Overweight- & Obesity-Associated Cancers in Texas, 2008–2017

Prepared by the Texas Cancer Registry
Texas Department of State Health Services

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The TCR also wants to thank all cancer reporters for their hard work and collaboration. Cancer reporters help us meet national high quality and timeliness standards, and enable us to serve as the primary source of cancer data in Texas.

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Background

- Overweight and obesity are associated with increased risk of at least 13 different types of cancer: colorectal, endometrial, post-menopausal breast, liver, pancreatic, kidney, thyroid, ovarian, multiple myeloma, gallbladder, gastric cardia, esophageal adenocarcinoma, and meningioma.[1]
- This statistical report describes the burden of overweight- and obesity-related cancers in Texas and compares cancer rates and trends to national data.
- Because cancer registries do not routinely collect information on height and weight, this report uses data from all tumors diagnosed at the 13 cancer sites associated with overweight/obesity, rather than cases diagnosed in persons with overweight/obesity.

Implications for Public Health Practice

- The burden of overweight- and obesity-related cancers might be reduced through efforts to prevent and control overweight and obesity.
- Comprehensive cancer control strategies, including use of evidence-based interventions to promote healthy weight, could help decrease the incidence of these cancers in Texas.

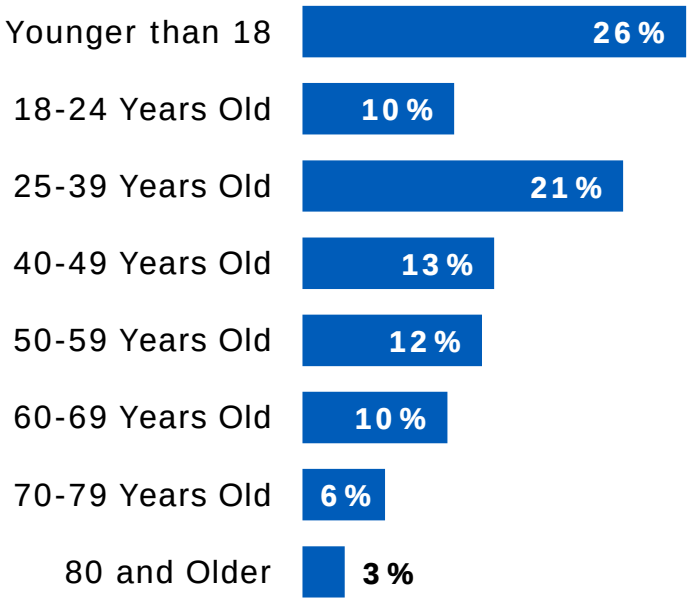
[1] Centers for Disease Control and Prevention, https://www.cdc.gov/vitalsigns/obesity-cancer/index.html

Texas Overview

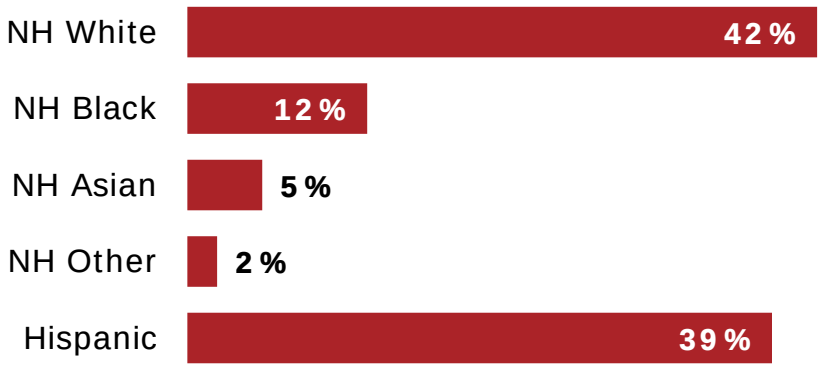
Texas Population Estimates

- The estimated population of Texas for 2019 was 28,995,881.[1]
- The population of Texas is 1/12th of total U.S. population.

Population by Age Group, Texas, 2018[2]



Population by Race/Ethnicity, Texas, 2018[2]



[1] United States Census Bureau QuickFacts, census.gov/quickfacts/fact/table/TX,US/PST045219
[2] Texas Demographic Center, demographics.texas.gov/Data/TPEPP/Estimates/
NH = Non-Hispanic

Key Population Demographics for Texas

- Six Texas counties have a population over 1,000,000 people — Harris, Dallas, Tarrant, Bexar, Travis and Collin. About 47% of Texans live in one of these counties.[1]
- 33 counties have a population between 100,000–1,000,000 people.[1]
- 181 counties each have a population less than the number of Texans expected to die from cancer in 2020, which is 45,858.[1]

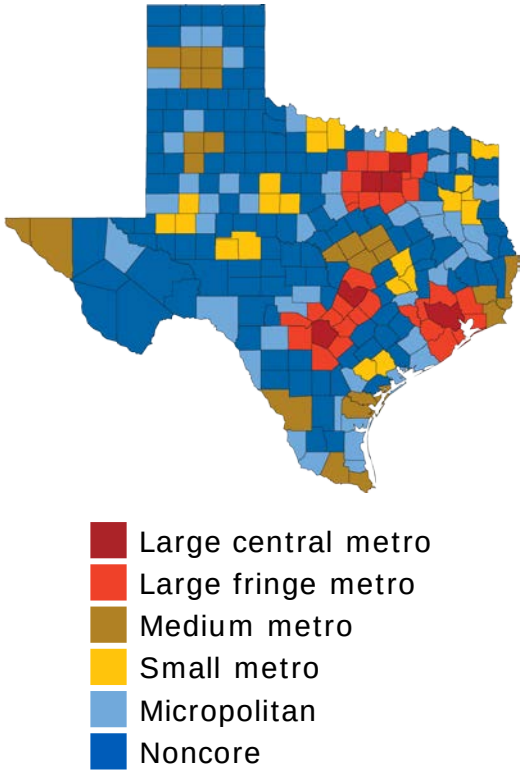
	Texas[2]	United States[2]
Population	29 Million	328.2 Million
Hispanic	39.6%	18.3%
Persons living in poverty	14.9%	11.8%
Persons without health insurance (ages 0-64)	20.0%	10.0%
Persons who speak a language other than English spoken at home (ages 5 years and older)	35.5%	21.5%
Adults ages 25 and older with a high school diploma	83.2%	87.7%

[1] Texas Demographic Center, demographics.texas.gov/Data/TPEPP/Estimates/
[2] United States Census Bureau QuickFacts, census.gov/quickfacts/fact/table/TX,US/PST045219

Texas Urban-Rural Classification

In this report, Texas counties are classified using the 2013 Urban-Rural Classification Scheme for Counties.[1]

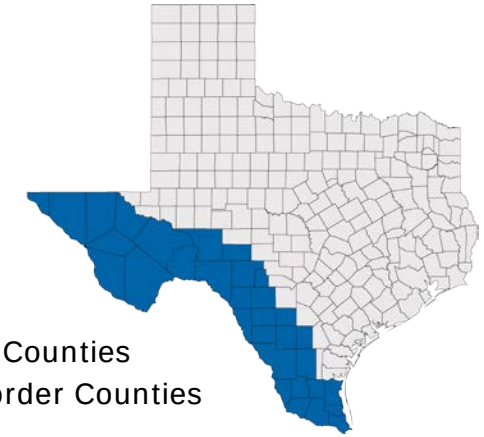
Metropolitan	
Large central metro	Counties in metropolitan statistical areas of 1,000,000 or more population that: contain the entire population of the largest principal city of the MSA, or have their entire population contained in the largest principal city, or contain at least 250,000 inhabitants of any principal city
Large fringe metro	Counties in MSAs of 1,000,000 or more population that do not qualify as large central metro counties
Medium metro	Counties in MSAs with populations of 250,000–999,999
Small metro	Counties in MSAs with populations less than 250,000
Nonmetropolitan	
Micropolitan	Counties with an urban cluster population of 10,000–49,999
Noncore	Nonmetro counties that do not qualify as micropolitan



[1] 2013 Urban-Rural Classification Scheme for Counties, National Center for Health Statistics, Centers for Disease control and Prevention (CDC). cdc.gov/nchs/data_access/urban_rural.htm

Texas Border Region

- In this report, “border counties” are defined as the 32 counties designated by the La Paz Agreement.
- Some of the key differences in demographics between the border and non-border counties are presented in the table below.



