

What is Diabetes?

Diabetes is a disease that affects the body's ability to use sugar (glucose) from foods and turn it into energy.¹ When sugar enters the bloodstream, the body signals the pancreas to release insulin, a hormone that helps move sugar from the blood into cells throughout the body.¹ The disease occurs when the body is unable to make or use insulin properly, making blood sugar levels rise. Untreated or uncontrolled diabetes can lead to health problems such as heart disease, kidney disease, and vision loss.¹

Diabetes was the 7th leading cause of death in the United States in 2019.¹ In the United States, approximately 37.3 million people had diabetes, of whom 8.5 million were undiagnosed in 2019.² There are several types of diabetes including:

*Type 1 Diabetes*³

Occurs when the pancreas is unable to produce insulin due to an autoimmune reaction which destroys insulin producing cells. Type 1 diabetes typically develops among children, teens, and young adults, but it can occur at any age. People with type 1 diabetes must take daily insulin shots or wear an insulin pump to maintain blood sugar levels under control. Type 1 diabetes accounts for 5-10% of all cases of diagnosed diabetes and is not preventable.

*Type 2 Diabetes*⁴

Occurs when the blood sugar levels rise because the body has become insulin resistant. Insulin resistance develops over many years when cells are unable to respond normally to insulin and the pancreas cannot continue to produce enough insulin for cells to respond. Type 2 diabetes typically develops among adults, but it can occur at any age and may not have noticeable symptoms at first. Type 2 diabetes accounts for 90-95% of all cases of diagnosed diabetes and can be prevented or delayed with healthy lifestyle changes such as diet and physical activity.

*Gestational Diabetes*⁵

Occurs only during pregnancy among people who do not already have diabetes. Increased hormone production and other bodily changes during pregnancy can affect the body's ability to effectively use insulin. Gestational diabetes affects between 2-10% of all pregnancies in the United States. Approximately 50% of those with gestational diabetes develop type 2 diabetes post-pregnancy, but this can be prevented with lifestyle changes.

*Prediabetes*⁶

Occurs when blood sugar levels are higher than normal, but not high enough to be diagnosed with type 2 diabetes. An estimated 96 million adults in the United States are considered to be prediabetic, of whom 80% are unaware of their status. Prediabetes can also be prevented with healthy lifestyle changes.

Risk Factors for Type 2 Diabetes

Demographic Risk Factors

- *Age*
 - Adults 45 years and older have a higher risk of developing type 2 diabetes than other age groups.⁷
 - In recent years, type 2 diabetes among children, teens, and young adults has increased due to family history and/or share lifestyle practices (e.g., sedentary behaviors) with close relatives.
- *Family History*
 - Individuals with first degree relatives (e.g., parent, sibling) who have type 2 diabetes are at greater risk for developing diabetes.⁷
- *Race/Ethnicity*
 - African Americans, Hispanic/Latinos, and American Indian/Alaska Natives, as well as some Pacific Islanders and Asian Americans, have a higher risk of developing type 2 diabetes.⁷

Social and Behavioral Risk Factors

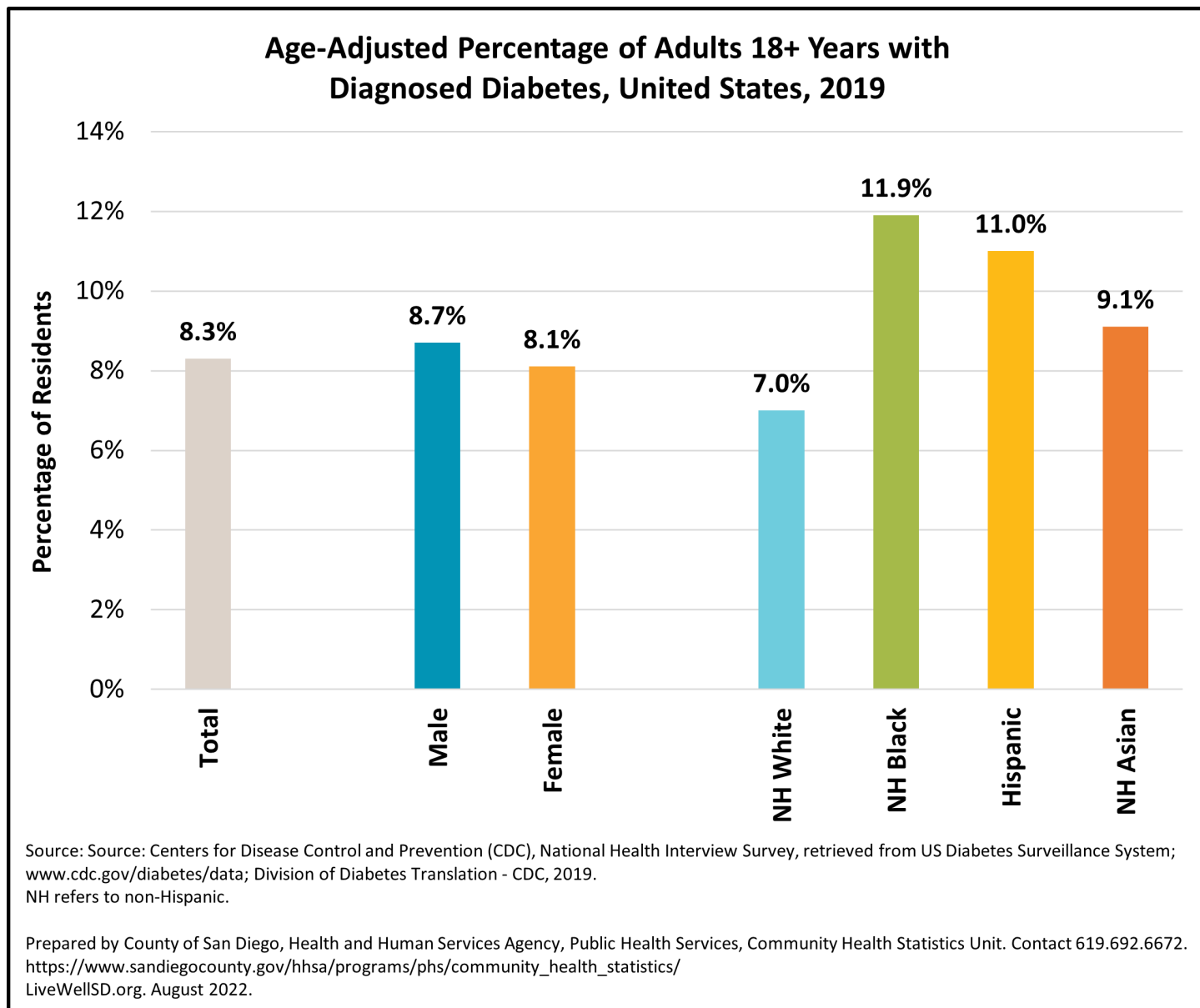
- *Prediabetes*
 - Having prediabetes increases the risk of type 2 diabetes.⁶
- *Poor diet and physical inactivity*
 - Individuals who have a poor diet and are physically active less than 3 times a week have a greater risk of developing type 2 diabetes.⁷
- *Overweight or obese*
 - Individuals who are overweight or obese have a greater risk of developing diabetes.⁷

Intermediate Outcomes

Diabetes increases the risk of other diseases and is accompanied by complications beyond acute glucose elevation. Some of these diseases or complications include:

