

## What is Stroke?

Stroke is a type of cardiovascular disease that occurs when blood and oxygen are unable to reach the brain due to blockage or rupturing of a blood vessel. Without proper nutrients and oxygen, the deprived part of the brain begins to die.<sup>1</sup> Stroke is the fifth leading cause of death and a leading cause of disability in the United States.<sup>2</sup>

There are several types of stroke<sup>1</sup>:

- *Ischemic strokes* occur when blood vessels to the brain are blocked by blood clots, plaque or other particles.
- *Hemorrhagic strokes* occur when a blood vessel that supplies blood to the brain bursts and leaks blood into the brain.
- *Transient ischemic attacks (TIA or “mini-stroke”)* occur when a blood vessel that supplies blood to the brain is blocked for a short period of time. Transient ischemic attacks are also a warning sign for a future stroke and is still considered a medical emergency.

Some of the physical signs of stroke include<sup>3</sup>:

- Numbness or weakness of the face, arm, or leg
- Confusion, trouble speaking or understanding
- Trouble walking, dizziness or loss of balance or coordination
- Vision problems
- Severe headache with unknown cause

## Risk Factors for Stroke

### Demographic Risk Factors

- *Age*
  - The risk of stroke increases with age, but strokes can occur at any age.
  - After the age of 55, the risk of stroke more than doubles every ten years.<sup>4</sup>
- *Genetics and family history*
  - The risk of stroke is higher if a family member has had a stroke before 65 years.<sup>5</sup>
  - Genetic disorders such as sickle cell anemia, a genetic blood disorder of red blood cells, increases the risk for stroke.<sup>4</sup>
- *Sex*
  - The incidence of stroke and death from stroke is higher among females compared to males of all ages.<sup>4</sup>
  - Pregnant women have a higher risk for stroke than women who are not pregnant.<sup>4,5</sup>
  - Women who smoke or who are on birth control pills, and who have other risk factors, also have a higher stroke risk.<sup>6</sup>
- *Race/ethnicity*
  - Blacks, Hispanics, American Indians, and Native Alaskans are more likely to suffer a stroke than Non-Hispanic Whites and Asians.<sup>4</sup>

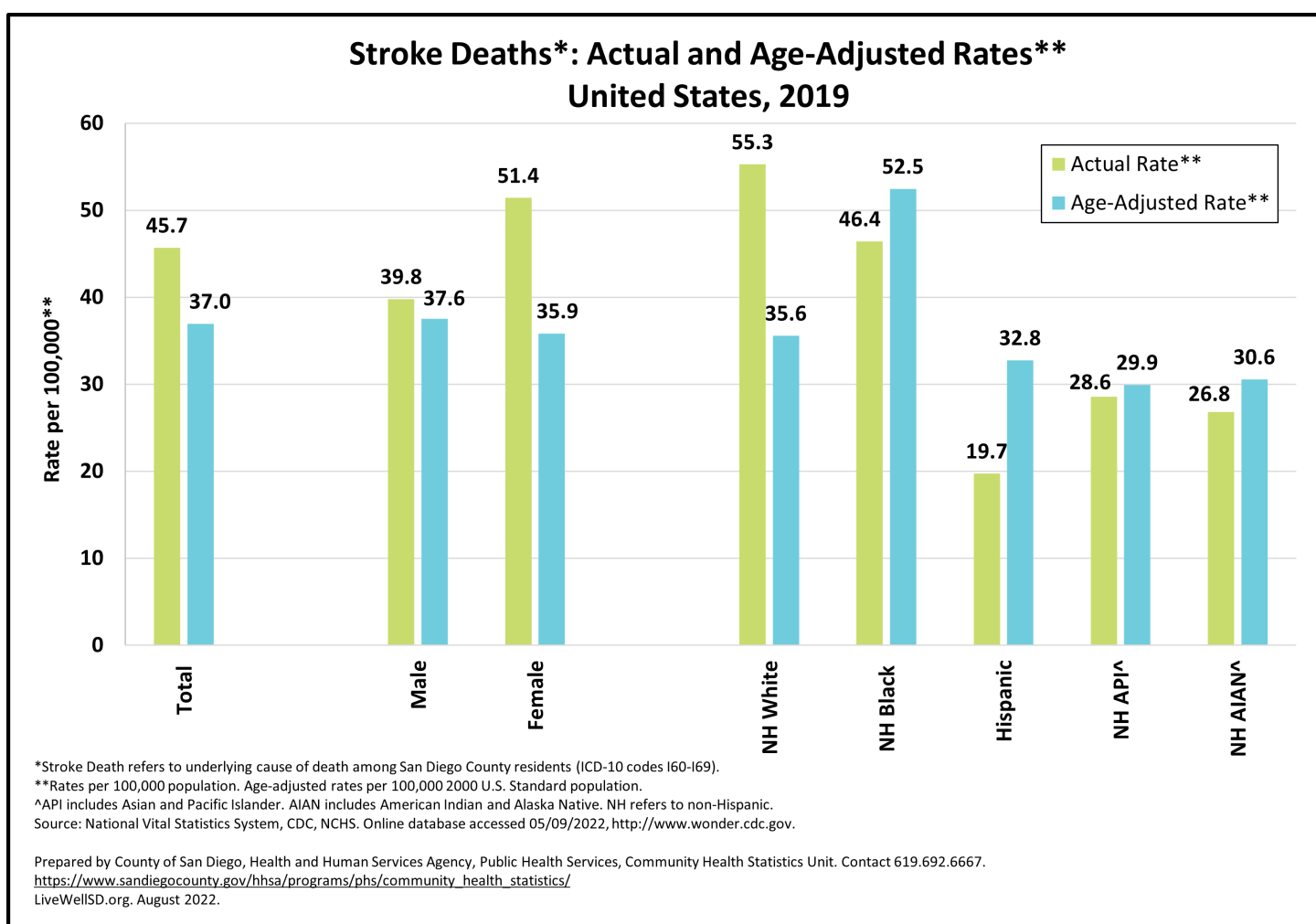
- Blacks have a higher death rate due to stroke compared to non-Hispanic Whites.<sup>5</sup>