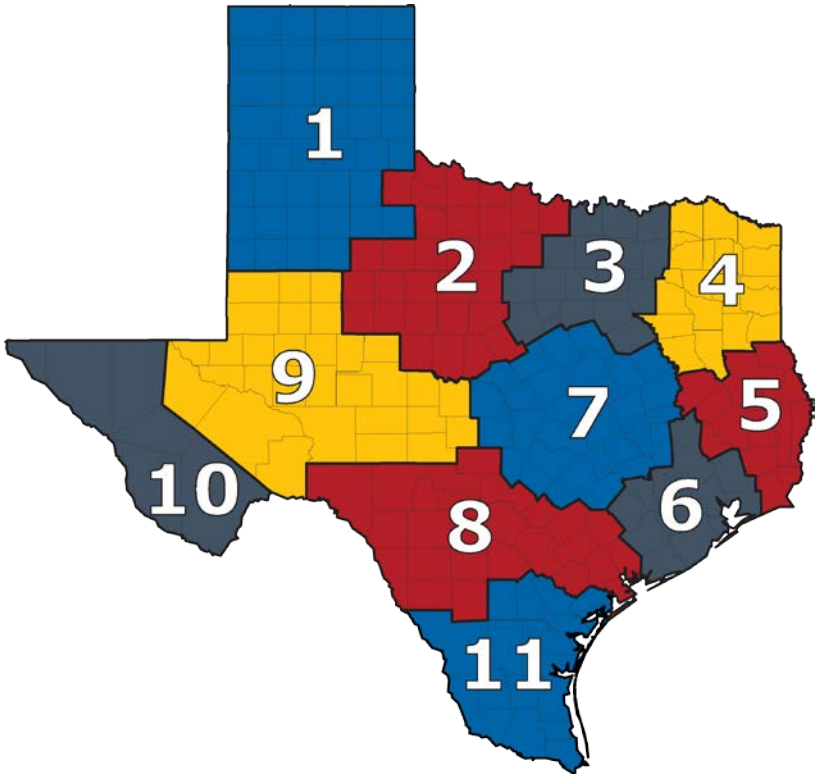
	Border Counties[1]	Non-Border Counties[1]
Population	3.0 Million	25.7 Million
Hispanic	88.4%	35.5%
Below poverty level	29.3%	15.9%
Adults ages 18–64 without health insurance	46.1%	28.3%
Do not speak English very well	31.7%	12.2%
Adults ages 25 and older without a high school diploma	32.8%	16.5%

[1] Office of Border Public Health, Texas Department of State Health Services, dshs.texas.gov/borderhealth/. Based on 2015 Census projections from DSHS Center for Health Statistics.

Texas Public Health Regions

- The Texas Department of State Health Service divides the state into 11 administrative Public Health Regions (also sometimes called health service regions).
- This report presents some information by public health region to show the variation of cancer statistics across the state.
- TCR's Web Query Tool can display cancer incidence and morality rates by health service region, as well as county, at cancer-rates.info/tx/.

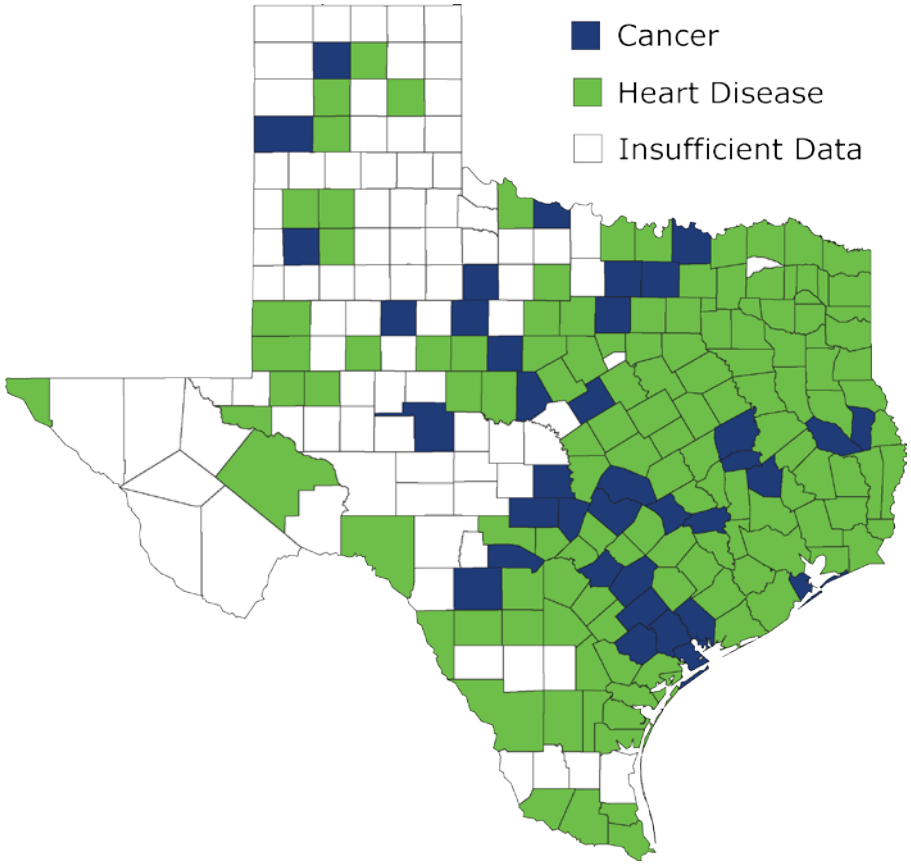
Map of Public Health Regions



Burden of Cancer in Texas

- In 2020, an estimated 127,131 new Texas cancer cases will be diagnosed.
- An estimated 45,858 Texans will die from cancer in 2020.
- As of January 1, 2017, 824,631 Texans who were diagnosed with cancer in the last 22 years were alive.
- Overall, cancer is the second leading cause of death in Texas, but the first in some areas of the state.[1]
- Cost of cancer in Texas for 2018 is estimated to be over $40.3 billion.[2]

Leading Cause of Death by Texas County, 2016



[1] Texas Department of State Health Services, Center for Health Statistics, Vital Statistics Annual Reports, Leading Causes of Death for Selected Years Texas Residents.
[2] An Economic Assessment of the Cost of Cancer in Texas and the Benefits of the Cancer Prevention and Research Institute of Texas and its Programs: 2018 Update

Overweight & Obesity Definitions and Trends

Overweight and Obesity

- Overweight and obesity is estimated to be the second most important modifiable risk factor for cancer after tobacco.[1]
- It is also associated with an increased risk of certain cancers and other diseases, including type 2 diabetes, stroke, hypertension, and heart disease.[2]
- Excess body weight is usually caused by consuming more calories than are used through metabolic processes and physical activity. Body weight is also linked to our genetics, environment, and presence of disease. Rates of overweight and obesity also vary with race, ethnicity, and socioeconomic status.
- Body Mass Index (BMI) is the most widely used proxy for body fat and provides a better measure than weight alone. It is calculated by dividing weight (in kg) by height (in m^2).