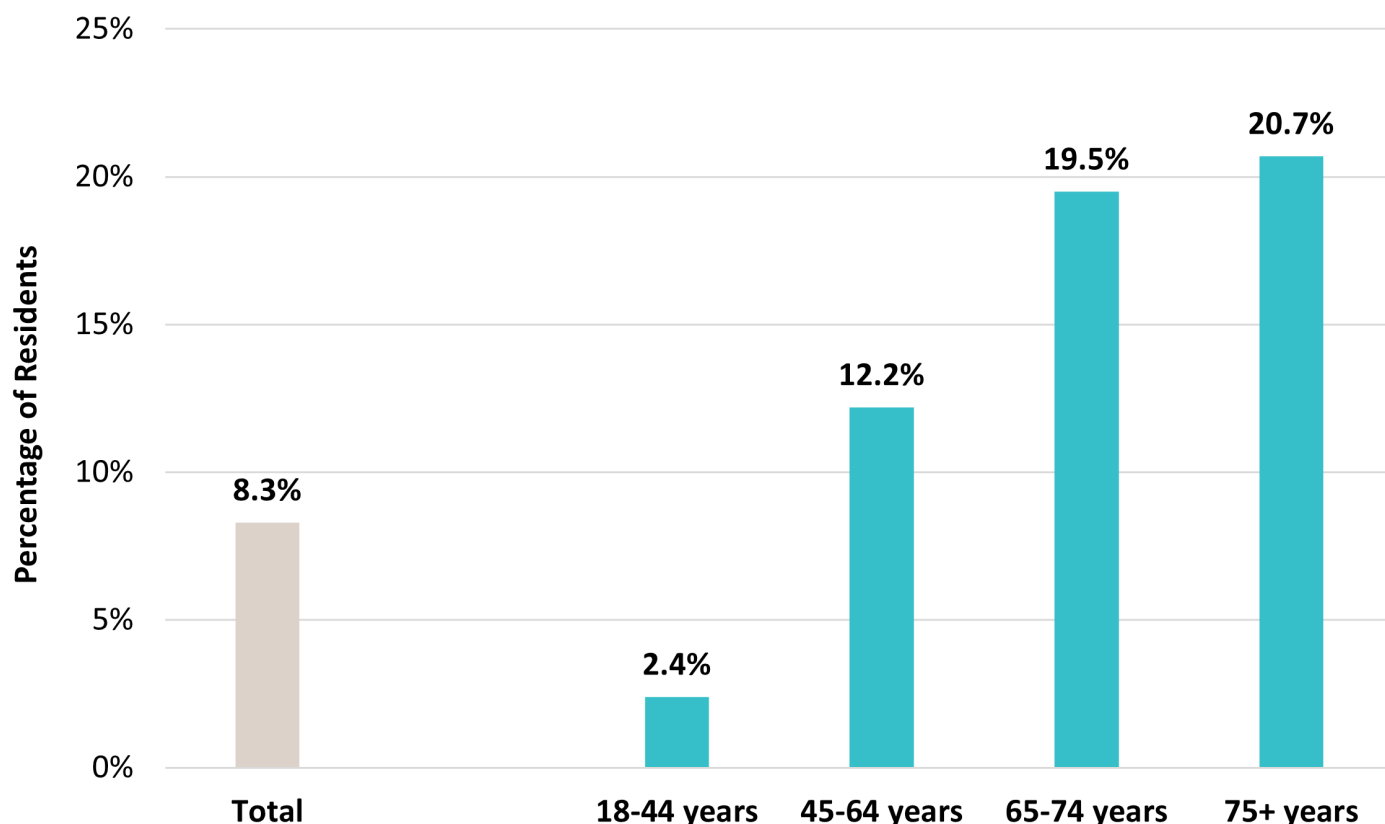
- *Heart Disease and Stroke*
 - A person with diabetes is twice as likely to have heart disease or stroke, and at a younger age, compared to a person who does not have diabetes.⁸
- *Hypertension (High Blood Pressure)*
 - Approximately two out of three people with diabetes have high blood pressure or use medication for hypertension.⁹
- *High Cholesterol*
 - Among adults diagnosed with diabetes, 44% had high cholesterol.¹⁰
- *Eye Disease*
 - Diabetes is the leading cause of blindness among adults 18-64 years.¹¹
 - In 2019, 11.8% of adults 18 years or older with diagnosed diabetes reported severe vision difficulty or blindness.¹¹
- *Lower Limb Conditions*
 - In 2018, there were a 154,000 hospital discharges reported due to lower-extremity amputations among adults 18 years or older with diabetes.¹¹
- *Nerve Damage*
 - Nearly half of all people with diabetes experience some form of nerve damage also known as diabetic neuropathy.¹²
- *Infections*
 - People with diabetes have a higher risk of developing flu-related complications such as pneumonia, bronchitis, sinus infections, and ear infections.¹³
- *Periodontal Disease*
 - Having high blood sugar weakens white blood cells which help fight infections from bacteria that can cause tooth decay, cavities, and gum disease.¹⁴
 - People with diabetes are more likely to have severe gum disease, which can result in loss of teeth if left untreated.¹⁴
- *Chronic Kidney Disease (CKD)*
 - Approximately 1 in 3 adults with diabetes have chronic kidney disease.¹⁵

National Statistics and Disparities



- In 2019, the age-adjusted percentage of adult males with diagnosed diabetes (8.7%) was higher than the age-adjusted percentage of adult females with diabetes (8.1%) and the United States overall (8.3%).¹⁶
- In the United States, non-Hispanic Black adults had the highest age-adjusted percentage of diagnosed diabetes (11.9%), followed by Hispanic adults (11.0%) in 2019.¹⁶
- Non-Hispanic Black (11.9%), Hispanic (11.0%), and non-Hispanic Asian (9.1%) adults had higher age-adjusted percentages of diagnosed diabetes than the age-adjusted percentage of diagnosed diabetes in the United States overall (8.3%).¹⁶

Age-Adjusted Percentage of Adults 18+ Years with Diagnosed Diabetes by Age, United States, 2019



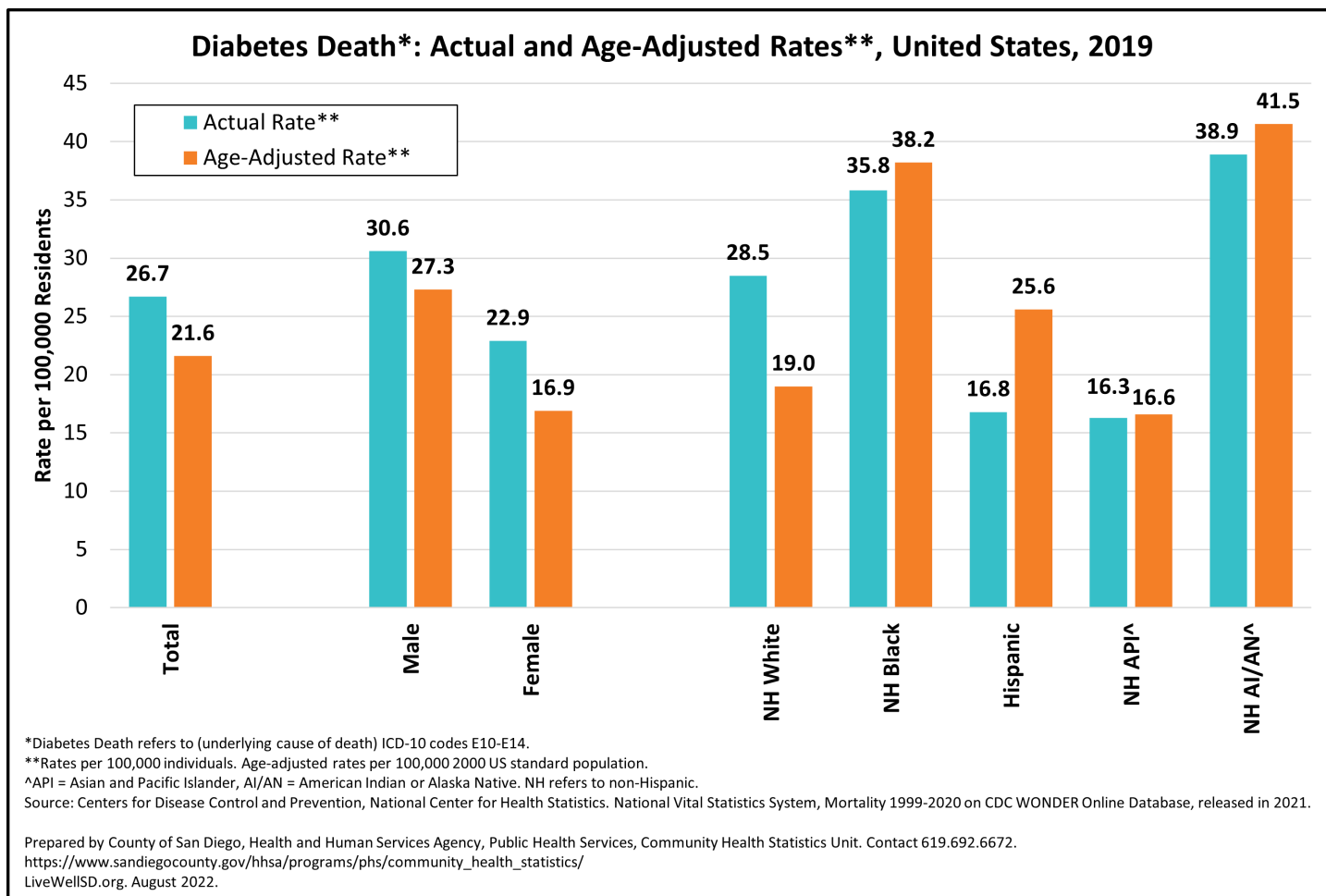
Source: Source: Centers for Disease Control and Prevention (CDC), National Health Interview Survey, retrieved from US Diabetes Surveillance System; www.cdc.gov/diabetes/data; Division of Diabetes Translation - CDC, 2019.

