	2018	2019
El Centro	32.8%	35.4%	15.7%	15.6%	51.0%	48.1%
Flagstaff	32.6	34.5	21.7	24.4	45.2	41.0
Phoenix	33.6	32.1	22.4	24.2	43.6	43.4
Tucson	23.7	29.0	26.0	24.3	49.8	46.4
Yuma	20.7	26.2	35.4	26.3	43.6	47.4
Arizona	**31.1**	**31.2**	**23.5**	**24.1**	**45.0**	**44.4**
NATION	**38.5%**	**38.7%**	**12.7%**	**12.4%**	**48.3%**	**48.7%**

[1] Includes HMOs, PPOs, point-of-service plans, and exclusive provider organizations.
[2] Medicaid includes fee-for-service and managed care.

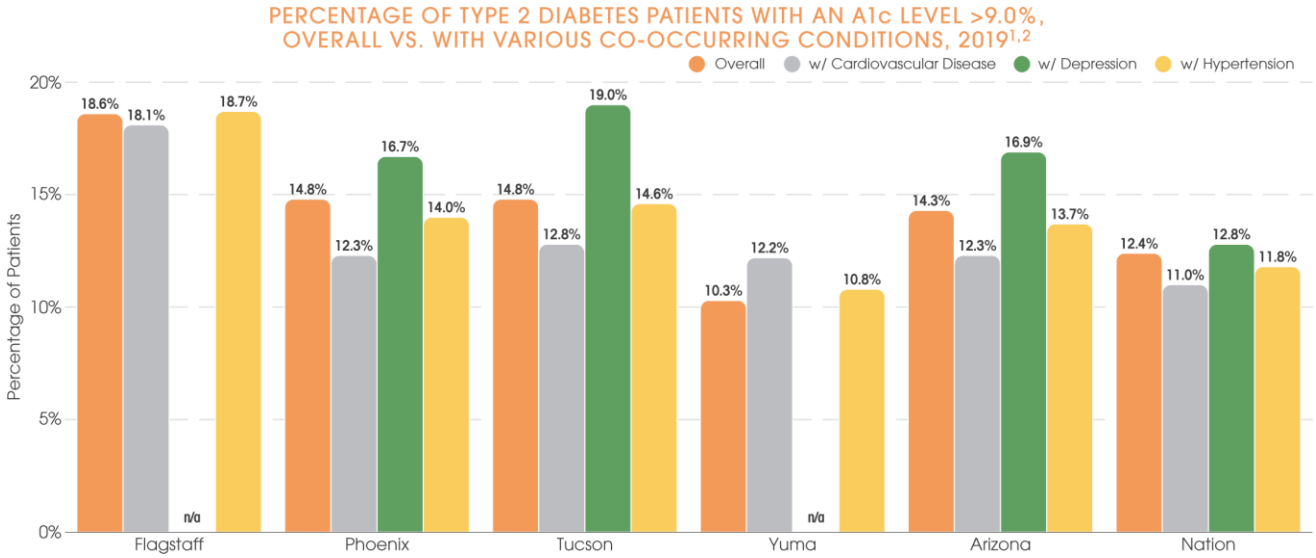


PERCENTAGE OF TYPE 2 DIABETES PATIENTS, BY ACTUAL COMPLICATION, 2019[1]									
MARKET	Cardio-vascular Disease	Chronic Kidney Disease	Hypo-glycemia	MI	Nephropathy	Neuropathy	PAD	Retinopathy	Stroke
El Centro	41.6%	34.1%	1.5%	3.1%	46.1%	22.6%	14.9%	n/a	4.5%
Flagstaff	37.8	13.7	3.7	4.1	27.7	32.5	9.8	13.7	3.5
Phoenix	40.2	22.3	3.0	2.9	38.1	38.5	17.2	17.2	4.8
Tucson	33.6	21.3	2.7	4.0	34.7	36.0	9.9	24.1	4.4
Yuma	32.5	16.9	3.9	2.8	27.6	40.1	11.0	16.3	4.1
Arizona	39.0	21.6	3.0	3.1	36.7	38.1	15.6	17.9	4.6
NATION	**40.5%**	**22.3%**	**3.0%**	**3.1%**	**36.9%**	**35.8%**	**17.2%**	**16.9%**	**4.5%**