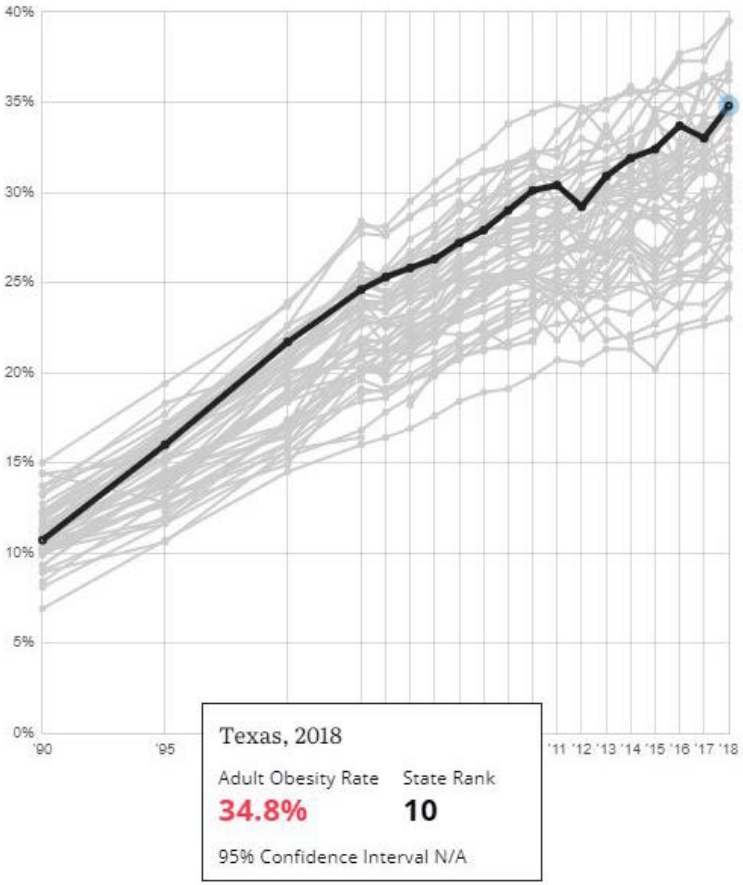
Adult BMI	Weight Status
<18.5	Underweight
18.5-24.9	Normal/healthy weight
25.0-29.9	Overweight
30.0-34.9	Obese (Class 1)
35.0-39.9	Obese (Class 2)
≥40.0	Obese (Class 3)

[1] Islami et al. 2018. CA Cancer J. Clin. 68(1):31-54
[2] Centers for Disease Control and Prevention, cdc.gov/obesity/index.html

Overweight and Obesity in Texas

- Texas ranked 10th in adult obesity rate and 7th in overweight/obesity rate in 2018.[1]
- The Centers for Disease Control and Prevention estimates that 35% of Texas adults were obese in 2018, and a further 35% were overweight. This means 70% of adults were either overweight or obese in Texas in 2018.[2]
- An estimated 37% of Texas adolescents are overweight or obese.[2]
- 75% of Texas adults are projected to be overweight or obese by 2040.[3]
- A quarter of Texas adults are considered to be physically inactive – the 17th highest rate in the nation.[4]

Percent of Obese Adults by US State, 1990-2018 [4]

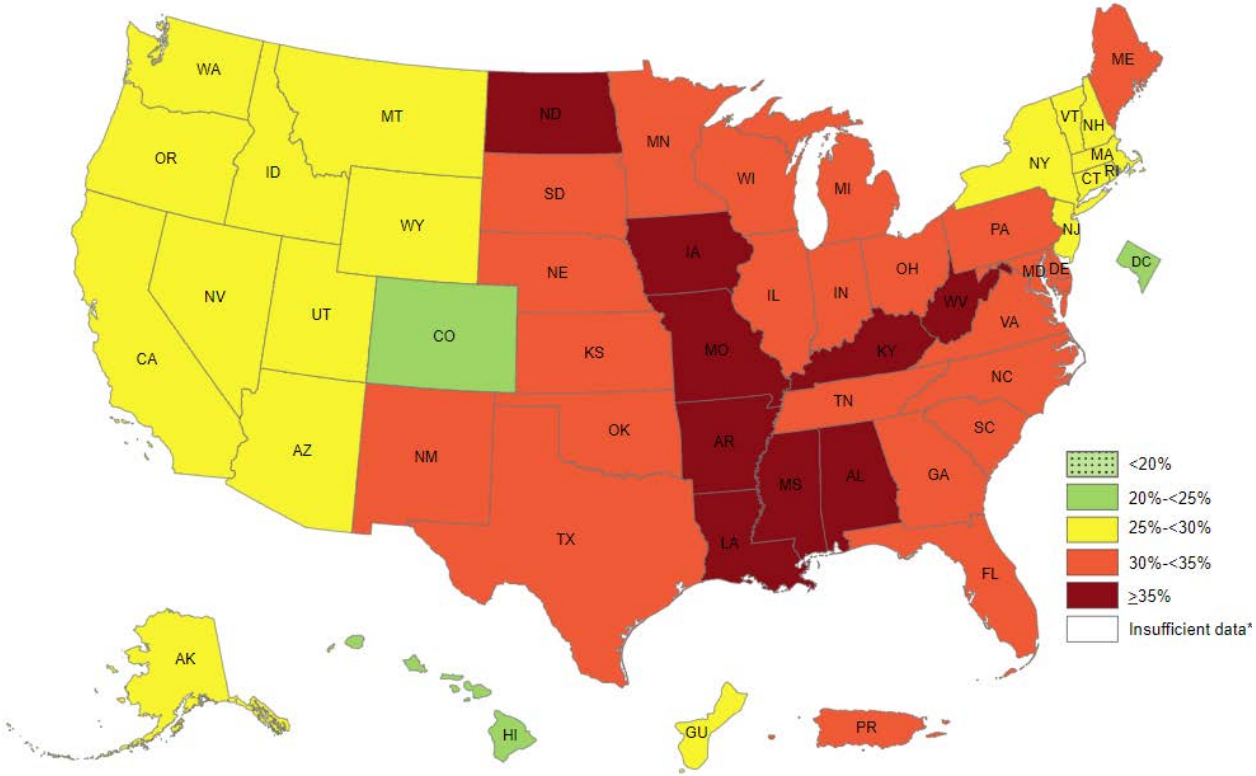


[1] Trust for America's Health and Robert Wood Johnson Foundation. The State of Obesity 2019.
[2] Centers for Disease Control and Prevention, cdc.gov/nccdphp/dnpao/data-trends-maps/index.html
[3] The Burden of Overweight and Obesity in Texas, DSHS.
[4] State of Childhood Obesity, stateofchildhoodobesity.org/adult-obesity/

Obesity Prevalence

Texas has the 10th highest rate of adult obesity in the US.

Adult Obesity Rate (BRFSS, 2018)[1]

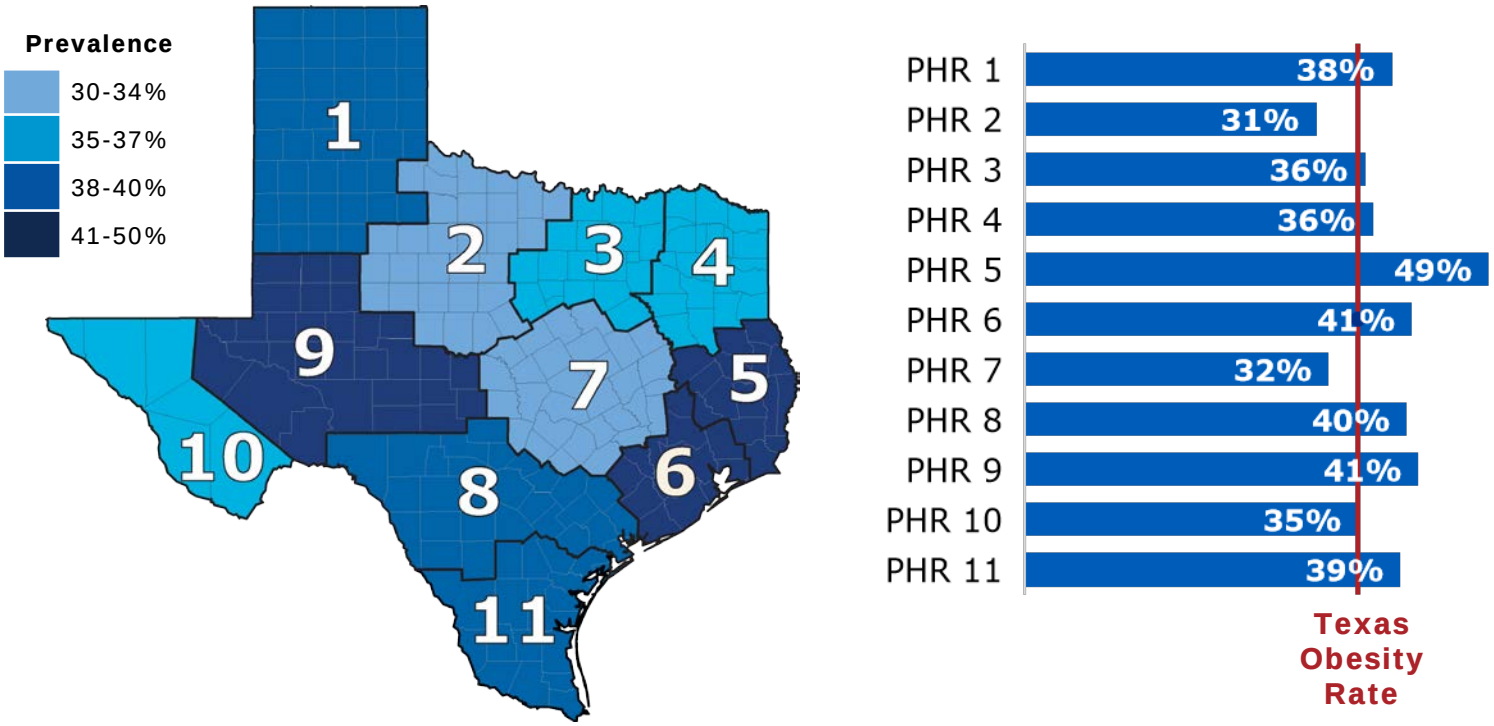


[1] Centers for Disease Control and Prevention, cdc.gov/obesity/data/prevalence-maps.html. Obesity rates were determined by self-reported BMI by participants of the Behavioral Risk Factor Surveillance System.