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- In the United States, adults 75 years and older had the highest percentage of diagnosed diabetes (20.7%), followed by adults 65-74 years (19.5%) in 2019.¹⁶

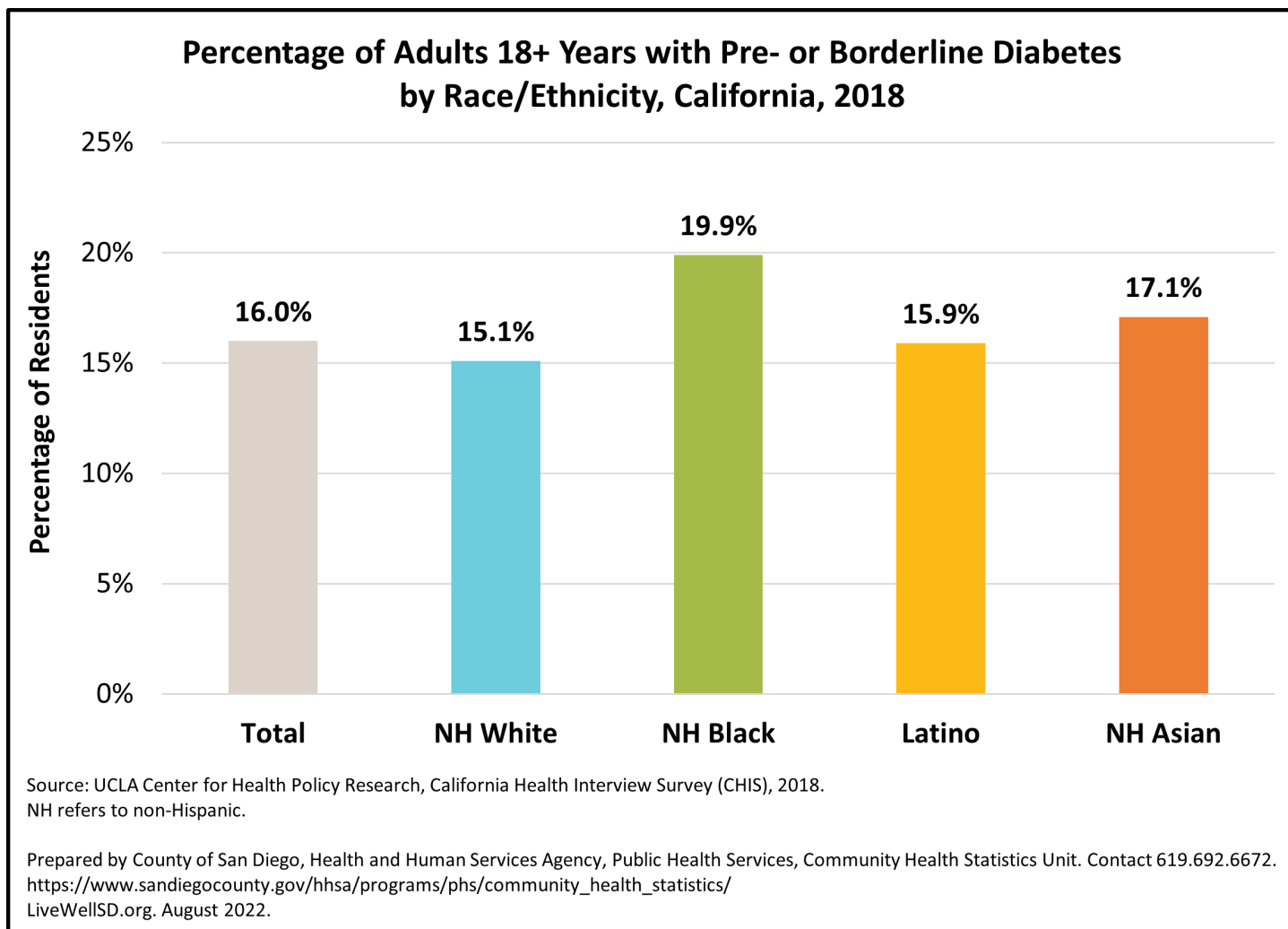
Cost

- In 2017, the total estimated direct and indirect costs of diagnosed diabetes was \$327 billion in the United States.¹¹
- The associated excess medical costs per person due to diabetes increased from \$8,417 in 2012 to \$9,601 in 2017.¹¹



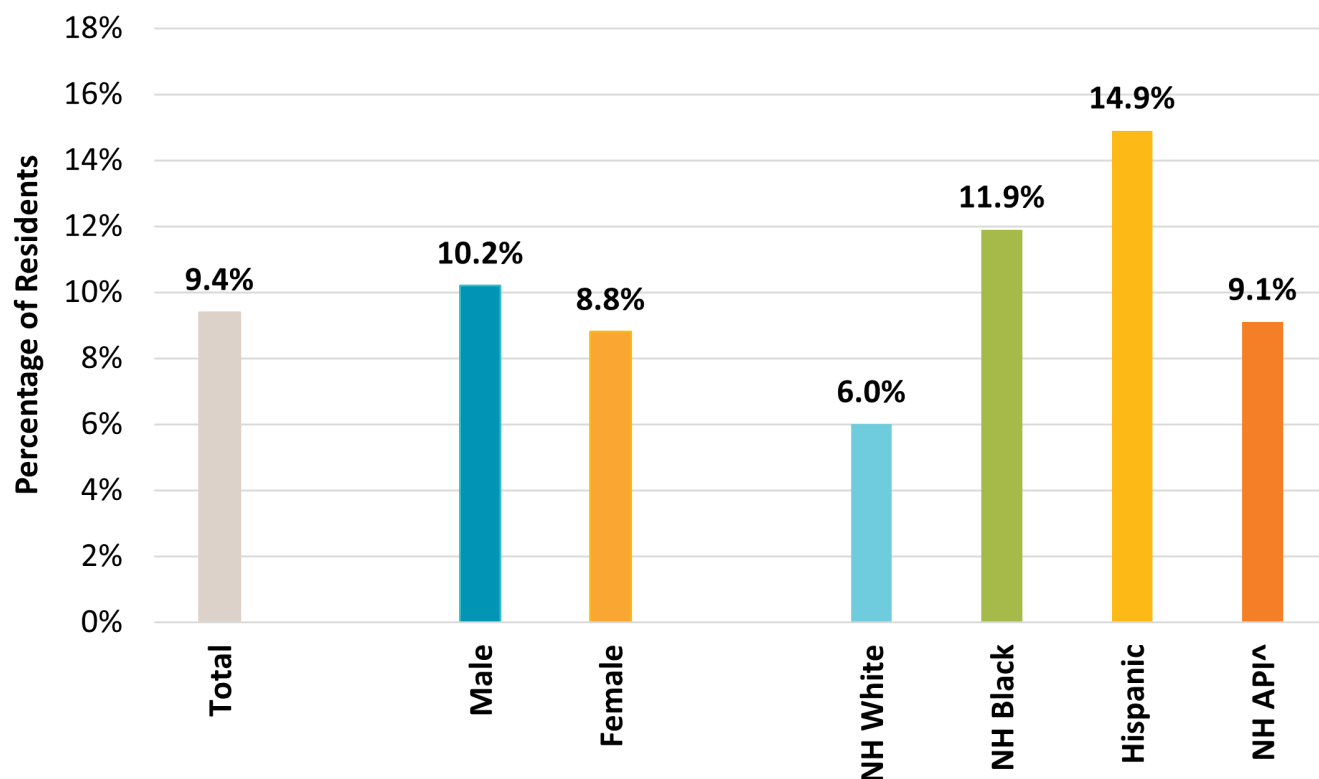
- In 2019, males had higher actual and age-adjusted rates of death due to diabetes than females and the United States overall.¹⁷
- In 2019, American Indian/Alaska Natives had the highest actual and age-adjusted rates of death due to diabetes compared to all other races/ethnicities.¹⁷
- In the United States, American Indian/Alaska Natives (41.5 per 100,000), non-Hispanic Blacks (38.2 per 100,000), and Hispanics (25.6 per 100,000) had higher age-adjusted rates of death due to diabetes than the United States (21.6 per 100,000) overall in 2019.¹⁷

State Statistics and Disparities



- In 2018, the percentage of adults who had pre– or borderline diabetes in the State of California was 16.0%.¹⁸
- In California, non-Hispanic Black adults had the highest percentage of pre– or borderline diabetes (19.9%) than all other races/ethnicities in 2018.¹⁸

Age-Adjusted Percentage of Adults 18+ years with Diagnosed Diabetes, California, 2019



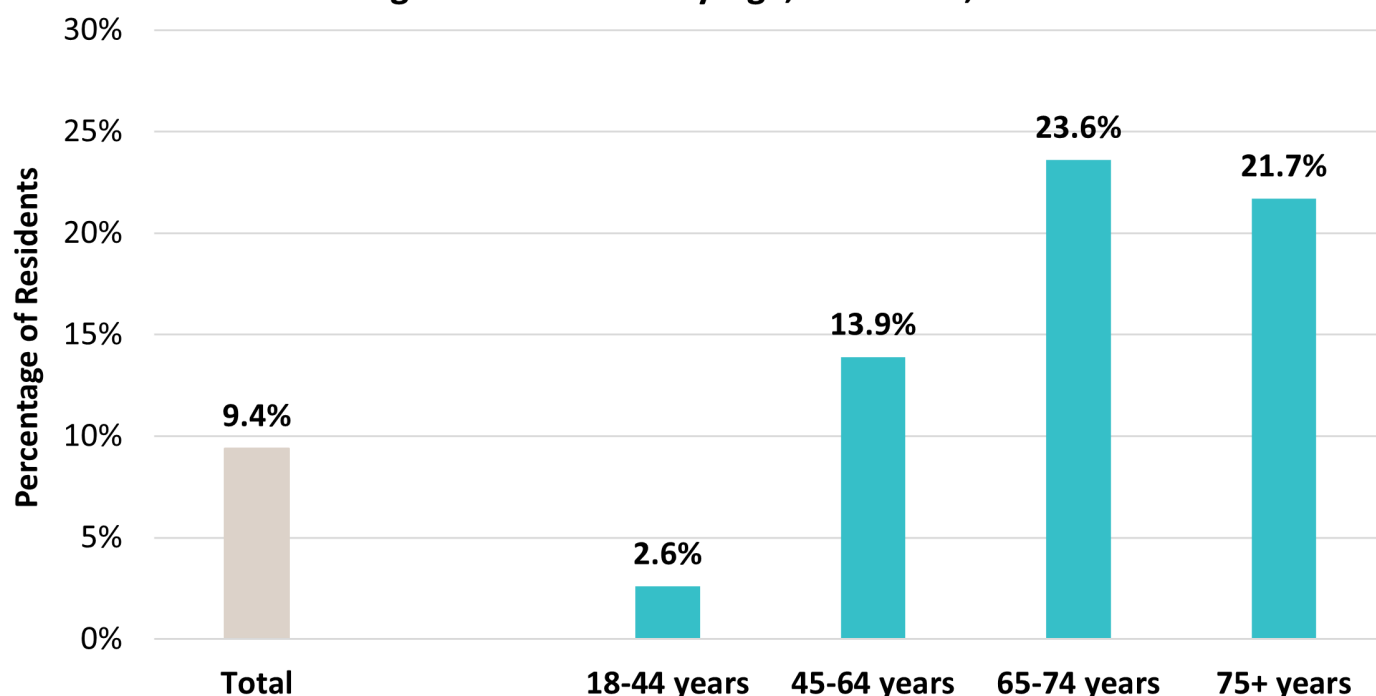
Source: Centers for Disease Control and Prevention (CDC), National Health Interview Survey, retrieved from US Diabetes Surveillance System; www.cdc.gov/diabetes/data; Division of Diabetes Translation - CDC, 2019.