PERCENTAGE OF TYPE 2 DIABETES PATIENTS WITH VARIOUS COVID-19 RISK FACTORS, 2019[1]						
MARKET	Asthma	Cardiovascular Disease	CKD	Hypertension	Obesity	Pneumonia
El Centro	7.8%	41.6%	34.1%	89.0%	38.4%	5.6%
Flagstaff	6.8	37.8	13.7	76.2	29.3	6.5
Phoenix	7.2	40.2	22.3	81.6	28.3	9.1
Tucson	7.3	33.6	21.3	75.9	29.0	7.2
Yuma	4.9	32.5	16.9	78.1	43.2	5.7
Arizona	7.0	39.0	21.6	80.8	28.7	8.5
NATION	**6.1%**	**40.5%**	**22.3%**	**82.2%**	**25.9%**	**6.5%**

PERCENTAGE OF TYPE 2 DIABETES PATIENTS WITH VARIOUS COMPLICATIONS, 2019[1]									
MARKET	CKD Stage 1	CKD Stage 2	CKD Stage 3	CKD Stage 4	CKD Stage 5	ESRD	Nephropathy	Neuropathy	Retinopathy
El Centro	1.0%	8.9%	19.8%	4.9%	1.5%	6.7%	46.1%	22.6%	n/a
Flagstaff	n/a	2.0	7.1	2.0	1.3	4.3	27.7	32.5	13.7%
Phoenix	0.6	3.3	15.1	3.0	0.8	3.6	38.1	38.5	17.2
Tucson	0.8	3.7	12.8	2.9	1.0	3.9	34.7	36.0	24.1
Yuma	0.4	2.4	10.3	2.5	1.1	4.0	27.6	40.1	16.3
Arizona	**0.6**	**3.3**	**14.4**	**2.9**	**0.8**	**3.6**	**36.7**	**38.1**	**17.9**
NATION	**0.7%**	**3.2%**	**15.0%**	**3.8%**	**1.0%**	**3.3%**	**36.9%**	**35.8%**	**16.9%**

[1] A complication is defined as a patient condition caused by diabetes. Complications of diabetes include, but are not limited to, atherosclerotic cardiovascular disease (ASCVD), chronic kidney disease (CKD), gastrointestinal (GI) symptoms, hypoglycemia, nephropathy, and stroke. ASCVD includes patients with acute coronary syndromes (ACS), myocardial infarction (MI), stroke, and other cardiovascular diseases.



DISTRIBUTION OF TYPE 2 DIABETES PATIENTS, BY PAYER AND A1c LEVEL RANGE, 2019[1]

MARKET	Commercial Insurance[2]				Medicare				Medicaid[3]			
	≤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	53.6%	22.1%	12.3%	12.0%	60.3%	18.8%	11.8%	9.1%	69.0%	n/a	12.6%	n/a
Flagstaff	43.5	18.8	16.4	21.3	51.5	22.8	15.8	9.9	43.6	18.9%	12.8	24.7%
Phoenix	54.0	19.4	11.9	14.7	58.8	19.5	10.8	10.9	50.1	17.5	12.8	19.6
Tucson	50.8	19.5	14.3	15.5	57.0	20.2	12.1	10.7	48.4	18.0	13.8	19.9
Yuma	55.4	21.4	12.9	10.3	60.1	20.1	11.3	8.5	50.8	18.0	13.9	17.4
Arizona	**54.0**	**19.4**	**12.2**	**14.5**	**58.7**	**19.8**	**11.0**	**10.5**	**49.7**	**17.6**	**12.9**	**19.7**
NATION	**55.2%**	**19.7%**	**11.9%**	**13.2%**	**59.4%**	**19.9%**	**11.1%**	**9.6%**	**50.7%**	**17.5%**	**12.6%**	**19.2%**

PERCENTAGE OF TYPE 2 DIABETES PATIENTS RECEIVING LONG-ACTING BASAL CATEGORY 1 VS. CATEGORY 2 WITH AN A1c LEVEL ≤7.0% OR >9.0%, 2017 AND 2019[1]