## Social and Behavioral Risk Factors

- *High blood pressure*
  - High blood pressure is the most important controllable risk factor and is a leading cause of stroke.<sup>7</sup>
- *Heart disease*
  - Common heart diseases can increase the risk of stroke. Coronary artery disease causes plaque build up in the arteries and blocks oxygen-rich blood flow to the brain.<sup>4</sup>
- *Atrial fibrillation*
  - Atrial fibrillation (irregular beating of the upper chambers of the heart) increases the risk of stroke by 4-6 times on average.<sup>8</sup>
  - Atrial fibrillation causes 1 in 4 strokes among people over 80 years old.<sup>8</sup>
- *Transient ischemic attacks (TIAs)*
  - TIAs are warning signs of a future stroke.
  - More than 1 in 3 people who have a TIA and don't get treated have a major stroke within 1 year.<sup>1</sup>
- *Diabetes*
  - People with diabetes are twice as likely to have heart disease or a stroke compared to people without diabetes.<sup>9</sup>
- *High blood cholesterol levels*
  - Consumption of fatty foods can cause cholesterol build up in the blood and formation of blood clots, leading to a stroke.<sup>7</sup>
- *Tobacco use*
  - Smoking can damage the heart and blood vessels.<sup>4</sup>
  - Nicotine increases blood pressure.<sup>4</sup>
- *Heavy alcohol consumption*
  - Excessive alcohol consumption can lead to an increase in blood pressure, which increases the risk for stroke.<sup>4</sup>
- *Physical inactivity*
  - Being inactive can increase the risk of stroke, as well as other chronic diseases.

## National Statistics and Disparities

- On average, someone will have a stroke in the United States every 40 seconds.<sup>10</sup>
- Nationally, strokes accounted for one of every 19 deaths in 2019.<sup>11</sup>
- Nearly 795,000 people experience a new or recurrent stroke annually, and about 610,000 of these are first attacks.<sup>11</sup>
- Stroke mortality rates are higher in the southeastern United States, also known as the “Stroke Belt”. The “Stroke Belt” consists of North Carolina, South Carolina, Georgia, Tennessee, Mississippi, Alabama, Louisiana, and Arkansas.<sup>11</sup>
- Each year, about 55,000 more women than men have a stroke.<sup>11</sup>
- African American adults have almost twice the risk of first-ever stroke compared to White adults.<sup>10</sup>