^API = Asian and Pacific Islander. NH refers to non-Hispanic.

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- In 2019, the age-adjusted percentage of adult males with diagnosed diabetes (10.2%) was higher than the age-adjusted percentage of adult females with diagnosed diabetes (8.8%) and the United States overall (9.4%).¹⁶
- In California, Hispanic adults had the highest age-adjusted percentage of diagnosed diabetes (14.9%), followed by non-Hispanic Black adults (11.9%) in 2019.¹⁶
- Hispanic (14.9%), non-Hispanic Black (11.9%), and non-Hispanic Asian and Pacific Islander (9.1%) adults had higher age-adjusted percentages of diagnosed diabetes than the age-adjusted percentage of diagnosed diabetes in California overall (9.4%).¹⁶

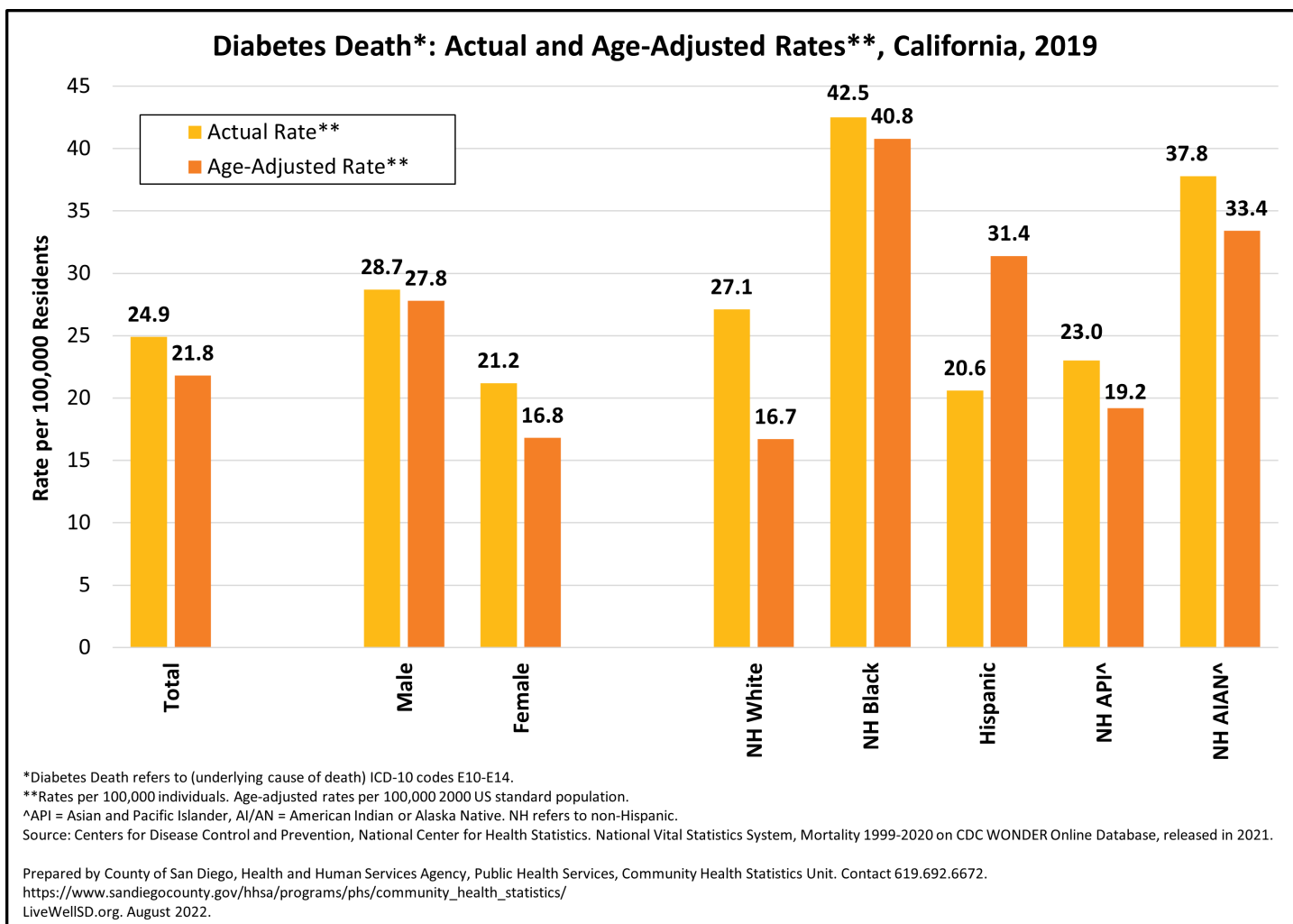
Age-Adjusted Percentage of Adults 18+ years with Diagnosed Diabetes by Age, California, 2019



Source: Centers for Disease Control and Prevention (CDC), National Health Interview Survey, retrieved from US Diabetes Surveillance System; www.cdc.gov/diabetes/data; Division of Diabetes Translation - CDC, 2019.

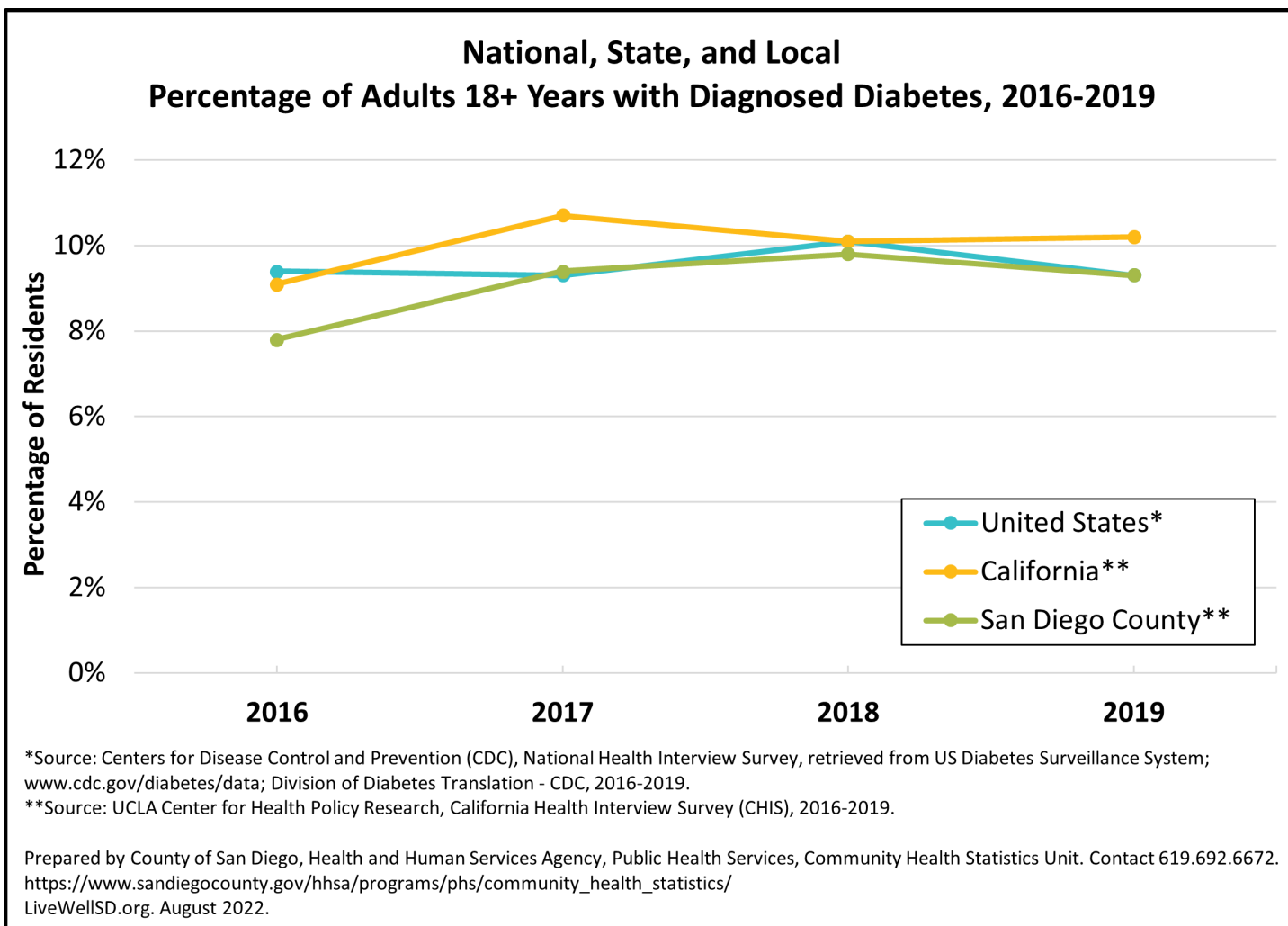
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- In California, adults 65-74 years had the highest percentage of diagnosed diabetes (23.6%), followed by adults 75 years and older (21.7%) in 2019.¹⁶