MARKET	≤7.0%[2]						>9.0%[3]					
	Category 1			Category 2			Category 1			Category 2		
	2017	2019	% Point Change[4]	2017	2019	% Point Change[4]	2017	2019	% Point Change[4]	2017	2019	% Point Change[4]
Phoenix	24.4%	25.5%	1.1	18.6%	22.8%	4.2	35.0%	33.1%	–1.9	37.2%	32.3%	–4.8
Tucson	25.0	25.4	0.4	20.3	26.3	6.0	33.0	31.3	–1.7	30.5	26.9	–3.6
Arizona	**24.9**	**25.4**	**0.5**	**18.8**	**25.0**	**6.2**	**34.4**	**32.1**	**–2.3**	**35.5**	**29.8**	**–5.6**
NATION	**25.3%**	**26.7%**	**1.4**	**21.0%**	**24.8%**	**3.9**	**32.1%**	**29.8%**	**–2.3**	**35.2%**	**29.1%**	**–6.1**

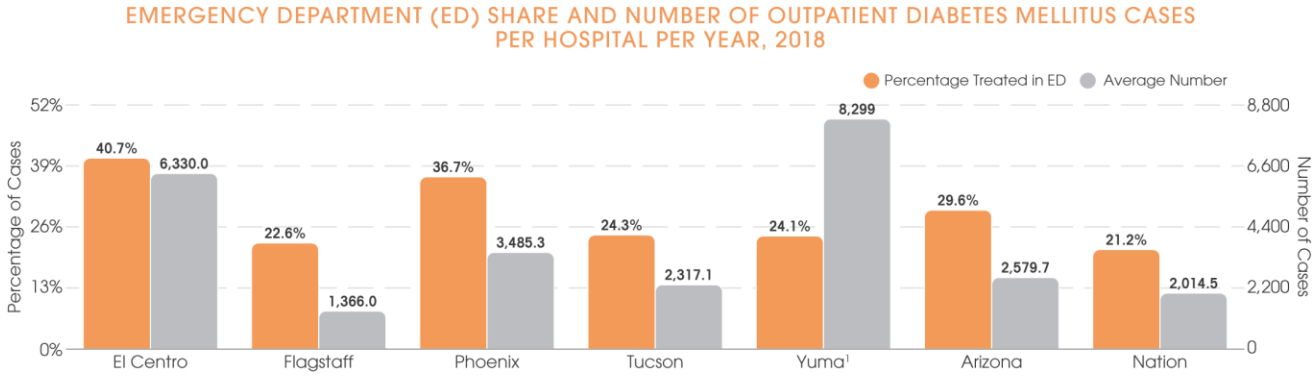
[1] An A1c test measures the average blood sugar level during the past 2–3 months. Figures reflect the percentage of diabetes patients who have had at least one A1c test in a given year.

[2] Positive percent change in this group indicates an increase, from 2017 to 2019, in the percentage of patients with A1c levels at or below 7.0%.

[3] Negative percent change in this group indicates a reduction, from 2016 to 2018, in the percentage of patients with A1c levels above 9.0%.

[4] Percentage-point changes are calculated from data with additional decimal places and may differ slightly from calculations using the rounded figures shown.

NOTE: "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. Some data were unavailable for the selected markets.