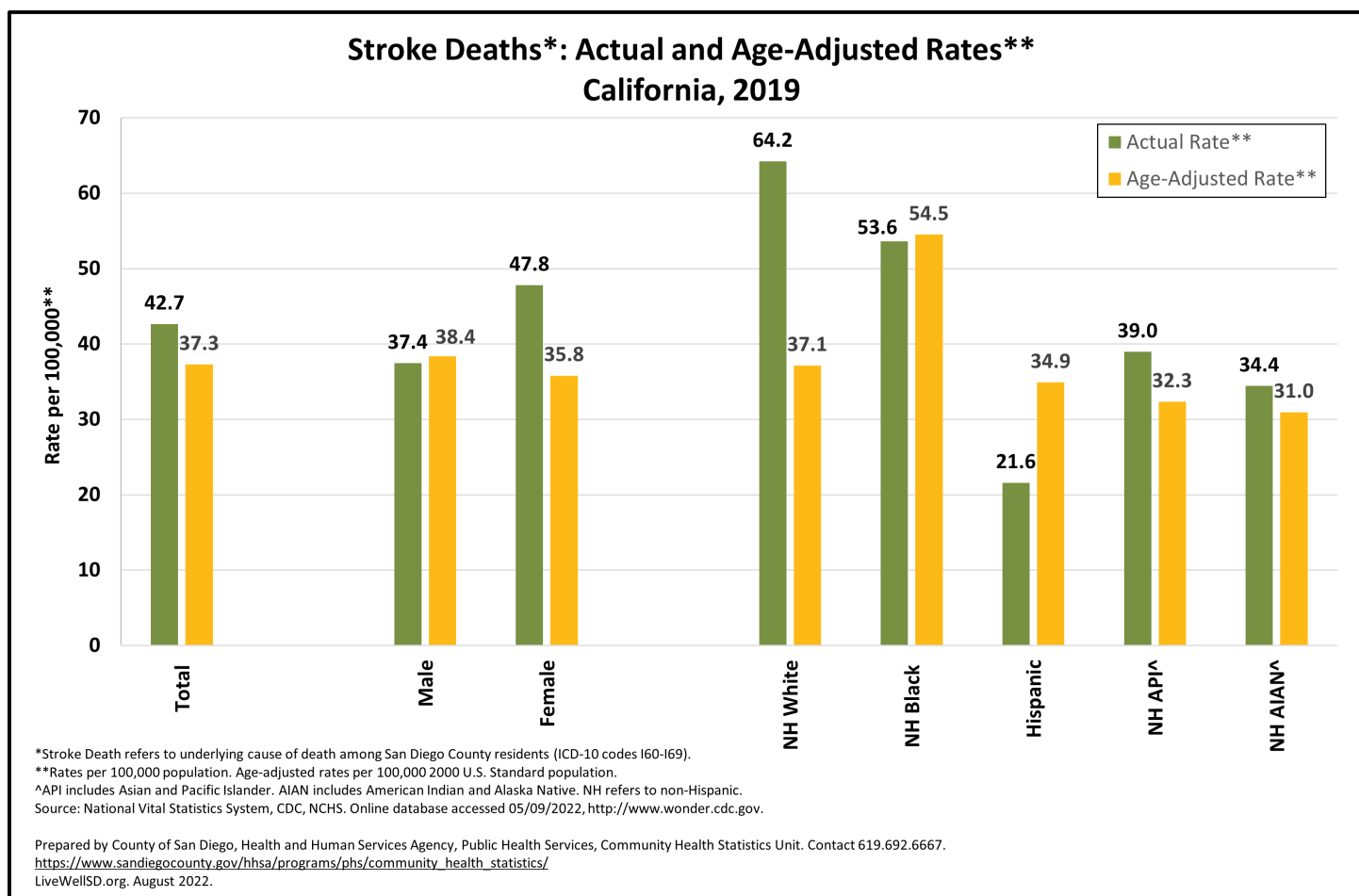
- In 2019, the total age-adjusted stroke death rate in the United States was 37.0 per 100,000 residents.<sup>12</sup>
- In the United States, the age-adjusted stroke death rate was slightly higher among males (37.6 per 100,000 residents) than females (35.9 per 100,000 residents).<sup>12</sup>

- The age-adjusted stroke death rate among non-Hispanic Blacks was nearly 1.5 times greater than the age-adjusted stroke death rate among non-Hispanic Whites (52.5 per 100,000 versus 35.6 per 100,000).<sup>12</sup>

## Cost

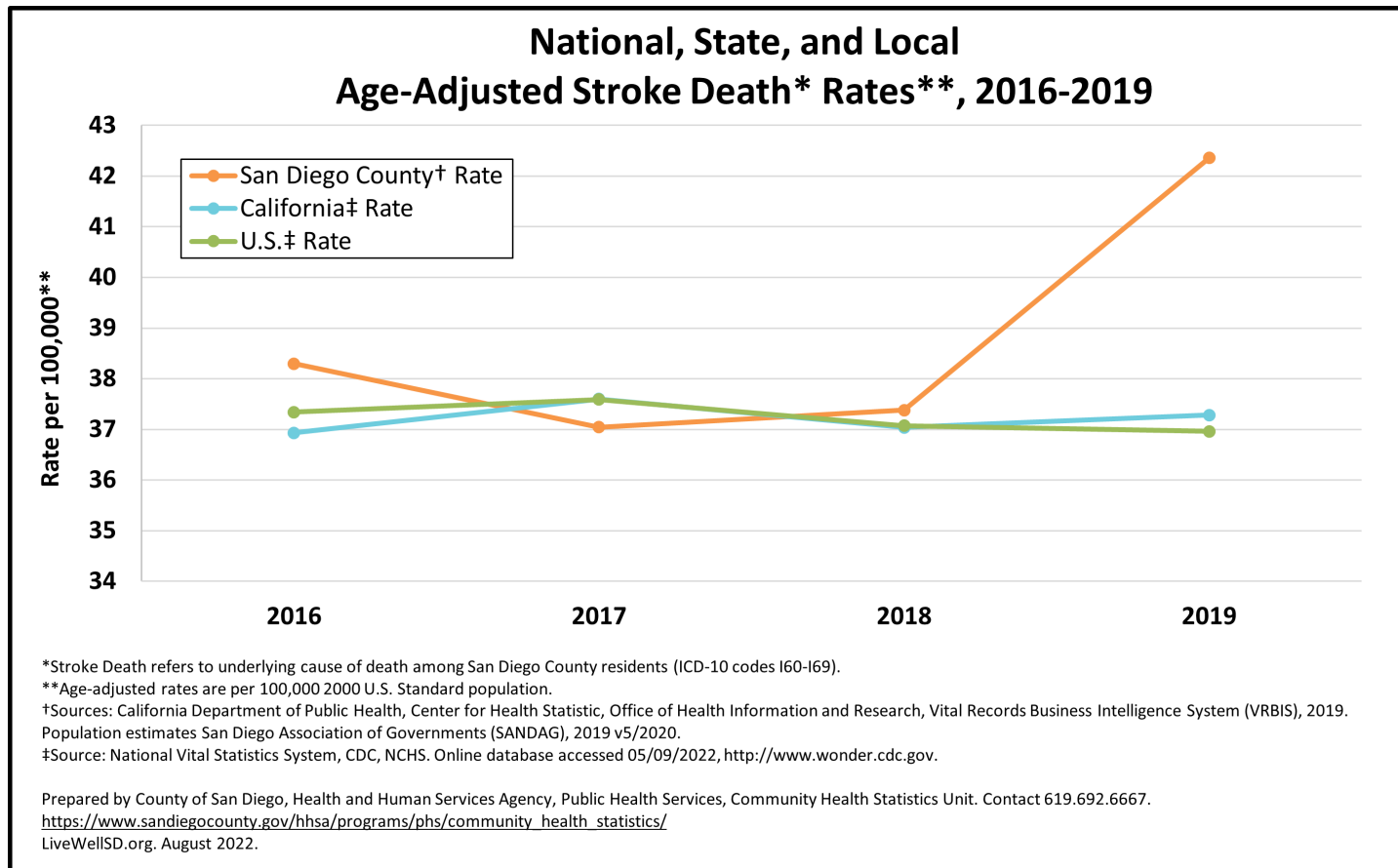
- In 2017-2018, the estimated direct medical cost of stroke in the United States was \$33.4 billion. This includes outpatient hospital visits, inpatient stays, ED visits, prescriptions, and home health care.<sup>11</sup>