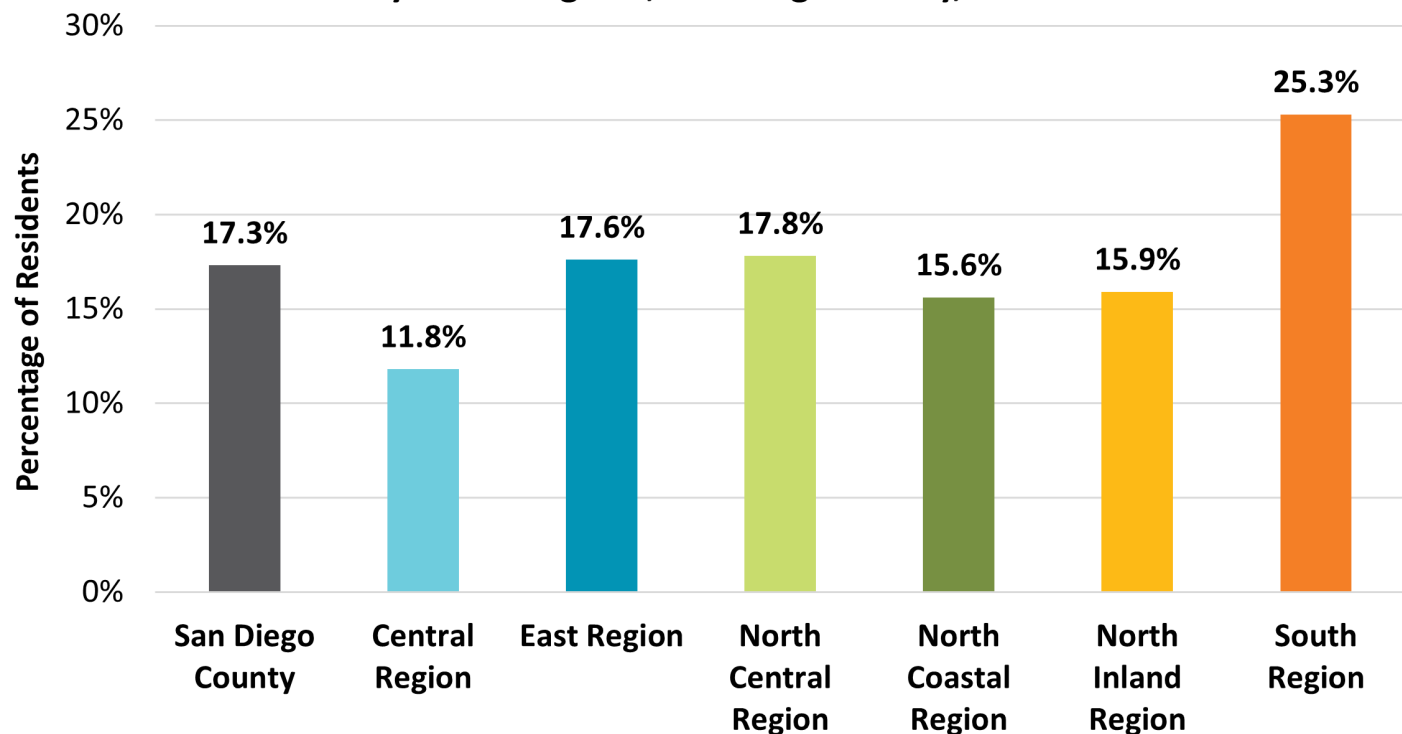
- In 2019, males had higher actual and age-adjusted rates of death due to diabetes than females and California overall.¹⁷
- In 2019, non-Hispanic Blacks had the highest actual and age-adjusted rates of death due to diabetes compared to all other races/ethnicities.¹⁷
- In California, non-Hispanic Blacks (40.8 per 100,000), American Indian/Alaska Natives (33.4 per 100,000), and Hispanics (31.4 per 100,000) had higher age-adjusted rates of death due to diabetes than California (21.8 per 100,000) overall in 2019.¹⁷

Local Statistics and Disparities



- Between 2017-2019, the State of California had a higher percentage of adults aged 18 years and older with diagnosed diabetes compared to San Diego County and the United States overall.¹⁹
- In 2019, the State of California had a higher percentage of adults aged 18 years and older with diagnosed diabetes (10.2%) compared to San Diego County (9.3%) and the United States overall (9.3%).¹⁹

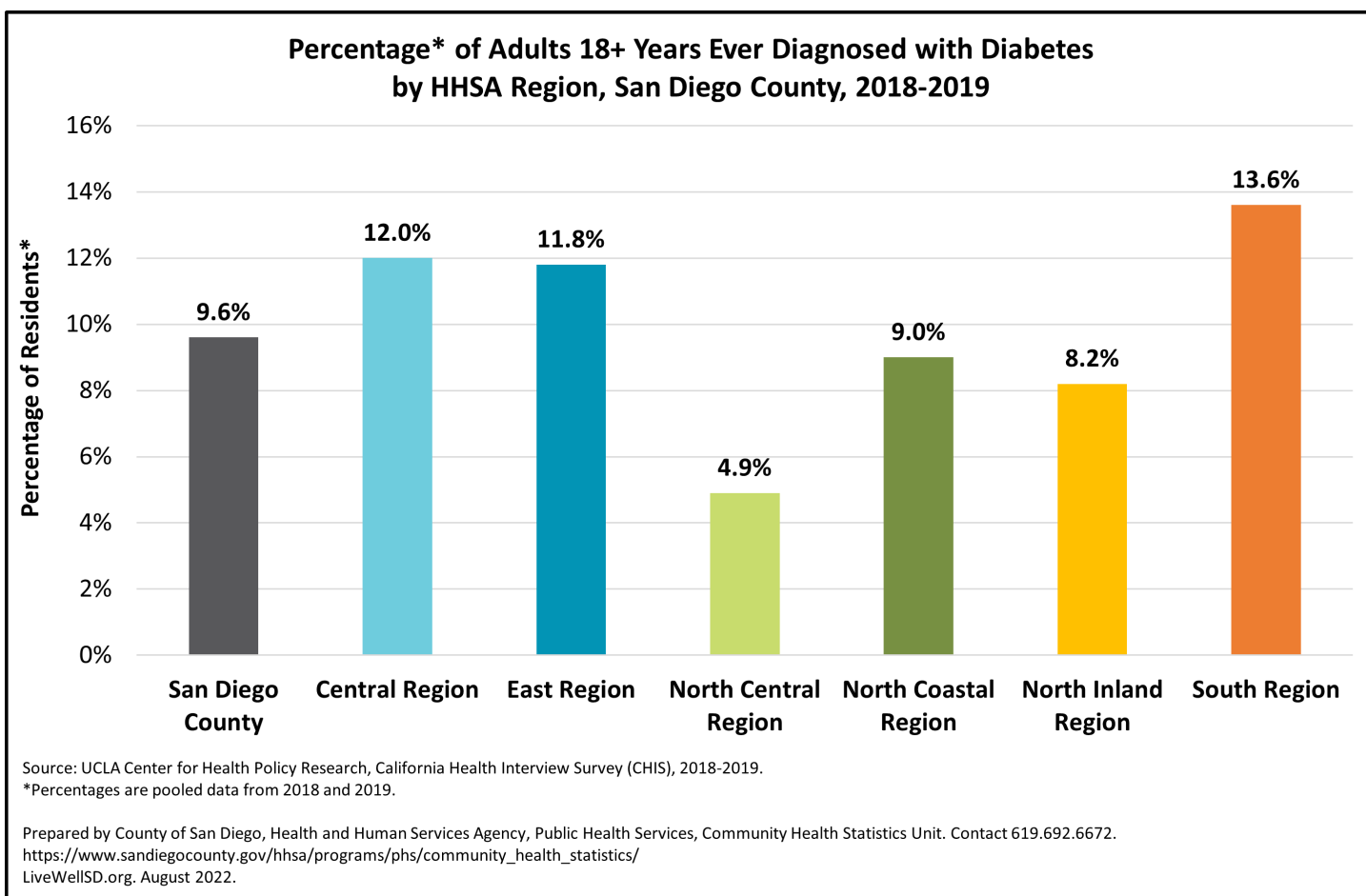
Percentage of Adults 18+ Years with Pre- or Borderline Diabetes by HHSA Regions, San Diego County, 2018