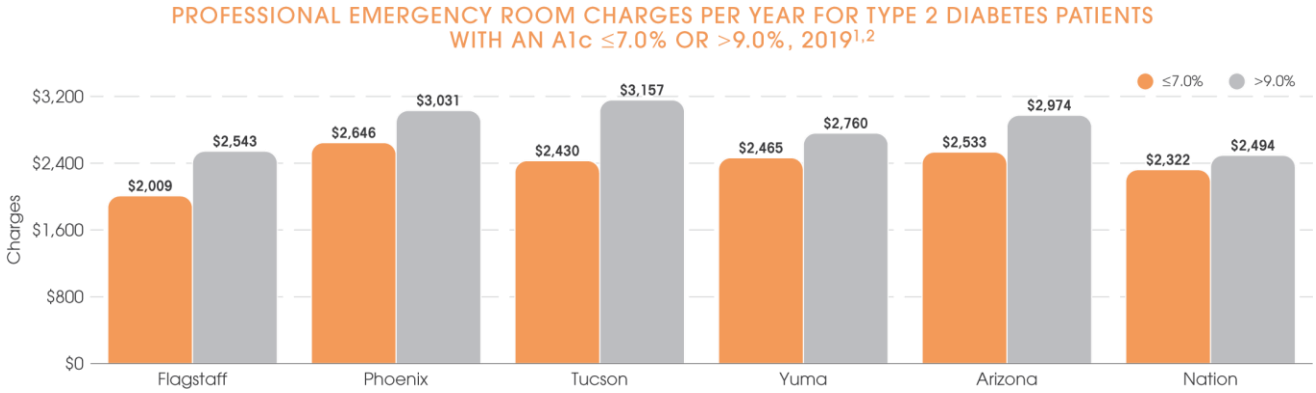


Case counts for markets containing a single hospital are the totals for that hospital, rather than an average.
NOTE: Hospital data come from IQVIA's *Hospital Procedure & Diagnosis* (HPD) database. Emergency department case counts data are based on all short-term, acute-care hospitals and are effective as of 2018. Psychiatric, rehabilitation, armed forces, and long-term acute-care hospitals are excluded.

PROFESSIONAL CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, BY SETTING, 2018–2019[1]

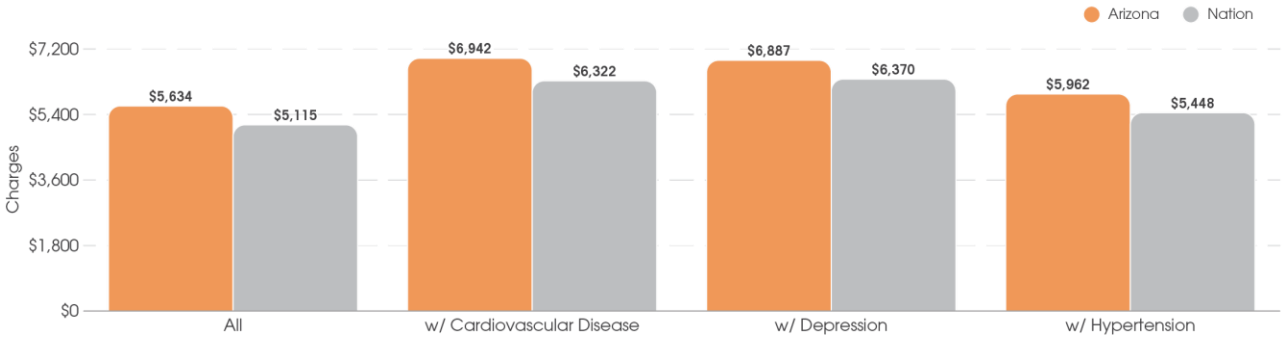
	Ambulatory Surgery		Emergency Department		Inpatient		Outpatient		Office/ Clinic	
MARKET	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019
El Centro	$2,171	$1,498	$1,538	$1,184	$3,554	$3,052	$2,247	$2,039	$3,889	$3,544
Flagstaff	4,457	5,014	1,666	2,127	4,755	4,371	1,468	1,849	1,867	1,826
Phoenix	4,839	5,093	2,736	2,853	5,834	5,821	2,197	2,232	3,739	3,611
Tucson	4,365	4,800	2,512	2,420	5,732	5,932	2,091	2,015	3,043	2,882
Yuma	4,735	4,926	1,750	2,320	4,713	3,367	1,608	1,758	3,556	2,406
Arizona	4,753	5,044	2,576	2,719	5,605	5,634	2,046	2,112	3,445	3,312
NATION	$3,993	$4,153	$2,142	$2,268	$5,080	$5,115	$1,837	$1,882	$2,857	$2,819

[1] Professional charges are those generated by the providers delivering care to patients with diabetes in various settings.