## State Statistics and Disparities



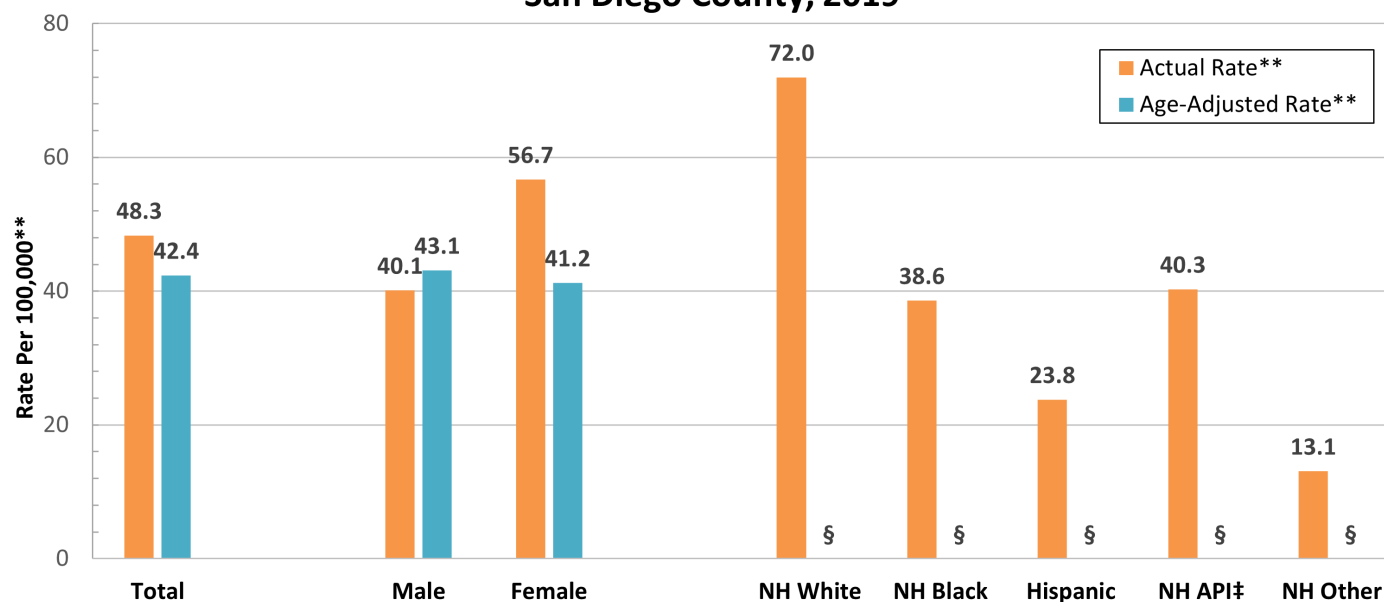
- In 2019, the age-adjusted stroke death rate among California residents was 37.3 per 100,000 residents.<sup>12</sup>
- The age-adjusted stroke death rate was slightly higher among males (38.4 per 100,000 residents) than females (35.8 per 100,000 residents).<sup>12</sup>
- Non-Hispanic Blacks had the highest age-adjusted stroke death rate (54.5 per 100,000 residents) followed by non-Hispanic Whites (37.1 per 100,000 residents).<sup>12</sup>

## Local Statistics and Disparities



- In 2016, 2018, and 2019, age-adjusted stroke death rates in San Diego County surpassed state and national rates.<sup>12,13</sup>

## Stroke Deaths\*: Actual and Age-Adjusted Rates\*\* San Diego County, 2019



\*Stroke Death refers to underlying cause of death among San Diego County residents (ICD-10 codes I60-I69).

\*\*Rates calculated per 100,000 residents. Age-adjusted rates are per 100,000 2000 U.S. standard population.

§ Rates not calculated for < 5 cases.

‡ API includes Asian and Pacific Islander. NH refers to non-Hispanic.