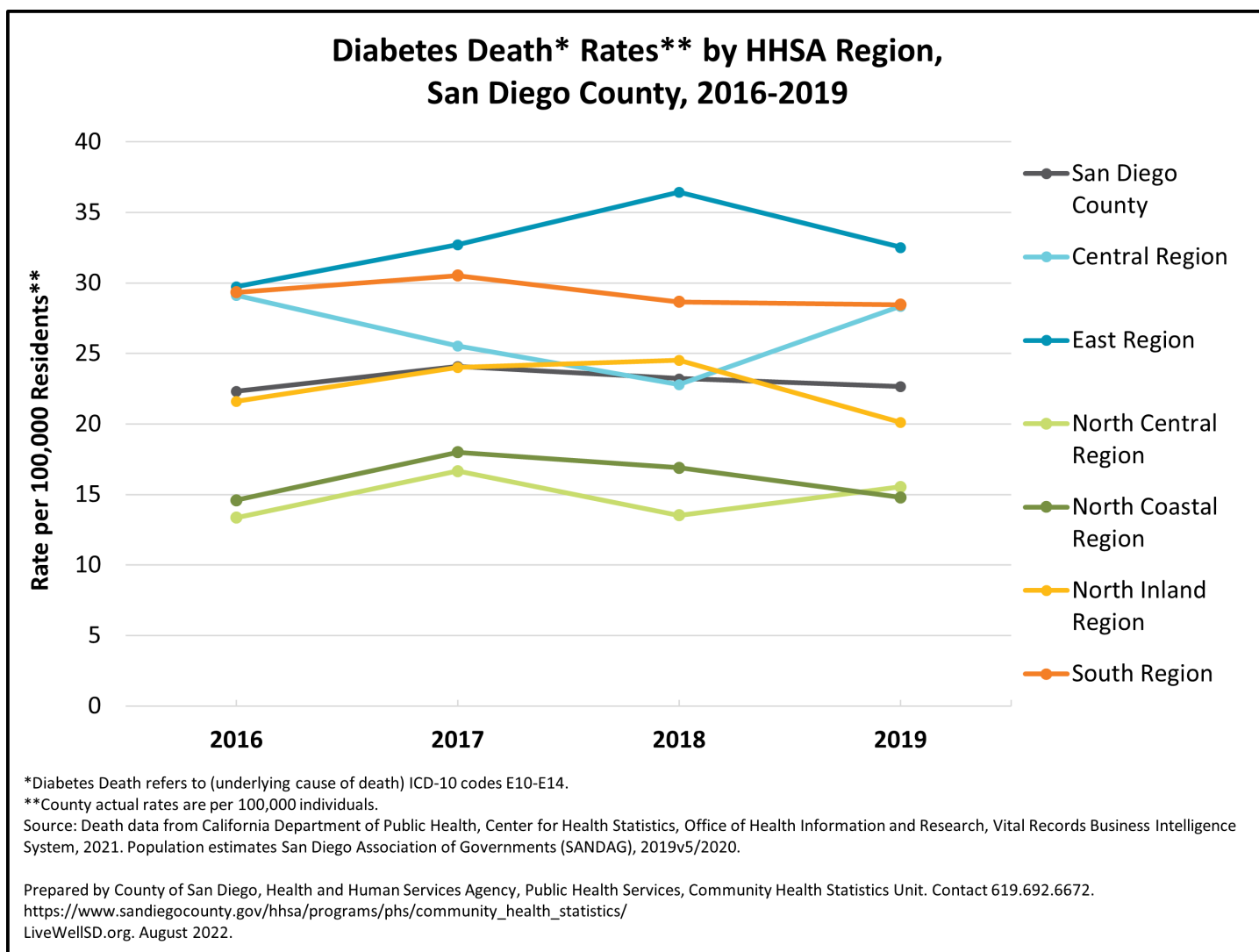
Source: UCLA Center for Health Policy Research, California Health Interview Survey (CHIS), 2018.

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- Among Health and Human Services Agency (HHSA) regions, South Region had the highest percentage of adults with pre– or borderline diabetes (25.3%), followed by North Central Region (17.8%) and East Region (17.6%).¹⁸
- In 2018, South Region had a higher percentage of adults with pre– or borderline diabetes compared to all other HHSA regions and San Diego County overall.¹⁸

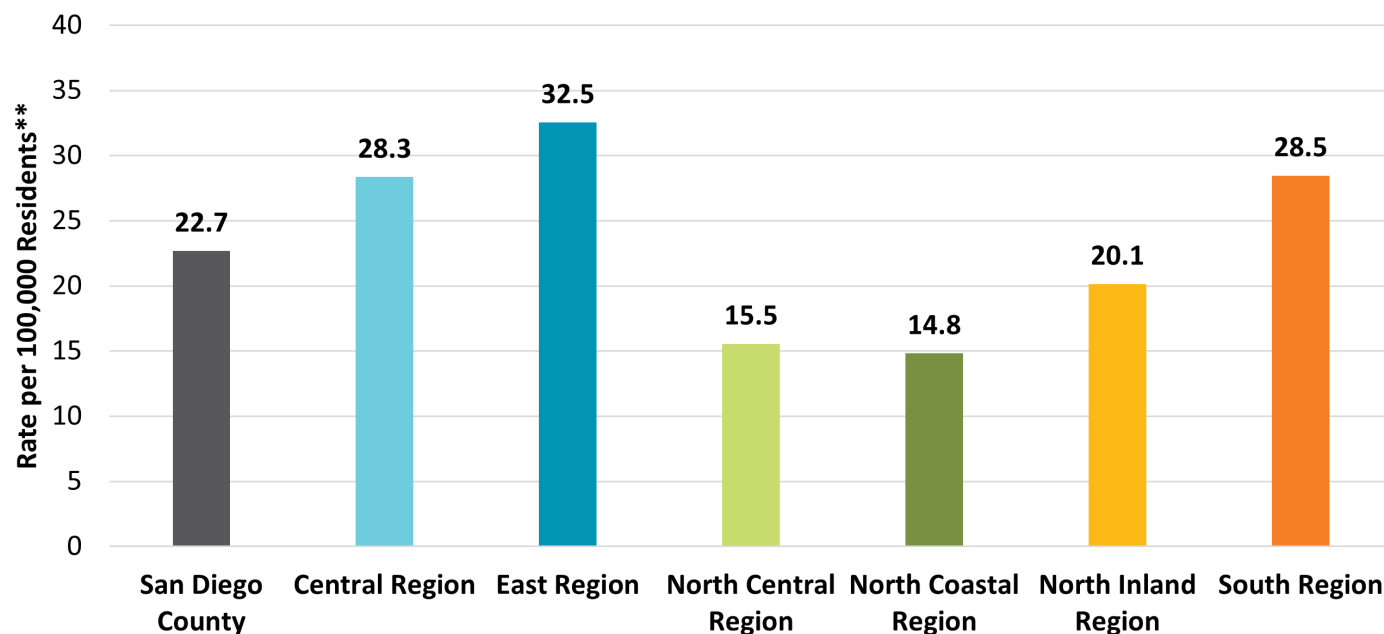


- Among HHSA regions, South Region had the highest percentage of adults with diagnosed diabetes (13.6%), followed by Central Region (12.0%) and East Region (11.8%).²⁰
- Between 2018-2019, South Region had a higher percentage of adults diagnosed diabetes compared to all other HHSA regions and San Diego County overall.²⁰



- Between 2016-2019, the death rate due to diabetes increased in all Health and Human Services Agency (HHSA) regions, except Central Region and North Inland Region.²²
- Central Region had the highest increase in diabetic deaths from 2018 (22.8 per 100,000) to 2019 (28.3 per 100,000) compared to all other HHSA regions.²²

Diabetes Death* Rates by HHSA Region,
San Diego County, 2019**



*Diabetes Death refers to (underlying cause of death) ICD-10 codes E10-E14.

** County actual rates are per 100,000 individuals.

Source: Death data from California Department of Public Health, Center for Health Statistics, Office of Health Information and Research, Vital Records Business Intelligence System, 2021. Population estimates San Diego Association of Governments (SANDAG), 2019v5/2020.