Obesity Prevalence in Texas by PHR

- In all Public Health Regions, adult obesity rates were 30% or higher.
- PHR 5 has an obesity rate that is significantly higher than the rest of Texas.[1]

Adult Obesity Prevalence by PHR, 2018 [1]



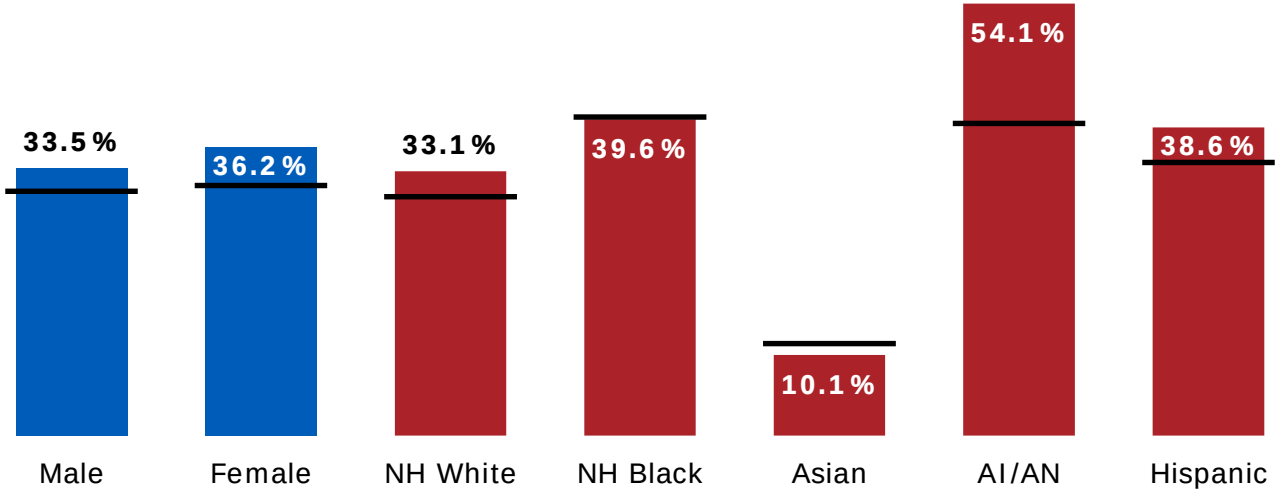
[1] Texas Department of State Health Services, dshs.texas.gov/Obesity/Data/

Obesity Rates by Sex and Race/Ethnicity

- Among US states and DC, Texas ranking 8th for female obesity rate, and 14th for male.[1]
- Texas also ranks 3rd for obesity rate among Hispanics, and 17th for obesity rate among both NH whites and NH blacks.[1]

Percent of Texas Adults with Obesity[2]

Black lines represent percent of US adults with obesity



[1] Trust for America's Health and Robert Wood Johnson Foundation. The State of Obesity 2019. Obesity rates are self-reported rates from BRFSS.
[2] Centers for Disease Control and Prevention, chronicdata.cdc.gov/Nutrition-Physical-Activity-and-Obesity/Nutrition-Physical-Activity-and-Obesity-Behavioral/hn4x-zwk7

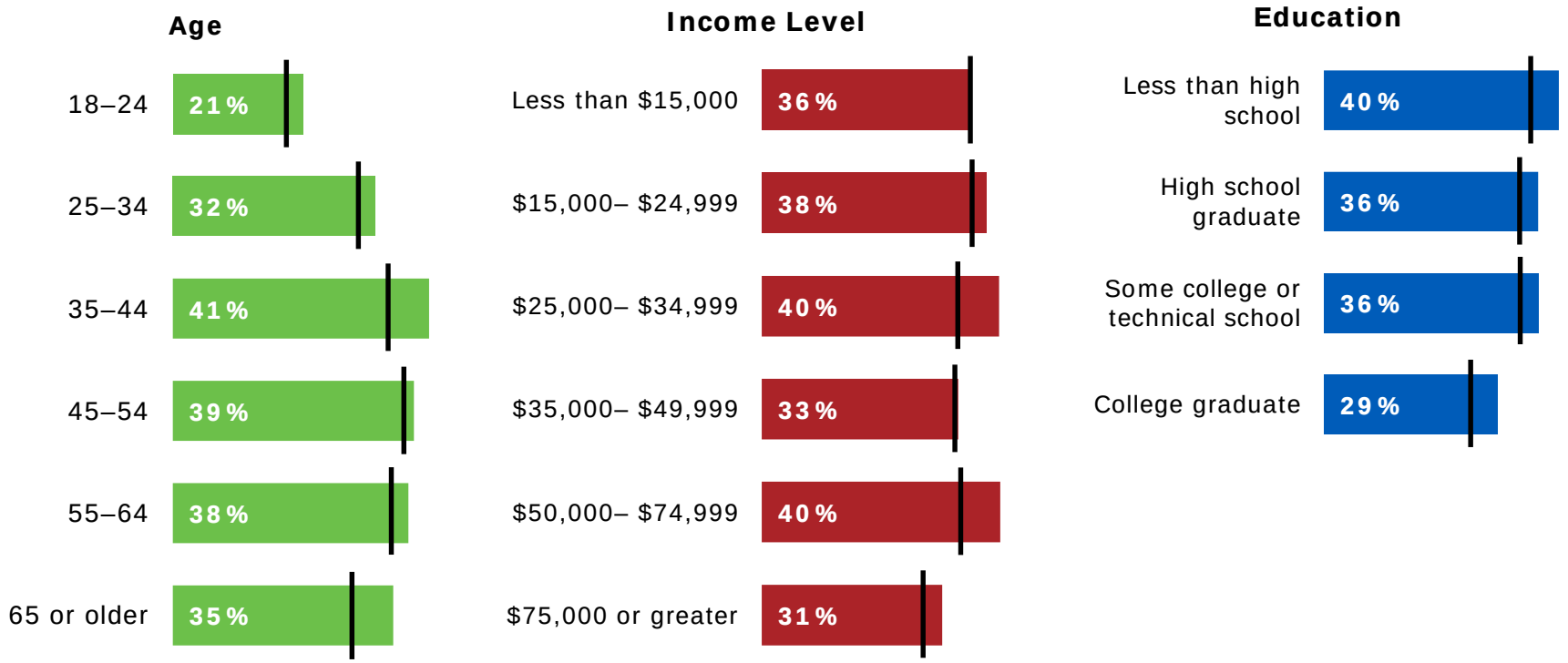
- Asian excludes 'Other Pacific Islanders' to allow comparison with national rates. NH = Non-Hispanic; AI/AN = American Indian/Alaska Native.