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

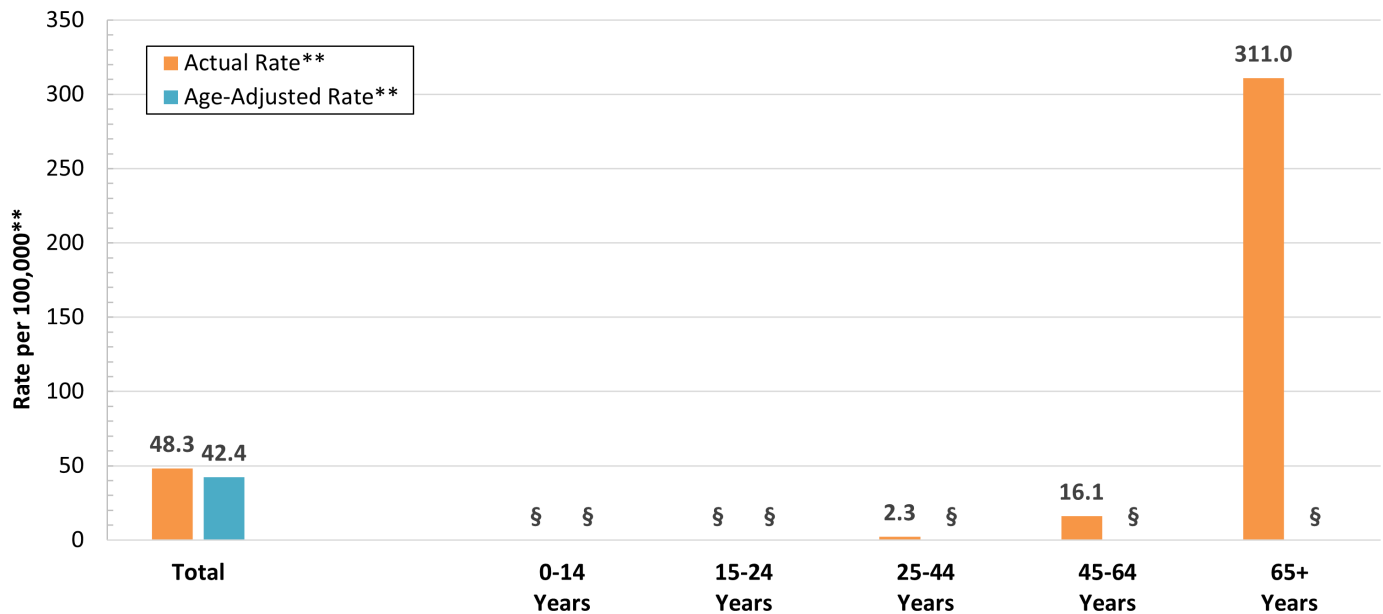
Prepared by County of San Diego, Health and Human Services Agency, Public Health Services, Community Health Statistics Unit. Contact 619.692.6667.

[https://www.sandiegocounty.gov/hhsa/programs/phs/community\\_health\\_statistics/](https://www.sandiegocounty.gov/hhsa/programs/phs/community_health_statistics/)

LiveWellSD.org. August 2022.

- In 2019, the age-adjusted death rate due to stroke was 42.4 per 100,000 residents in San Diego County.<sup>13</sup>
- The age-adjusted death rate was similar for males and females (43.1 per 100,000 residents versus 41.2 per 100,000 residents).<sup>13</sup>
- Non-Hispanic White residents had the highest stroke death rate compared to other races/ethnicities.<sup>13</sup>

## Stroke Death\* Rates\*\* by Age Group, San Diego County, 2019



\*Stroke Death refers to underlying cause of death among San Diego County residents (ICD-10 codes I60-I69).

\*\*Rates calculated per 100,000 residents. Age-adjusted rates are per 100,000 2000 U.S. standard population.

§ Rates not calculated for < 5 cases.

Sources: California Department of Public Health, Center for Health Statistics, Office of Health Information and Research, Vital Records Business Intelligence System (VRBIS), 2019.

Population estimates San Diego Association of Governments (SANDAG), 2019 v5/2020.