[1] The A1c test measures the average blood sugar level during the past 2–3 months. Figures reflect the percentage of diabetes patients who have had at least one A1c test in a given year.
[2] Professional charges are those generated by the providers delivering care to patients with diabetes in various settings.

PROFESSIONAL INPATIENT CHARGES PER YEAR FOR TYPE 2 DIABETES PATIENTS, OVERALL VS. WITH VARIOUS CO-OCCURRING CONDITIONS, 2019[1,2]



[1] A co-occurring condition is a condition a patient with diabetes may also have, which may or may not be directly related to the diabetes. Co-occurring conditions were narrowed down to a subset of conditions, including, but not limited to, atherosclerotic cardiovascular disease (ASCVD; includes patients with acute coronary syndromes, myocardial infarction, stroke, and other cardiovascular conditions), chronic kidney disease (CKD), gastrointestinal (GI) symptoms, congestive heart failure, hypoglycemia, obesity, peripheral artery disease (PAD), and stroke.

[2] Professional charges are those generated by the providers delivering care to patients with diabetes in various settings.

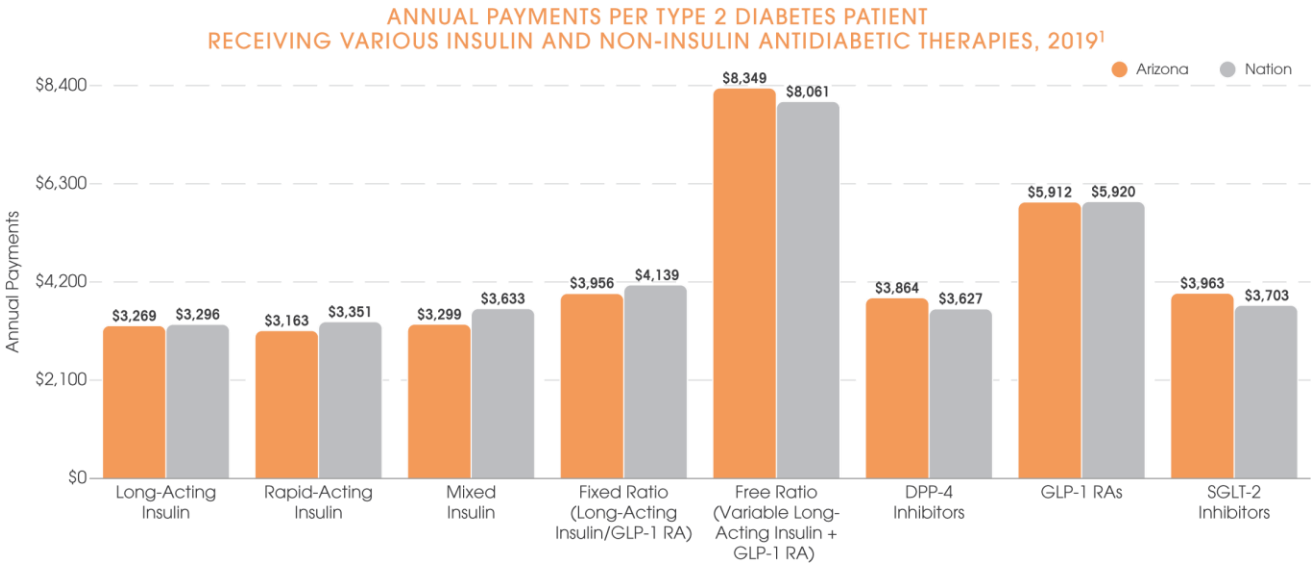
PERCENTAGE OF TYPE 2 DIABETES PATIENTS RECEIVING VARIOUS INSULIN AND COMBINATION THERAPIES, 2019