Obesity Rates by Age, Income and Education

- The rate of adult obesity tends to be higher in Texas compared to the national average across all age groups and income and education levels.
- Texas also has the highest rate of obesity in those over 65 years of age in the nation.[1]

Percent of Texas Adults with Obesity[2]

Black lines represent percent of US adults with obesity

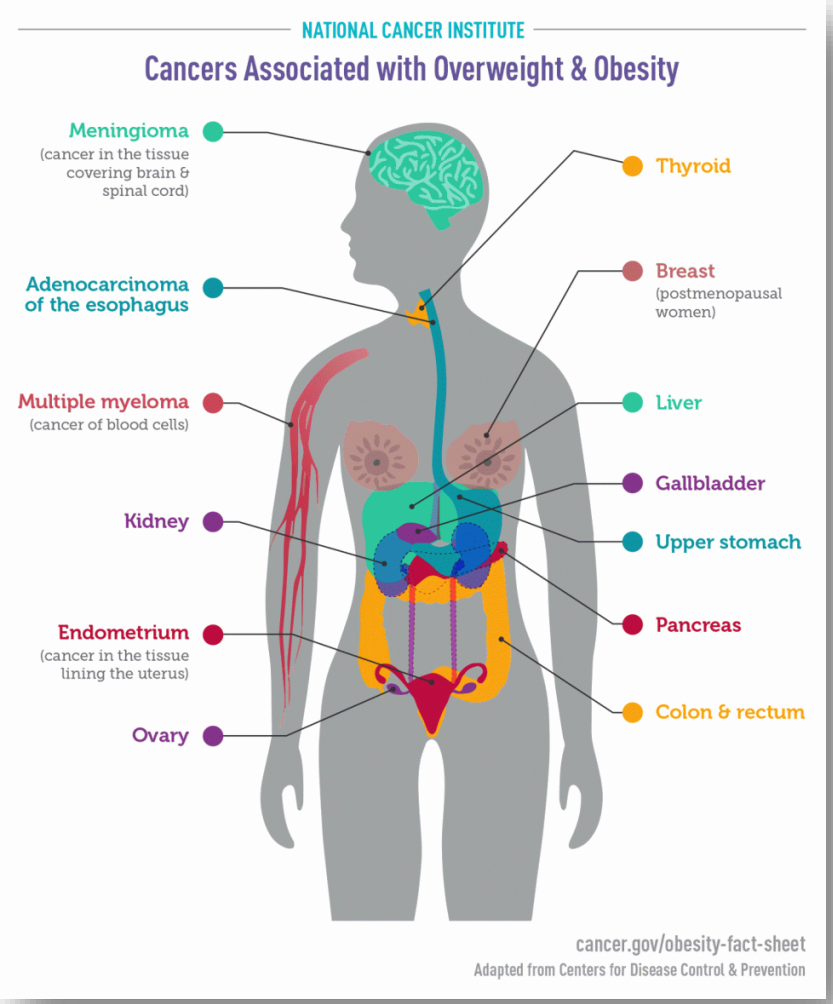


[1] Trust for America's Health and Robert Wood Johnson Foundation. The State of Obesity 2019. Obesity rates are self-reported rates from BRFSS.
[2] Centers for Disease Control and Prevention, chronicdata.cdc.gov/Nutrition-Physical-Activity-and-Obesity/Nutrition-Physical-Activity-and-Obesity-Behavioral/hn4x-zwk7

Overweight- & Obesity-Associated Cancer Sites

Overweight/Obesity-Associated Cancer Sites

- Endometrial cancer and esophageal adenocarcinoma have the strongest increase of risk associated with BMI, followed by liver, gallbladder, and kidney cancers.[1]
- Link between excess body weight and cancer risk is complex and varies with cancer type, but involves changes to insulin and hormone levels, and chronic inflammation.
- Three sites occur only in females: ovarian cancer, endometrial cancer, and post-menopausal breast cancer.
- Three sites also linked to lack of physical activity: colorectal cancer, breast cancer (in all females), and endometrial cancer.[2]

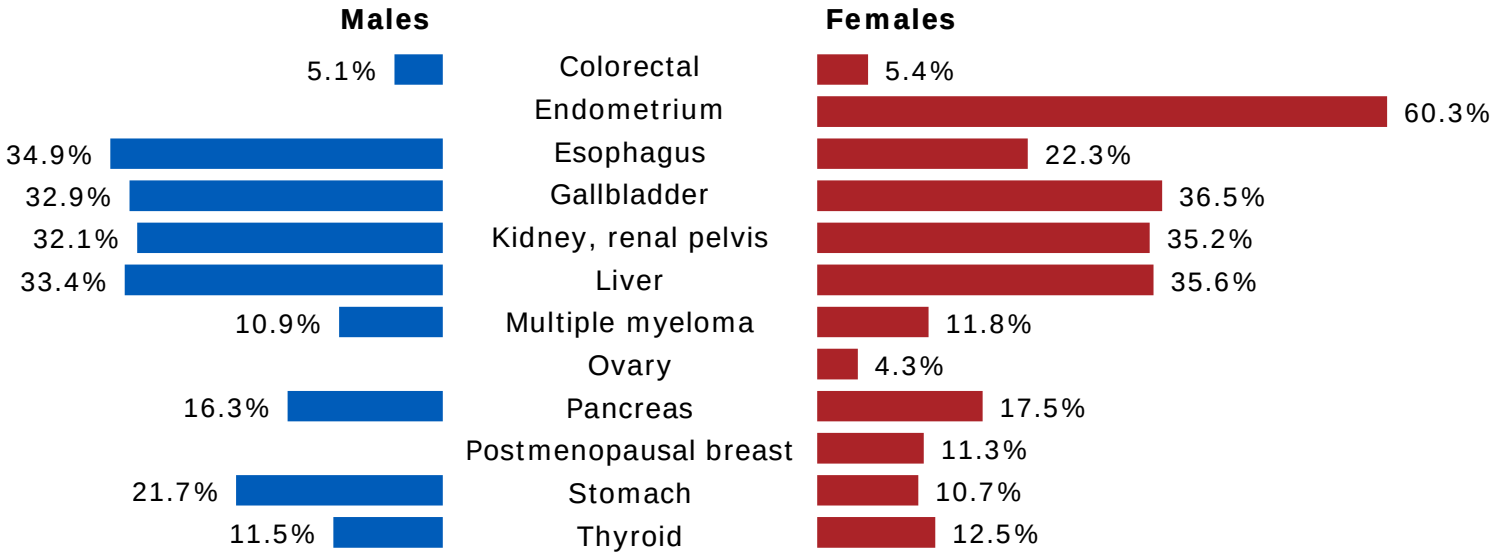


[1] Steele et al. 2017. MMWR, 66(39):1052-1058
[2] World Cancer Research Fund, wcrf.org/dietandcancer/exposures/physical-activity

Percent of Overweight/Obesity-Associated by Cancer Site

- The percent of cases that can be attributed to excess body weight varies with site and sex. 8% of all new cancer cases (5% in males, 11% in females), and 7% of cancer deaths (6% in males, 7% in females) are likely to be directly attributable to overweight/obesity.[1]
- Some are common, including breast, colorectal, endometrial, and kidney cancers, while others are relatively rare, such as meningioma.

Percent of Cancer Cases* Attributed to Excess Body Weight in Adults 30 years and Older by Sex, 2014[1]



* No estimates were provided for meningioma.