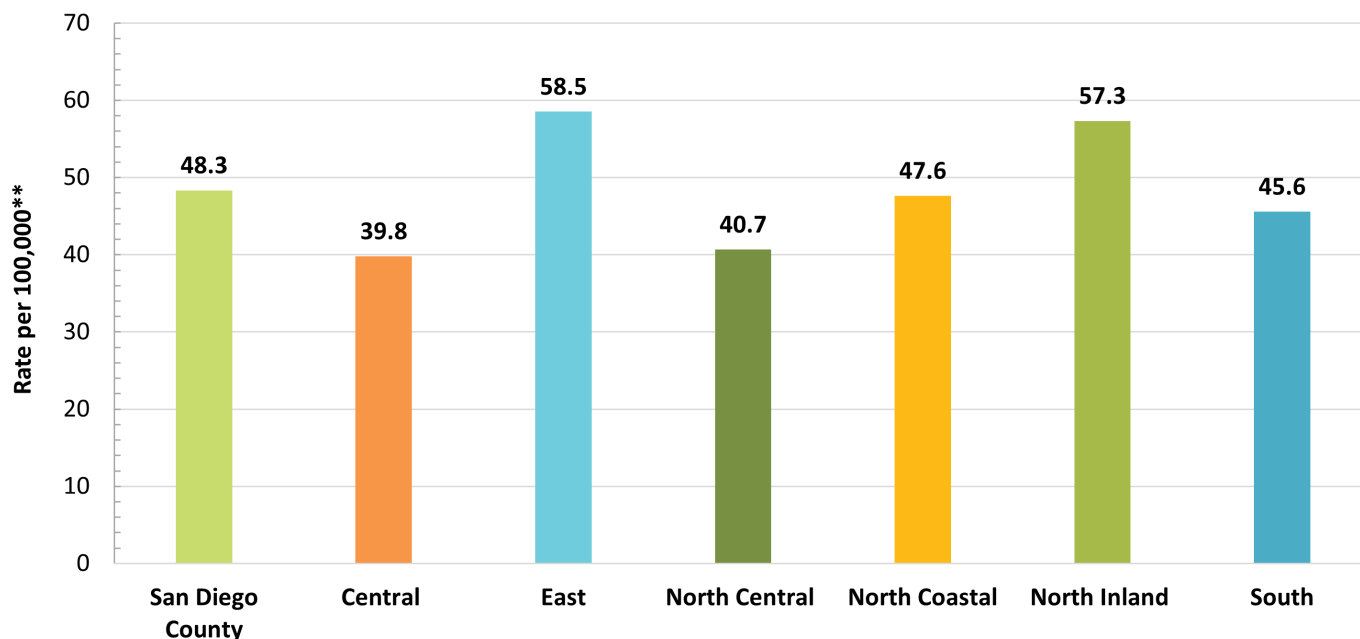
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- In 2019, the actual stroke death rate was highest among San Diego County residents aged 65+ years (311.0 per 100,000 residents).<sup>13</sup>
- The stroke death rate among residents aged 65+ years was nearly 6.4 times greater than the total San Diego County stroke death rate (311.0 per 100,000 residents versus 48.3 per 100,000 residents).<sup>13</sup>

## Stroke Death\* Rates\*\* by Health and Human Services Agency (HHS) Region, San Diego County, 2019



\*Stroke Death refers to underlying cause of death among San Diego County residents (ICD-10 codes I60-I69).

\*\*Rates calculated per 100,000 residents.

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

Prepared by County of San Diego, Health and Human Services Agency, Public Health Services, Community Health Statistics Unit. Contact 619.692.6667.

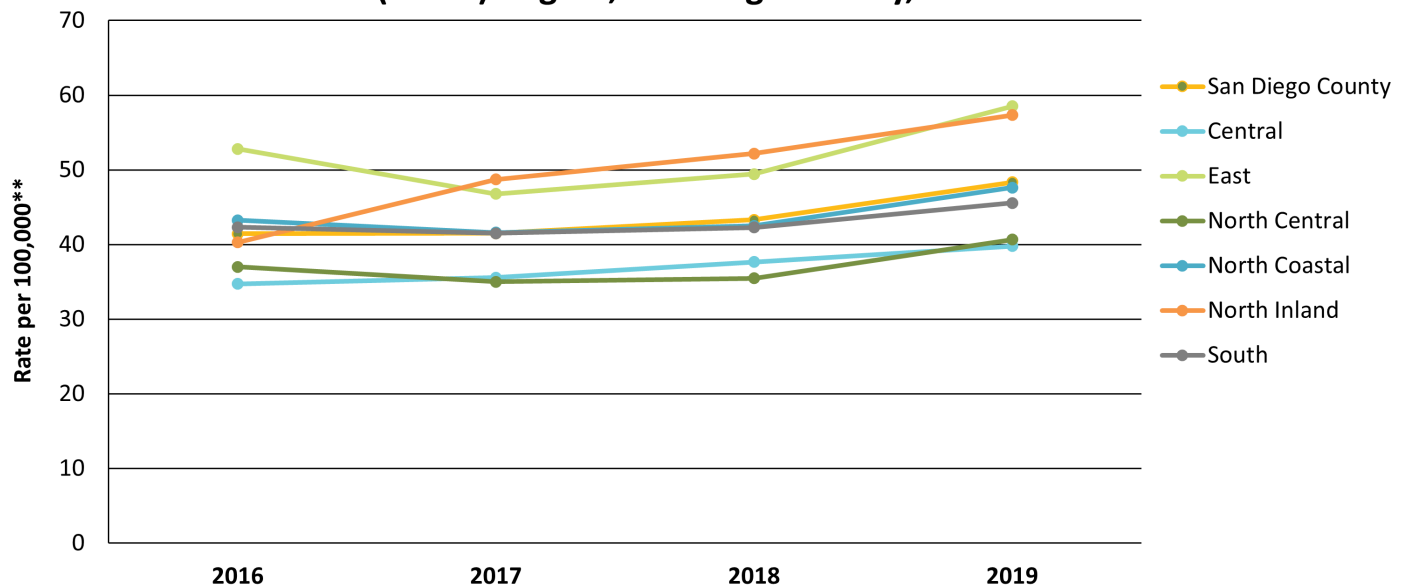
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- In 2019, East Region of San Diego County had the highest death rate due to stroke (58.5 per 100,000 residents), while Central Region had the lowest (39.8 per 100,000 residents).<sup>13</sup>
- East Region and North Inland Region had stroke death rates (58.5 per 100,000 residents and 57.3 per 100,000 residents, respectively) that were higher than the county stroke death rate (48.3 per 100,000 residents).<sup>13</sup>



## Stroke Death\* Rates\*\* by Health and Human Services Agency (HHSA) Region, San Diego County, 2016-2019



\*Stroke Death refers to underlying cause of death among San Diego County residents (ICD-10 codes I60-I69).