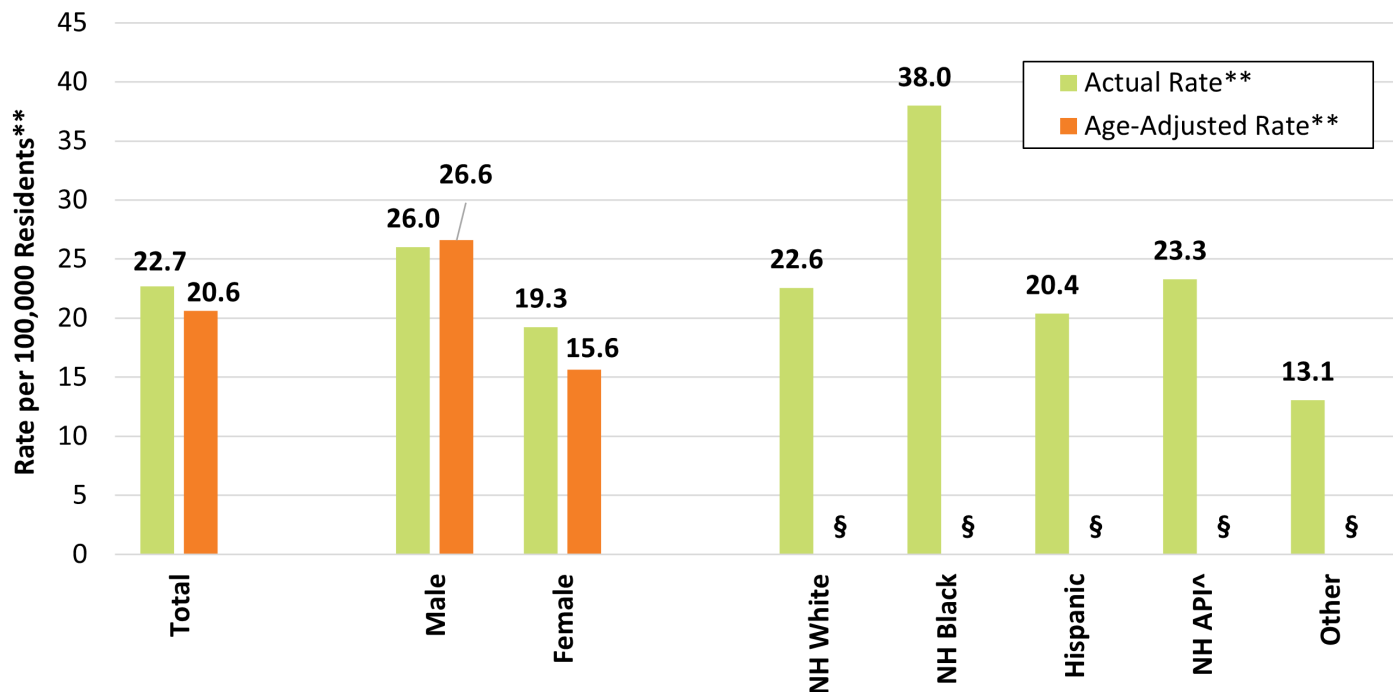
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- In 2019, East Region (32.5 per 100,000), South Region (28.5 per 100,000), and Central Region (28.3 per 100,000) had higher death rates due to diabetes than all other HHSA regions and San Diego County overall (22.7 per 100,000).²²
- Among all HHSA regions, North Coastal Region (14.8 per 100,000) and North Central Region (15.5 per 100,000) had the lowest death rates due to diabetes in 2019.²²

Diabetes Death*: Actual and Age-Adjusted Rates** San Diego County, 2019



*Diabetes Death refers to (underlying cause of death) ICD-10 codes E10-E14.

**County actual rates are per 100,000 individuals. County age-adjusted rates per 100,000 2000 US standard population.

§Rates not calculated for fewer than 5 events.

^API = Asian and Pacific Islander. NH refers to non-Hispanic.

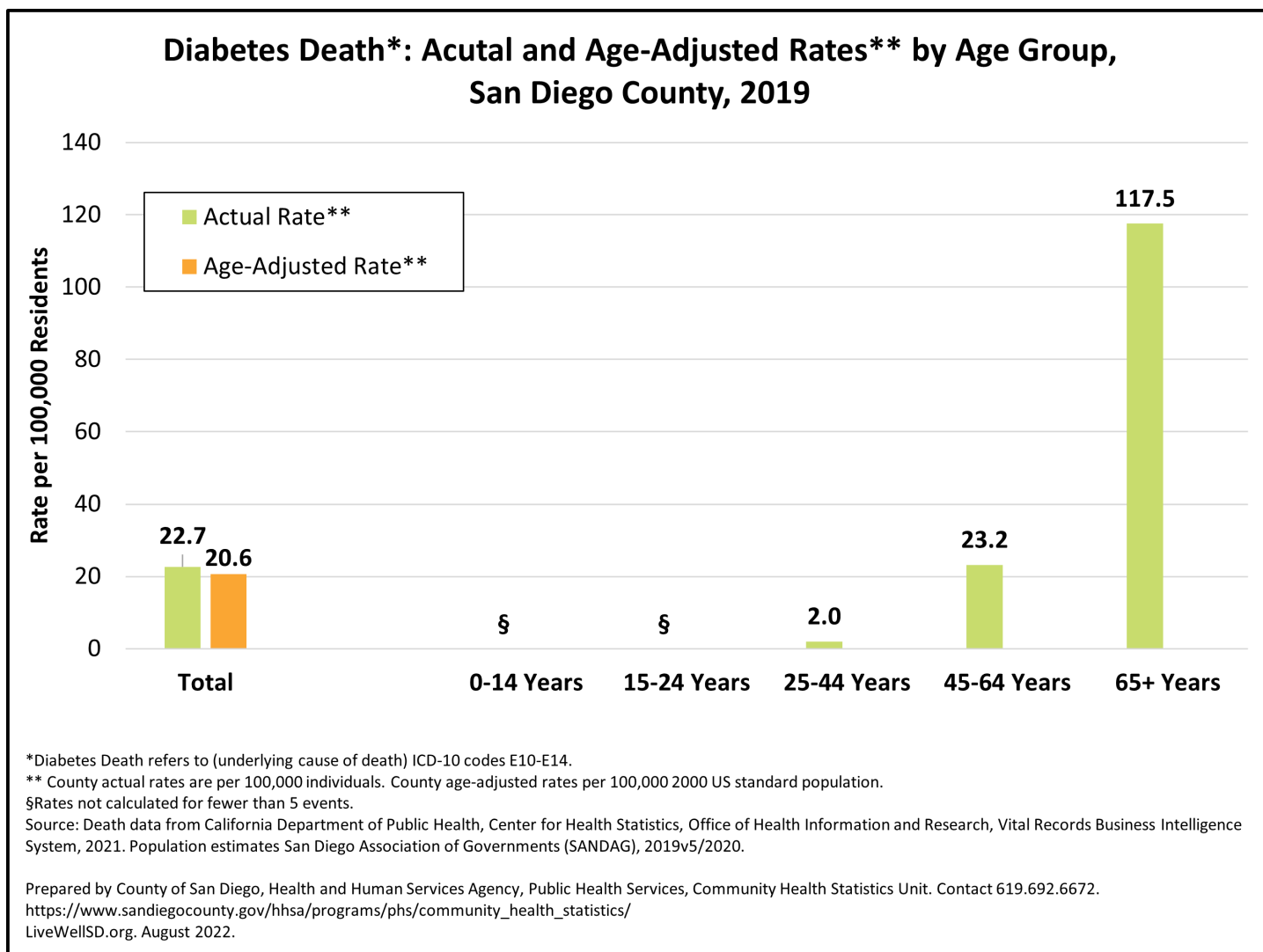
Source: Death data from California Department of Public Health, Center for Health Statistics, Office of Health Information and Research, Vital Records Business Intelligence System, 2021. Population estimates San Diego Association of Governments (SANDAG), 2019v5/2020.

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- In 2019, male residents in San Diego County had higher actual and age-adjusted death rates due to diabetes (26.6 per 100,000) compared to female residents (15.6 per 100,000) in San Diego County.²²
- Male residents in San Diego County had a higher age-adjusted death rate due to diabetes (26.6 per 100,000) than the age-adjusted death rate due to diabetes in San Diego County overall (20.6 per 100,000).²²
- Non-Hispanic Black residents in San Diego County had the highest death rate due to diabetes than all other races/ethnicities.²¹
- Non-Hispanic Black residents in San Diego County had a higher death rate due to diabetes (38.0 per 100,000) than San Diego County overall (22.7 per 100,000).²²



- San Diego County residents 65 years and older had the highest death rate due to diabetes than all other age groups.²²
- San Diego County residents 65 years and older had a higher death rate due to diabetes (117.5 per 100,000) than San Diego County overall (22.7 per 100,000).²²

Diabetes and Its Complications: Prevention for Individuals

- *Control blood sugar*
 - Blood sugar can be controlled by planning healthy meals, monitoring glucose levels frequently, and medication.¹
 - Engaging in at least 150 minutes per week of moderate-intensity physical activity can help lower blood sugar levels, lower the risk of heart disease, and help manage diabetes.⁸
- *Control blood pressure*
 - Blood pressure can be controlled by self-monitoring blood pressure levels, taking medications as recommended, managing stress, maintaining a healthy diet, and getting regular exercise.⁸
 - Aim to keep blood pressure below 140/90 mm Hg or as recommended by a provider.⁸
- *Follow a healthy diet*
 - Limit the amount of processed foods (e.g. sweets, fast food) and trans fats consumed.⁸
- *Maintain a healthy weight*
 - Losing excess weight (even small weight losses can be beneficial).⁸
 - Weight loss can be achieved by maintaining a healthy diet and getting regular exercise.
 - Modest weight loss (5-7% of body weight) can lower triglycerides and blood sugar.⁸
- *Get yearly eye exams for cataracts, diabetes retinopathy, and glaucoma*
 - Visit an eye doctor at least once a year for preventative care.²²
- *Stop or don't start smoking*
 - Smokers with diabetes are more likely to develop nerve damage or gum disease.^{12,14}
 - People who smoke are 30% to 40% more likely to develop type 2 diabetes compared to people who do not smoke.²³
- *See a doctor regularly to monitor:*
 - Changes in blood sugar over time, kidney function, and cholesterol and lipid levels.
- *Care for feet*
 - Diabetes can cause nerve damage which can range in severity from mild numbness to pain and difficulty when engaging in normal activities.¹²
 - Checking feet daily can help prevent the development of ulcers and possible amputation.¹²
 - Avoid being barefoot and protect feet by wearing socks and comfortable, well-fitting shoes.¹²