[1] Islami et al. 2018. CA Cancer J. Clin. 68(1):31-54

Overweight/Obesity-Associated Cancers 2008–2017

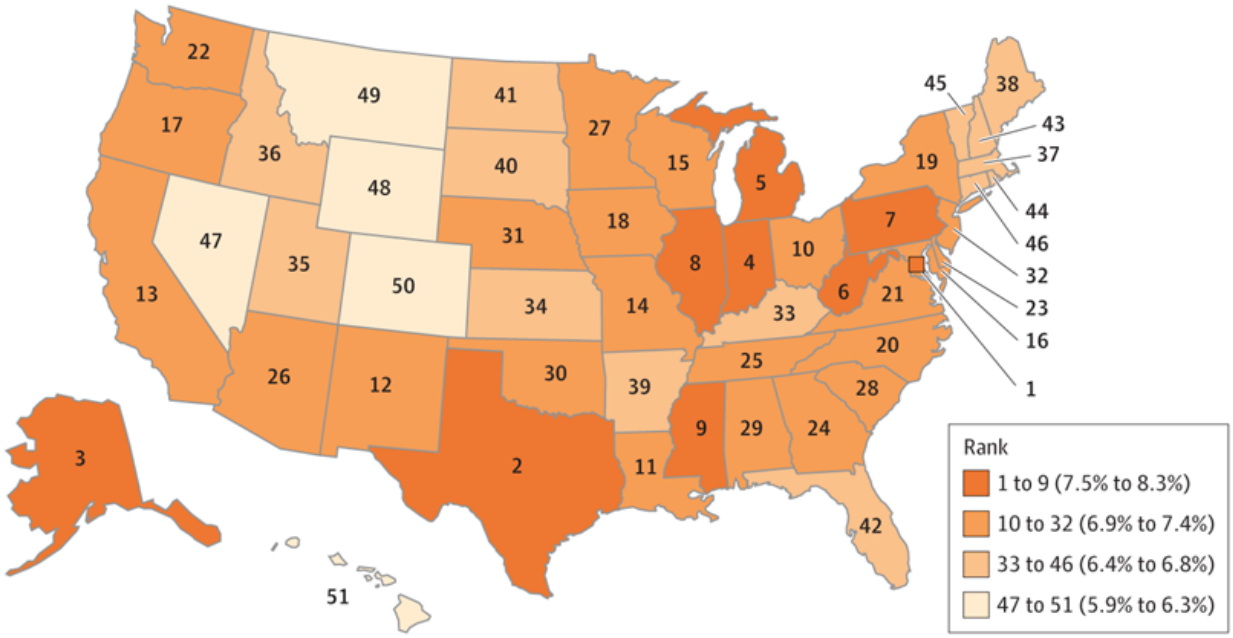
Overall Trends — Texas vs US

Because colorectal cancer incidence rates have declined due to increased screening for precancerous polyps, trends for all sites combined were analyzed without colorectal cancer in this report.[1] However, 5-year incidence rates include colorectal cancer.

[1] Steele et al. 2017. MMWR, 66(39):1052-1058

Proportion of Cancer Cases Attributed to Overweight/Obesity

During 2011-2015*, Texas ranked second in the proportion of incident cancer cases that were attributable to excess body weight in adults aged 30 years and over.[1]



Rank and Proportion of Incident Cancer Cases in the 50 US States and District of Columbia Attributable to Excess Body Weight in Adults 30 Years or Older, 2011-2015

The figures show estimates based on the prevalence of excess body weight from 2001 to 2004. States are categorized using the Jenks natural breaks classification method.

* Most recent data available.

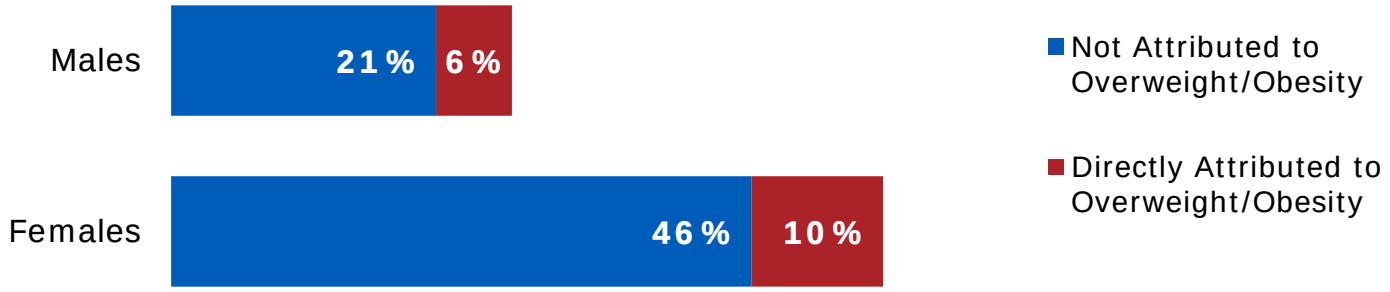
[1] Islami et al. (2019) JAMA Oncol. 5(3):384-392.

Image source: Islami et al. (2019) JAMA Oncol. 5(3):384-392.

Percent of New Cancer Cases at Overweight/Obesity-Associated Sites

- 41% of all new invasive cancers—56% in females and 27% in males—diagnosed in Texas are at cancer sites associated with overweight/obesity. Not all cases can be attributed to excess body weight.
- 10.4% of all new invasive cancers in females and 6.0% in males were estimated to be directly attributed to overweight/obesity in Texas in 2011-2015.[1]
- This means approximately 5,700 cancers diagnosed in females and 3,400 cancers in males in Texas in 2017 were directly attributable to overweight/obesity.

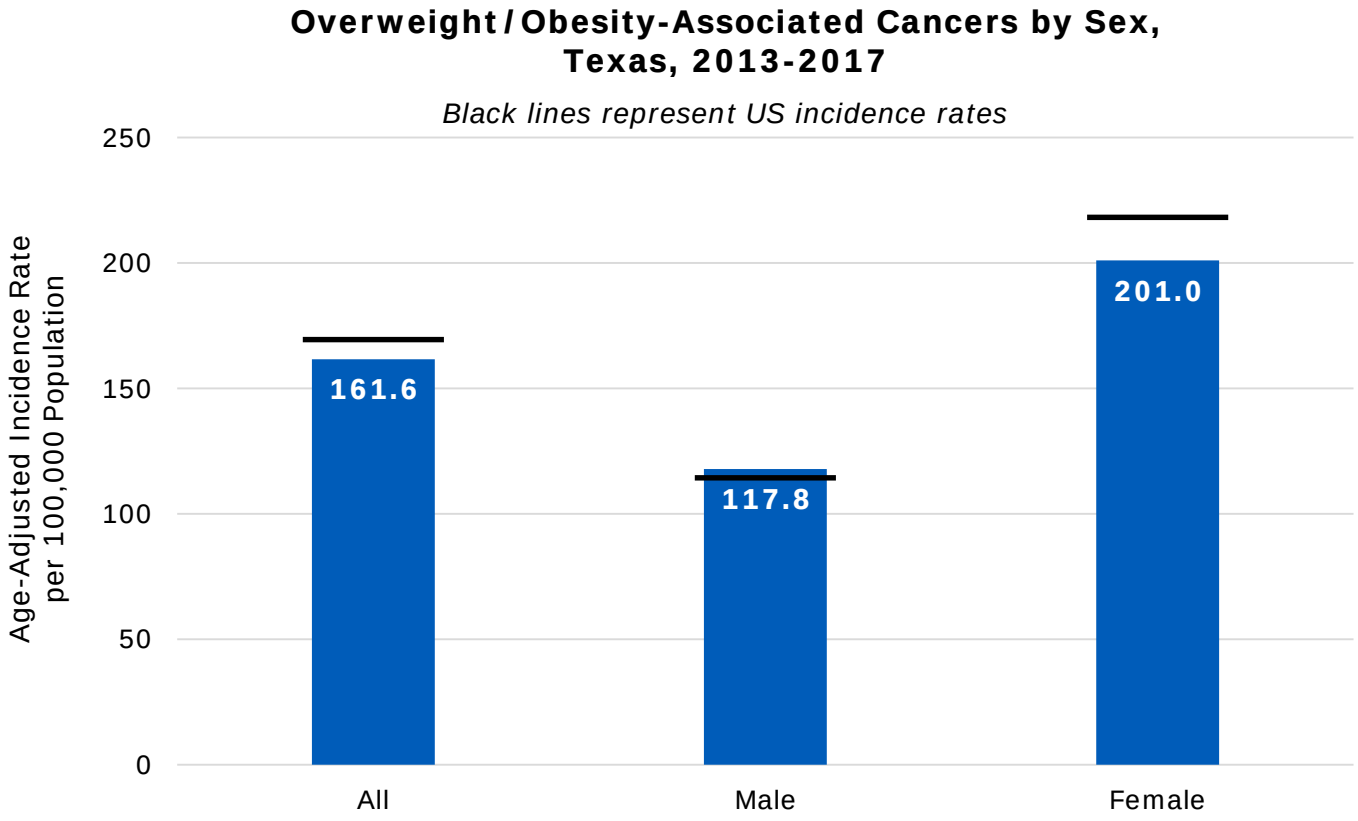
Percent of New Cancer Cases at Overweight/Obesity-Associated Sites, 2013–2017