\*\*Rates calculated per 100,000 residents.

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

Prepared by County of San Diego, Health and Human Services Agency, Public Health Services, Community Health Statistics Unit. Contact 619.692.6667.

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- In San Diego County, East Region and North Inland Region had the highest rates of stroke deaths from 2017 to 2019.<sup>13</sup>
- Overall, the rates of stroke deaths increased from 2017 to 2019 in every region and the county.<sup>13</sup>

## Stroke and Its Complications: Prevention for Individuals<sup>14</sup>

- *Lower blood pressure*
- *Eat healthy foods*
  - Eat low fat, high fiber foods.
  - Limit salt (sodium) intake.
- *Maintain a healthy weight*
- *Exercise regularly*
  - Adults should get at 2 hours and 30 minutes of moderate-intensity aerobic physical activity each week.
- *Control blood sugar*
- *Lower blood cholesterol*
  - Blood cholesterol levels should be checked at least once every 5 years.
- *Manage stress*
- *Moderate alcohol consumption*
  - Men should have no more than 2 drinks per day and women should have no more than one per day.
- *Don't smoke*
- *Take medicine as instructed*
- *Recognize the Warning Signs of Stroke<sup>3</sup>:*
  - Sudden numbness or weakness of the face, arm, or leg
  - Sudden confusion, trouble speaking or understanding
  - Sudden trouble walking, dizziness or loss of balance or coordination
  - Sudden trouble seeing in one or both eyes
  - Sudden severe headache with no known cause
  - Sudden chest pain
  - If warning signs appear, **call 9-1-1 immediately.**

## Prevention Tools for Public Health Professionals: Stroke Critical Pathway

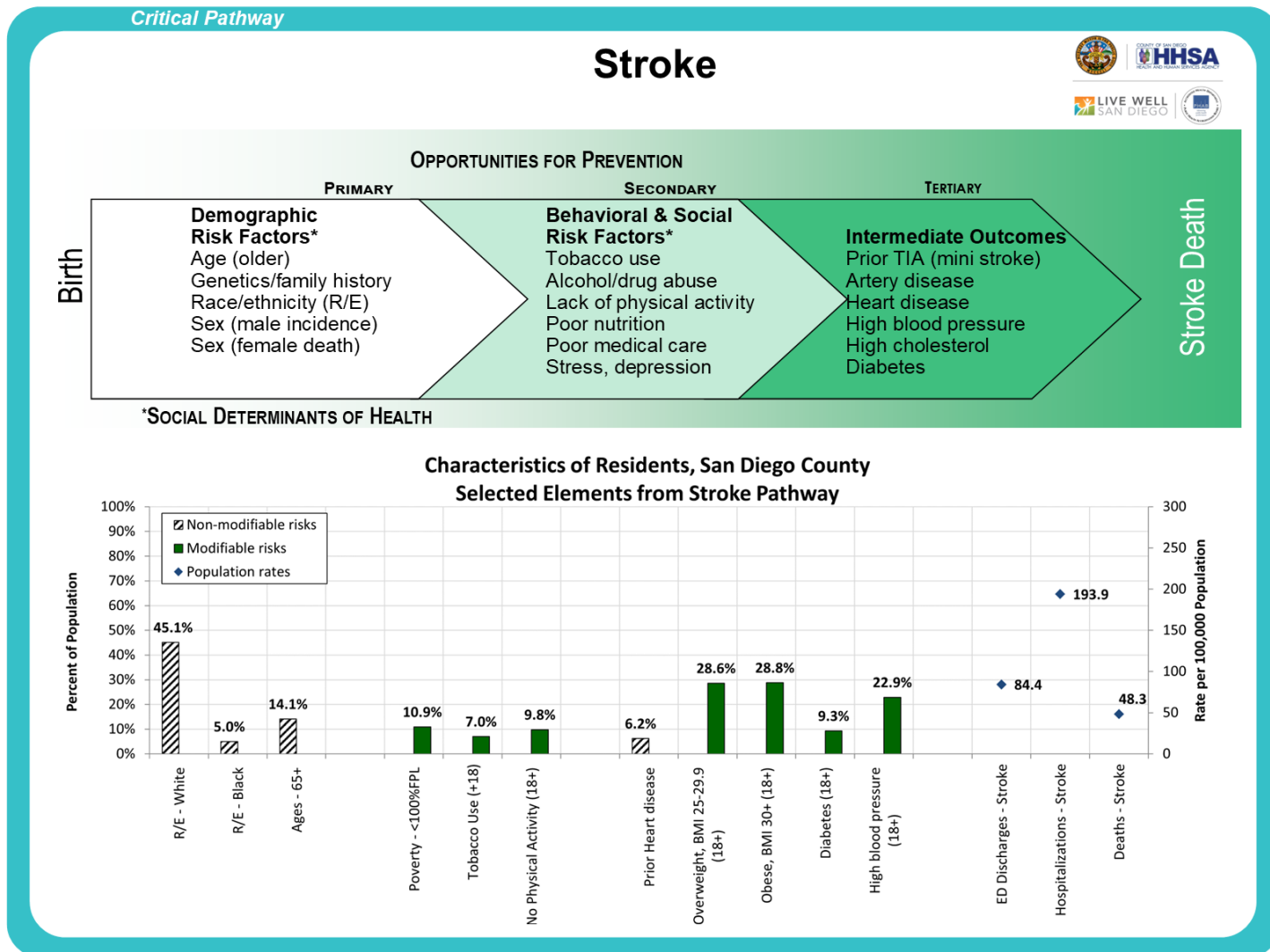
There are many opportunities for public health professionals in the community to help reduce the risk of stroke and to improve the health outcomes of individuals who already have the disease. To assist in community health efforts, a *Stroke Critical Pathway* was developed.