MARKET	Long-Acting Basal Category 1	Long-Acting Basal Category 2	Rapid-Acting Insulin	Mixed Insulin	Fixed Ratio (Long-Acting Insulin/GLP-1 RA)	Free Ratio (Variable Long-Acting Insulin + GLP-1 RA)
El Centro	16.1%	7.4%	8.0%	2.1%	1.3%	7.6%
Flagstaff	26.3	5.3	15.2	2.0	n/a	4.8
Phoenix	14.0	3.2	7.4	1.5	0.3	2.9
Tucson	23.0	3.9	10.5	4.8	0.4	4.6
Yuma	28.1	3.4	14.4	3.8	0.4	3.9
Arizona	15.6	3.4	8.1	1.9	0.3	3.1
NATION	20.0%	6.2%	12.5%	3.2%	0.6%	5.2%

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

PERCENTAGE OF TYPE 2 DIABETES PATIENTS RECEIVING VARIOUS NON-INSULIN ANTIDIABETIC THERAPIES, 2019

MARKET	Biguanides	DPP-4 Inhibitors	GLP-1 RAs	Insulin Sensitizing Agents	SGLT-2 Inhibitors	Sulfonylureas
El Centro	75.8%	22.4%	21.9%	13.7%	15.3%	27.1%
Flagstaff	70.6	8.1	12.6	9.2	9.1	25.5
Phoenix	76.8	10.3	8.2	10.0	7.8	35.1
Tucson	73.4	9.1	11.7	8.6	7.1	30.1
Yuma	71.0	9.2	10.1	6.8	5.5	35.1
Arizona	76.1	10.1	8.6	9.6	7.6	34.7
NATION	68.9%	13.2%	13.7%	6.9%	11.2%	31.7%



[1] Figures reflect the per-patient yearly payments for diabetes patients receiving a particular type of therapy. These are the actual amounts paid by the insurer and patient for such prescriptions. Costs mainly include copayments, but can also include tax, deductibles, and cost differentials where applicable.

ANNUAL OUT-OF-POCKET COSTS PER TYPE 2 DIABETES PATIENT RECEIVING VARIOUS INSULIN THERAPIES, BY PAYER, ARIZONA, 2019

PAYER	Long-Acting Basal Category 1	Long-Acting Basal Category 2	Rapid-Acting Insulin	Mixed Insulin	Fixed Ratio (Long-Acting Insulin/GLP-1 RA)
Commercial[1]	$230	$240	$151	$199	$226
Medicare	250	280	200	232	325
Medicaid[2]	$6	$14	$3	$1	$8

[1] Includes HMOs, PPOs, point-of-service plans, and exclusive provider organizations.
[2] Medicaid includes fee-for-service and managed care.
NOTE: "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. "Fixed ratio (long-acting insulin/GLP-1 RA)" refers to the two therapies combined in a single product.

ANNUAL OUT-OF-POCKET COSTS PER TYPE 2 DIABETES PATIENTS RECEIVING VARIOUS NON-INSULIN ANTIDIABETIC THERAPIES, BY PAYER, ARIZONA, 2019

PAYER	Biguanides	DPP-4 Inhibitors	GLP-1 RAs	Insulin Sensitizing Agents	SGLT-2 Inhibitors	Sulfonylureas
Commercial[1]	$28	$260	$256	$48	$202	$37
Medicare	$7	$322	$370	$13	$348	$9
Medicaid[2]	$1	$8	$3	$1	$9	$1

[1] Includes HMOs, PPOs, point-of-service plans, and exclusive provider organizations.
[2] Medicaid includes fee-for-service and managed care.

READMISSION RATES FOR PATIENTS DIAGNOSED WITH TYPE 2 DIABETES, BY TYPE OF THERAPY, 2017–2019[1]