- *Get regular dental exams*
 - Maintain good oral health by brushing and flossing daily.¹⁴
 - Look for signs of gum disease (i.e. red, swollen, or bleeding gums) and visit the dentist regularly.¹⁴
- *Get an annual influenza vaccine*
 - People with diabetes have a higher risk of developing serious flu complications, such as pneumonia, bronchitis, sinus infections, and ear infections.¹³
 - Approximately 30% of adults hospitalized due to flu had diabetes.¹³
 - Annual flu vaccinations can reduce the risk of flu complications and outcomes, such as hospitalization, among people with diabetes.¹³

Prevention Tools for Public Health Professionals: Diabetes Critical Pathway

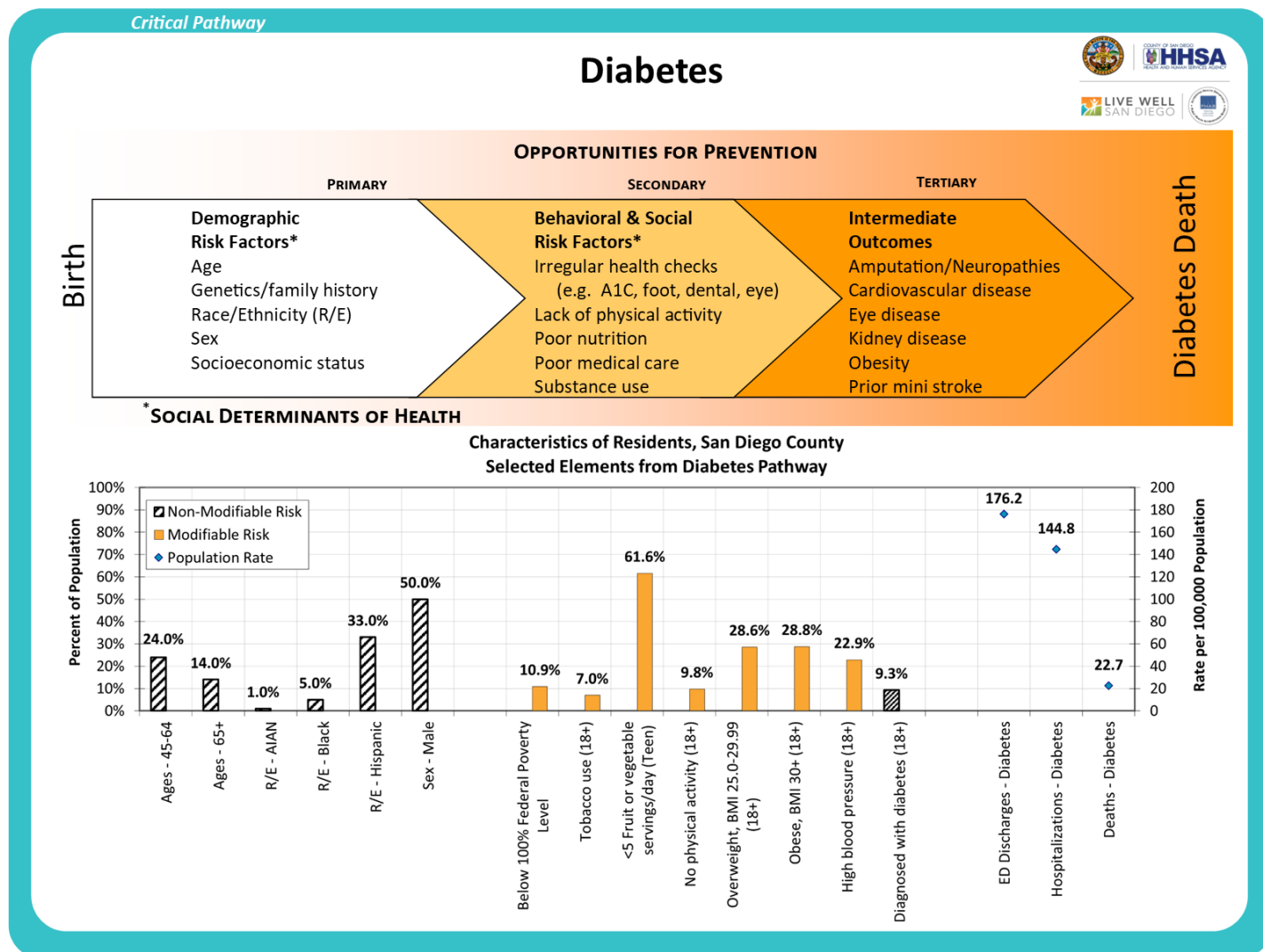
There are many opportunities for public health professionals in the community to help reduce the risk of diabetes and to improve the health outcomes of individuals who already have the disease. To assist in community health efforts, a *Diabetes Critical Pathway* was developed.

The *Diabetes Critical Pathway* is a tool to be used in health promotion and disease prevention efforts. Its purpose is to identify populations at greater risk for diabetes, and to identify prevention and early intervention opportunities. The *Diabetes Critical Pathway* displays a diagram of the major risk factors and intermediate outcomes or related diseases that have an impact on, or result from, diabetes. Risk factors are marked as non-modifiable (black striped bars) such as race/ethnicity or gender and modifiable (solid colored bars) such as physical activity or high blood pressure.

Beneath the risk factors diagram is a data grid describing the San Diego resident population in relation to selected elements of the pathway. The data grid is designed to assist in quick identification of opportunities for interventions that might have a high impact on a particular disease. The data represent all San Diegans, not only those with a particular disease. The left axis (bar) indicates the percent of the population with a known risk factor or intermediate outcome. The right axis (diamond) indicates the rate of a particular medical encounter within the population that is specified. The data are described fully in the complete version of the *Critical Pathways*.

In addition, the Community Health Statistics Unit website (www.SDHealthStatistics.com) provides detailed demographic, health and facility data including maps of geographically formatted health data. Also available are links to other County data sources, state and national sites of interest. For further assistance with data or interpretation, please contact the Community Health Statistics Unit.

Diabetes Critical Pathway to Disease



County of San Diego ■ Health and Human Services Agency ■ Public Health Services ■ Community Health Statistics Unit ■ www.SDHealthStatistics.com ■ (619)692-6887 08/2022

Data Sources

- ¹ Centers for Disease Control and Prevention. (2021). *What is diabetes?* <https://www.cdc.gov/diabetes/basics/diabetes.html>
- ² Centers for Disease Control and Prevention. (2021). *Prevalence of both diagnosed and undiagnosed diabetes.* <https://www.cdc.gov/diabetes/data/statistics-report/diagnosed-undiagnosed-diabetes.html>
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- ¹⁰ Center for Disease Control and Prevention. (2022). *The Facts, stats, and impacts of diabetes.* <https://www.cdc.gov/diabetes/library/spotlights/diabetes-facts-stats.html>
- ¹¹ Centers for Disease Control and Prevention. (2021). *Coexisting Conditions and Complications.* <https://www.cdc.gov/diabetes/data/statistics-report/coexisting-conditions-complications.html>
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- ¹³ Centers for Disease Control and Prevention. (2021). *Flu and People with Diabetes.* <https://www.cdc.gov/flu/highrisk/diabetes.htm>
- ¹⁴ Centers for Disease Control and Prevention. (2021). *Diabetes and oral health.* <https://www.cdc.gov/diabetes/managing/diabetes-oral-health.html>
- ¹⁵ Centers for Disease Control and Prevention. (2021). *Diabetes and chronic kidney disease.* <https://www.cdc.gov/diabetes/managing/diabetes-kidney-disease.html>

- ¹⁶ Centers for Disease Control and Prevention (CDC), National Health Interview Survey, retrieved from US Diabetes Surveillance System; www.cdc.gov/diabetes/data; Division of Diabetes Translation - CDC, 2019.
- ¹⁷ Centers for Disease Control and Prevention, National Center for Health Statistics. National Vital Statistics System, Mortality 1999-2020 on CDC WONDER Online Database, released in 2021.
- ¹⁸ UCLA Center for Health Policy Research, California Health Interview Survey (CHIS), 2018.
- ¹⁹ Centers for Disease Control and Prevention (CDC), National Health Interview Survey, retrieved from US Diabetes Surveillance System; www.cdc.gov/diabetes/data; Division of Diabetes Translation - CDC, 2016-2019.
- ²⁰ UCLA Center for Health Policy Research, California Health Interview Survey (CHIS), 2018-2019.
- ²¹ California Department of Public Health, Center for Health Statistics, Office of Health Information and Research, Vital Records Business Intelligence System, 2021.
- ²² Centers for Disease Control and Prevention. (2021). *Diabetes and vision loss*. <https://www.cdc.gov/diabetes/managing/diabetes-vision-loss.html>
- ²³ Centers for Disease Control and Prevention. (2022). *Smoking and diabetes*. <https://www.cdc.gov/diabetes/library/features/smoking-and-diabetes.html>