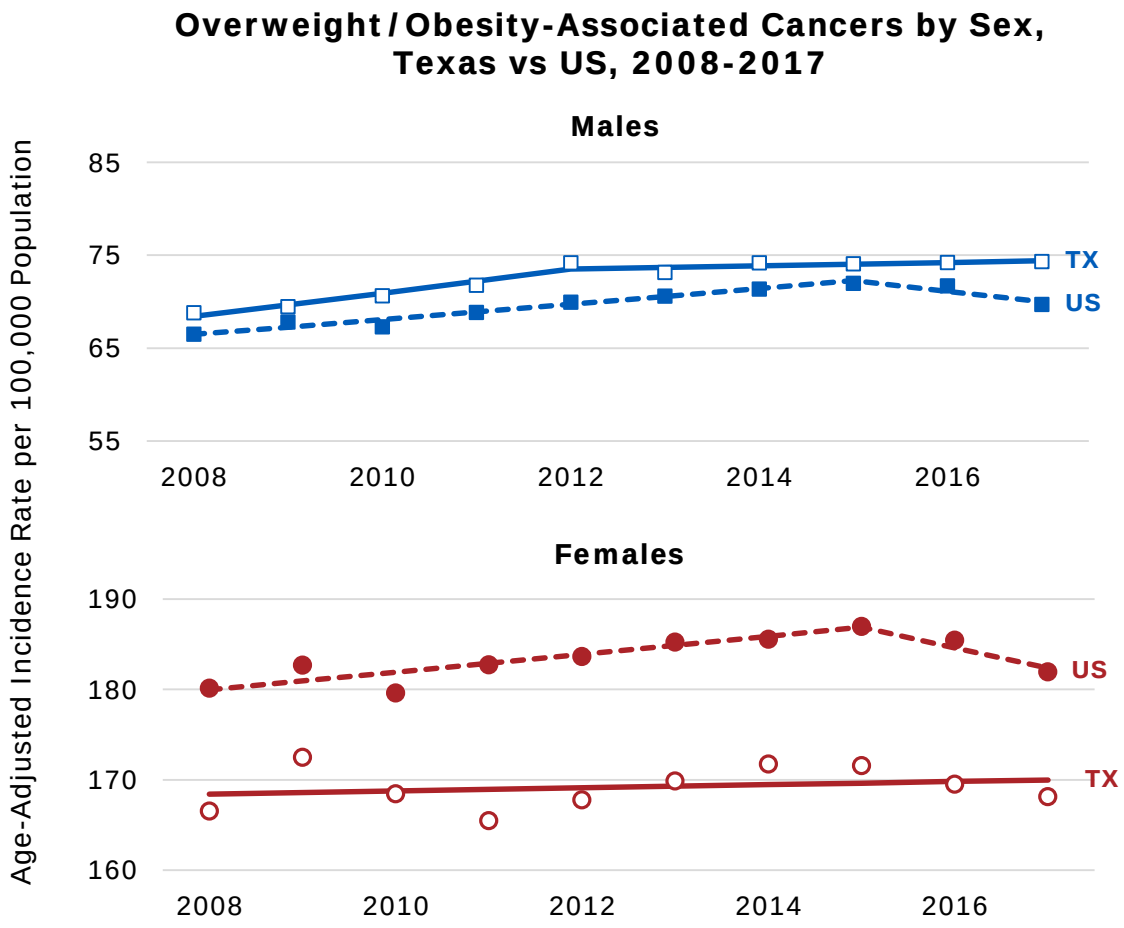
[1] Islami et al. (2019) JAMA Oncol. 5(3):384-392.

Overweight/Obesity-Associated Cancers Incidence Rates by Sex

Overall, the 5-year incidence rate of overweight/obesity-associated cancers in Texas was lower than the US average. The rate in Texas males was slightly higher than in US males.



Overweight/Obesity-Associated Cancer Incidence Rate Trends by Sex

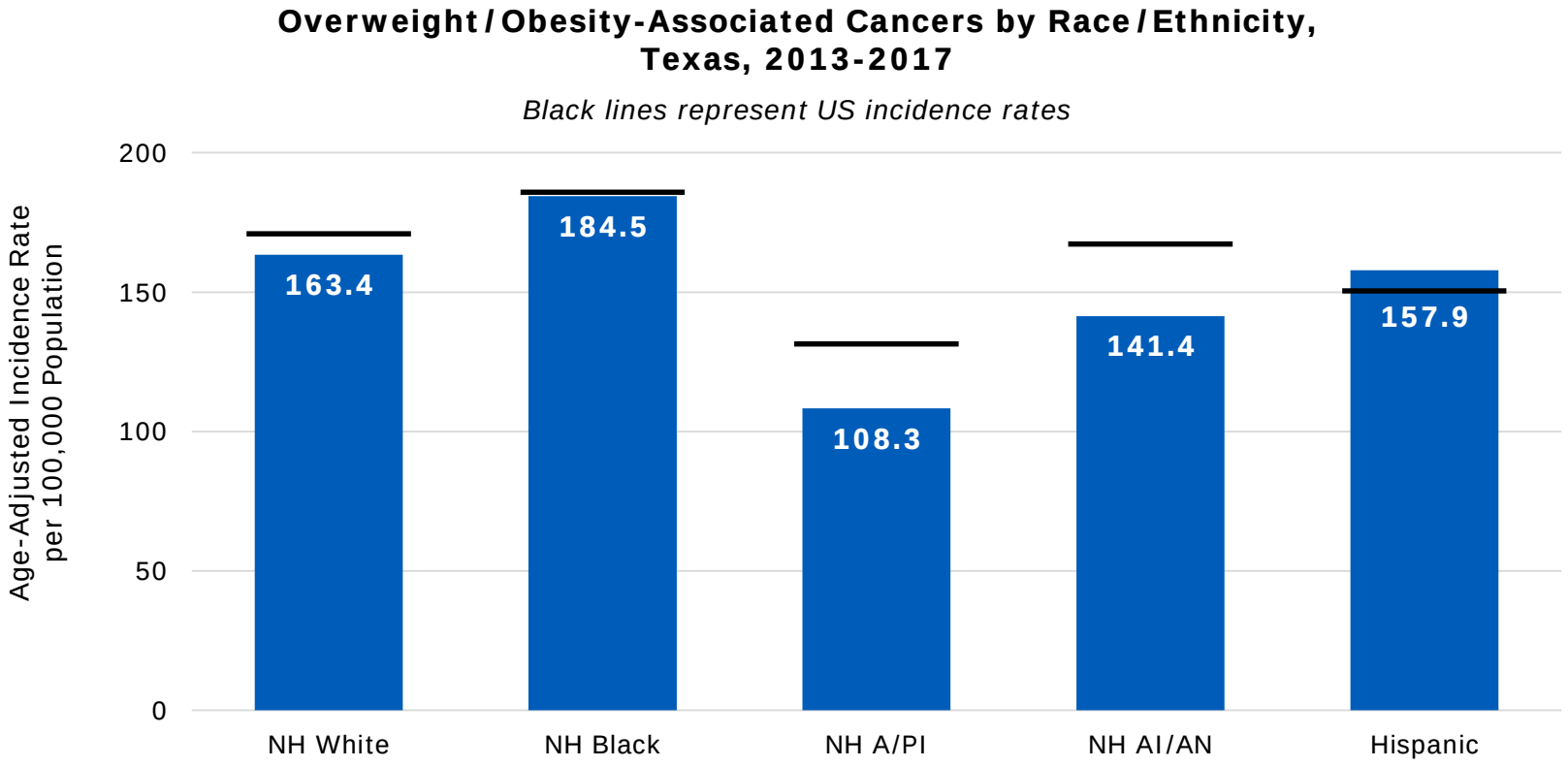


- For males, the overall incidence rate for overweight/obesity-related cancers increased in both TX and US.
  - In Texas, the average annual percent change was 0.9%, with an increase of 1.8% per year from 2008–2012 and then a stable rate.
  - In the US, the AAPC was 0.6%, with an increase of 1.2% per year from 2008–2015 and then a stable rate.
- For females, the overall incidence rate for overweight/obesity-associated cancers was stable in Texas and the US (US increase of 0.5 from 2008-2015, followed by stable rate).

Excludes colorectal cancer. Lines represent the Joinpoint modeled trend, and points represent observed data.