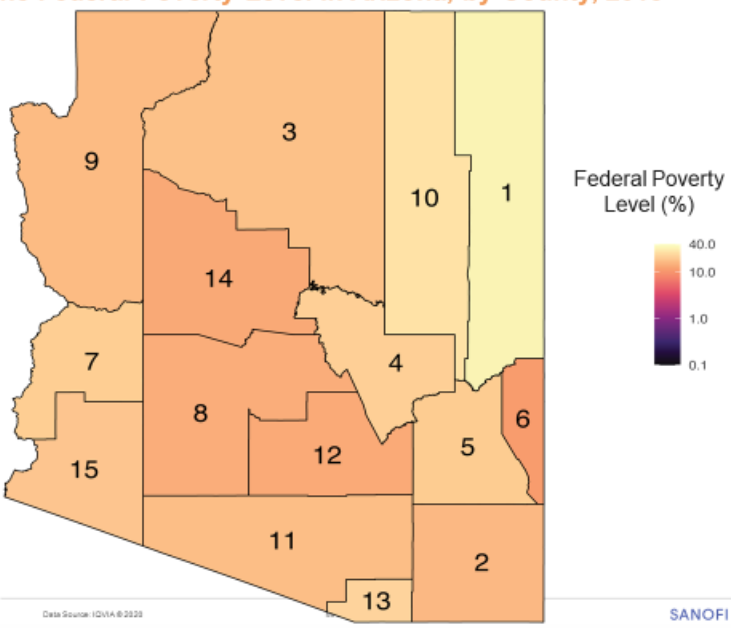
MARKET	Three-Day Readmissions			30-Day Readmissions		
	Long-Acting Basal Category 1	Long-Acting Basal Category 2	Three Non-Insulin Antidiabetic Products	Long-Acting Basal Category 1	Long-Acting Basal Category 2	Three Non-Insulin Antidiabetic Products
NATION	**7.4%**	**4.8%**	**14.7%**	**20.0%**	**17.4%**	**30.8%**

[1] Figures reflect the percentages of Type 2 diabetes patients who were readmitted to an inpatient facility in the three-year period between 2017 and 2019. These percentages include patients who filled multiple prescriptions. Readmissions are not necessarily due to Type 2 diabetes. Readmissions data are available down to the national level only.

MANAGED CARE DIGEST SERIES

Percentage of Population at or Below the Federal Poverty Level in Arizona, by County, 2018

Arizona	
ID	County
1	Apache County
2	Cochise County
3	Coconino County
4	Gila County
5	Graham County
6	Greenlee County
7	La Paz County
8	Maricopa County
9	Mohave County
10	Navajo County
11	Pima County
12	Pinal County
13	Santa Cruz County
14	Yavapai County
15	Yuma County



Census Bureau, American Community Survey, 5-year Estimate, Accessed May 2020

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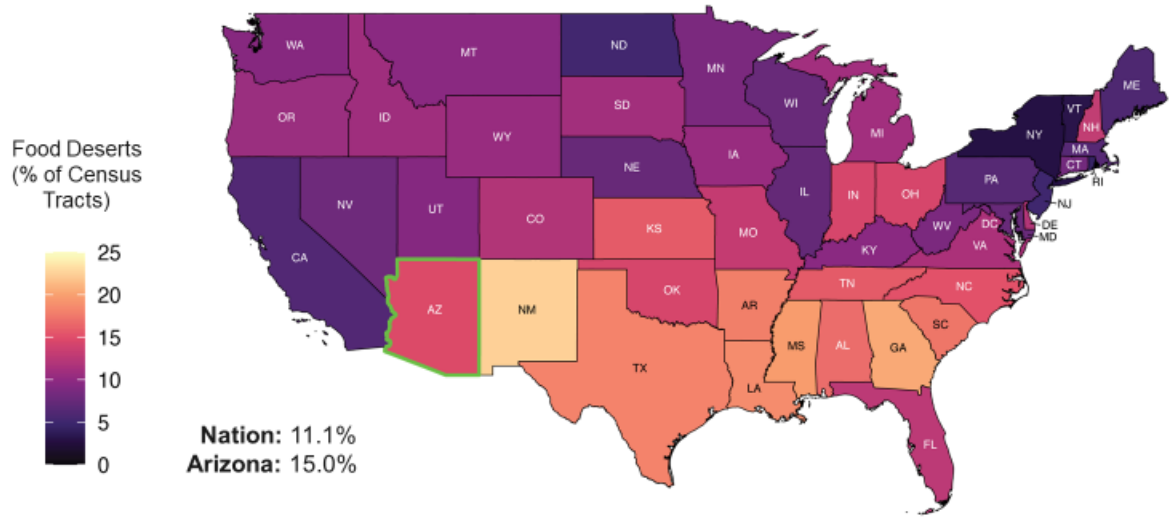
MANAGED CARE DIGEST SERIES