The *Stroke 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 stroke, and to identify prevention and early intervention opportunities. The *Stroke Critical Pathway* displays a diagram of the major risk factors and intermediate outcomes or related diseases that have an impact on, or result from, stroke. Risk factors are marked as non-modifiable (black striped bars) such as race/ethnicity or sex 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*.<sup>15</sup>

In addition, the Community Health Statistics Unit website ([www.SDHealthStatistics.com](http://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 and state and national sites of interest. For further assistance with data or interpretation, please contact the Community Health Statistics Unit.

## Stroke Critical Pathway to Disease



County of San Diego ■ Health and Human Services Agency ■ Public Health Services ■ Community Health Statistics Unit ■ [www.SDHealthStatistics.com](http://www.SDHealthStatistics.com) ■ (619)692-6667 08/2022

## Data Sources

- <sup>1</sup> Centers for Disease Control and Prevention. (2022). *About Stroke*. <https://www.cdc.gov/stroke/about.htm>.
- <sup>2</sup> American Stroke Association. *Stroke Risk Factors*. <https://www.stroke.org/en/about-stroke/stroke-risk-factors>.
- <sup>3</sup> Centers for Disease Control and Prevention. (2022). *Stroke Signs and Symptoms*. [https://www.cdc.gov/stroke/signs\\_symptoms.htm](https://www.cdc.gov/stroke/signs_symptoms.htm).
- <sup>4</sup> Centers for Disease Control and Prevention. (2022). *Know Your Risk for Stroke*. [https://www.cdc.gov/stroke/risk\\_factors.htm](https://www.cdc.gov/stroke/risk_factors.htm).
- <sup>5</sup> American Stroke Association. (2021). *Stroke Risk Factors Not Within Your Control*. <https://www.stroke.org/en/about-stroke/stroke-risk-factors/stroke-risk-factors-not-within-your-control>.
- <sup>6</sup> Centers for Disease Control and Prevention. (2022). *Women and Stroke*. <https://www.cdc.gov/stroke/women.htm>.
- <sup>7</sup> American Stroke Association. (2021). *Risk Factors Under Your Control*. <https://www.stroke.org/en/about-stroke/stroke-risk-factors/risk-factors-under-your-control>.
- <sup>8</sup> National Institute of Neurological Disorders and Stroke. (2022). *Atrial Fibrillation and Stroke*. <https://www.ninds.nih.gov/health-information/disorders/atrial-fibrillation-and-stroke>.
- <sup>9</sup> Centers for Disease Control and Prevention. (2022). *Heart Disease and Stroke*. <https://www.cdc.gov/chronicdisease/resources/publications/factsheets/heart-disease-stroke.htm>.
- <sup>10</sup> Centers for Disease Control and Prevents. (2022). *Disease or Condition of the Week: Stroke*. <https://www.cdc.gov/dotw/stroke/index.html>.
- <sup>11</sup> Tsao, C. W., Aday, A. W., Almarzooq, Z. I., Alonso, A., Beaton, A. Z., Bittencourt, M.S., Boehme, A. K., Buxton, A. E., Carson, A. P., Commodore-Mensah, Y., Elkind, M. S. V., Evenson, K. R., Eze-Nliam, C., Ferguson, J. F., Generoso, G., Ho, J. E., Kalani, R., Khan, S. S., Kissela, B. M., & Knutson, K. L. (2022). Heart Disease and Stroke Statistics—2022 Update: A Report from the American Heart Association. *Circulation*, 145 (8). <https://doi.org/10.1161/cir.0000000000001052>.
- <sup>12</sup> National Vital Statistics System, CDC, NCHS. Online database accessed 05/09/2022, <http://www.wonder.cdc.gov>.
- <sup>13</sup> California Department of Public Health, Center for Health Statistic, Office of Health Information and Research, Vital Records Business Intelligence System (VRBIS), 2019.
- <sup>14</sup> Centers for Disease Control and Prevention. (2022). *Prevent Stroke: What You Can Do*. <https://www.cdc.gov/stroke/prevention.htm>.
- <sup>15</sup> County of San Diego Health and Human Services Agency, Public Health Services. Community Health Statistics Unit. (2022). Critical Pathways: Stroke. August 2022.