Food Deserts in the Continental U.S., 2018



Food Access Research Atlas, U.S. Department of Agriculture, Accessed May 3, 2020

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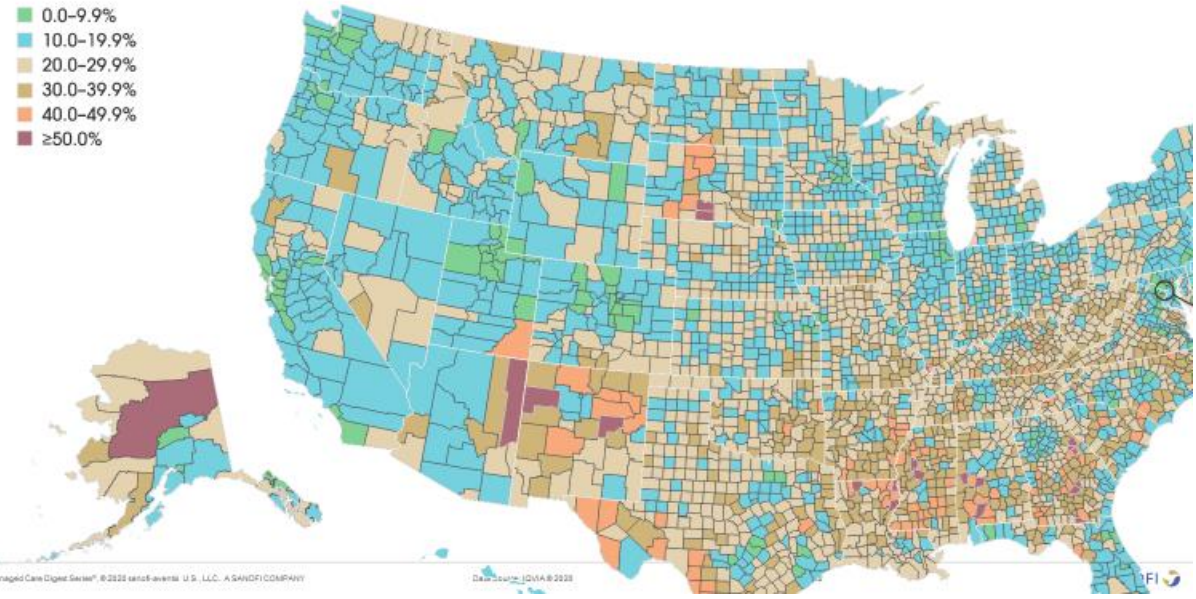
MANAGED CARE DIGEST SERIES®

Percentage of Households With No Internet access, by County, 2018

Data source: U.S. Census Bureau © 2020



MANAGED CARE DIGEST SERIES®

Methodology

IQVIA generated the Type 2 diabetes data for this presentation out of health care professional (837p) and institutional (837i) insurance claims, representing more than 11.7 million unique patients nationally in 2019 with a diagnosis of Type 2 diabetes (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, mail-order, 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-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 each patient, then strips away all patient-specific health information 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, etc.), while protecting the privacy of each patient.

Limitations

This is an administrative-claims-based data set, with potential biases secondary to coding variation and missing data. Administrative claims data have been used successfully in many published studies to examine patterns, effectiveness, and gaps in quality of care, and to assess outcomes in care. Although this data set focuses on patients with Type 2 diabetes, there are limitations in the granularity of ICD-10 codes used for billing. There were unmeasured factors that predict hospital readmission (e.g., quality of inpatient care and discharge planning, race, education, smoking, wellness program utilization) that were not controlled for in the multivariate analyses.

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CDC/Arizona 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% confidence interval of ±3%). Each survey has the potential to represent 96.3% 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, prediabetes or borderline diabetes
- 7 Don‘t know / Not sure
- 9 Refused Diabetes in Arizona:

MODULE 1: PREDIABETES (LAST TIME ASKED IN 2018)

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

eGFR – Estimated Glomerular Filtration Rate

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

uACR – Urine Albumin Creatinine Ratio

VS – Vital Statistics

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