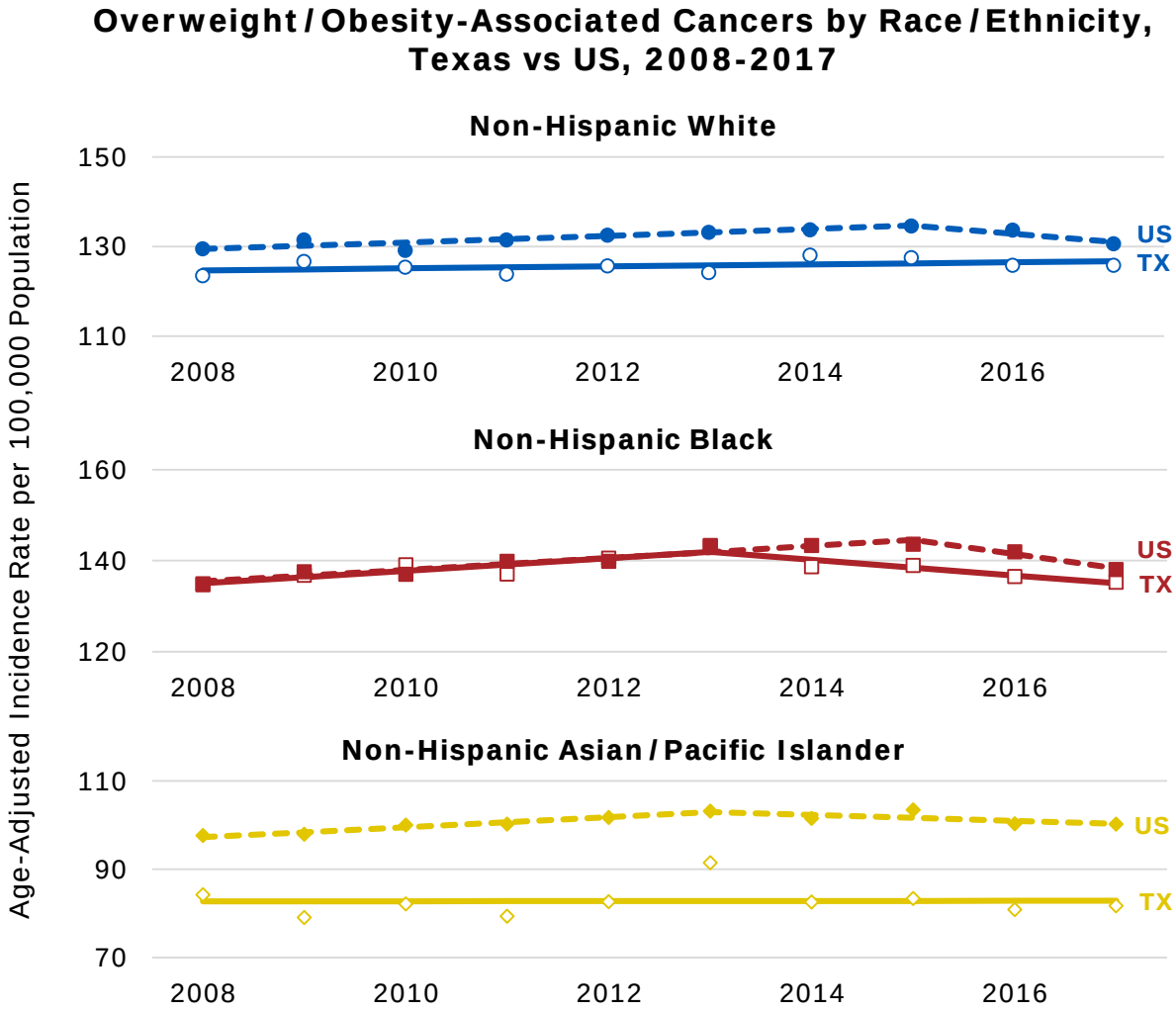
Overweight/Obesity-Associated Cancers Incidence Rates by Race/Ethnicity

For each race/ethnicity group, rates are generally lower in Texas compared to the US average, except for Texas Hispanics who have a higher rate of overweight/obesity-related cancers compared to the national average.



NH = Non-Hispanic; A/PI = Asian/Pacific Islander; AI/AN = American Indian/Alaska Native.

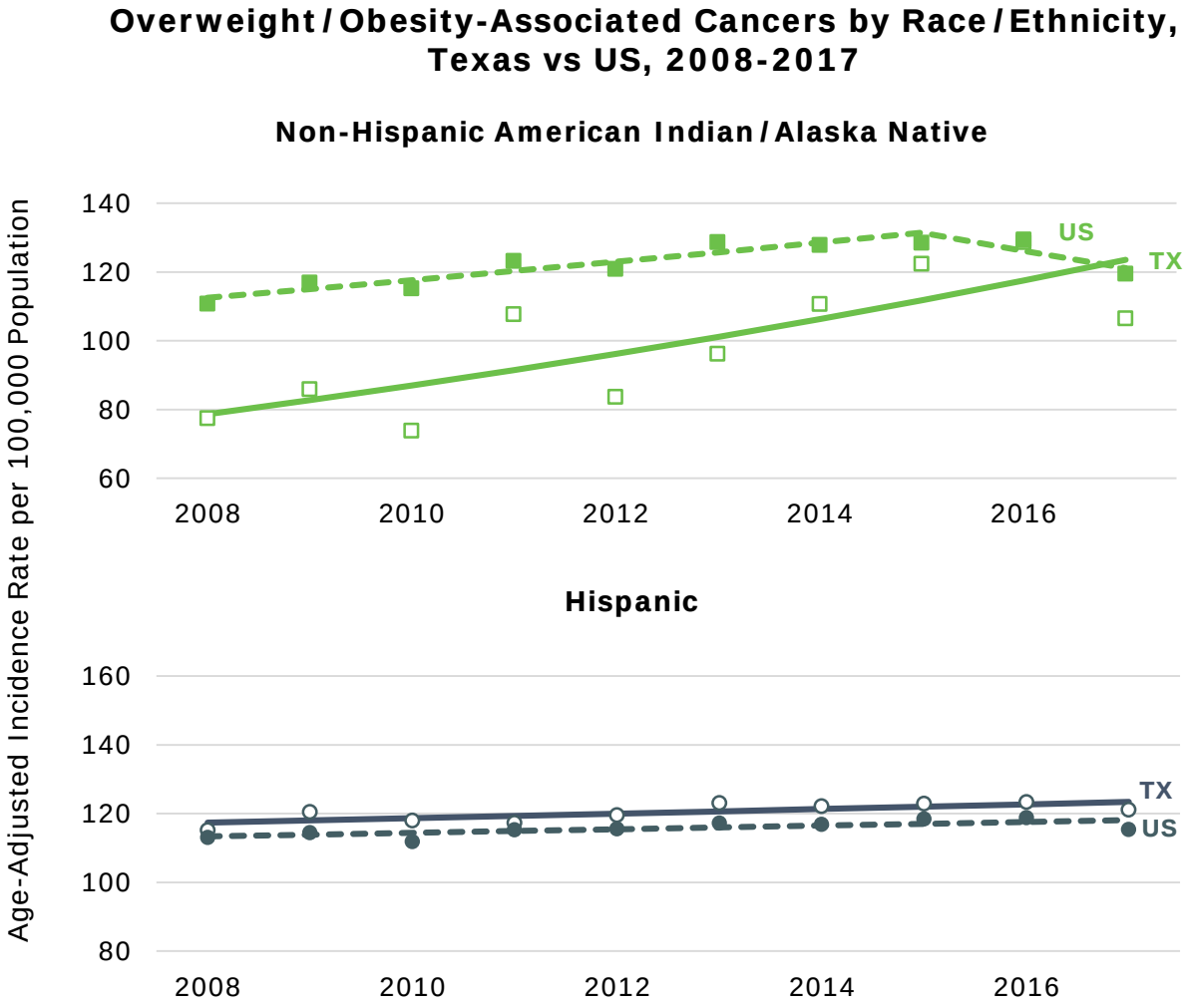
Overweight/Obesity-Associated Cancer Incidence Rate Trends by Race/Ethnicity (1 of 2)



- In Texas, incidence rates for overweight/obesity-related cancers were stable for three race/ethnicity groups from 2008–2017: non-Hispanic white, NH black and NH Asian/Pacific Islander.
- In the US, the rate for NH whites, NH black and NH A/PI remained stable.

Excludes colorectal cancer. Lines represent the Joinpoint modeled trend, and points represent observed data.

Overweight/Obesity-Associated Cancer Incidence Rate Trends by Race/Ethnicity (2 of 2)



- In Texas, incidence rates for overweight/obesity-associated cancers increased for two race/ethnicity groups from 2008–2017: non-Hispanic American Indian/Alaska Native and Hispanic.
  - The average annual percent change for NH AI/AN was 5.1%.
  - The AAPC for Hispanics was 0.6%.
- Hispanics also saw increased rates in the US (AAPC 0.5%).

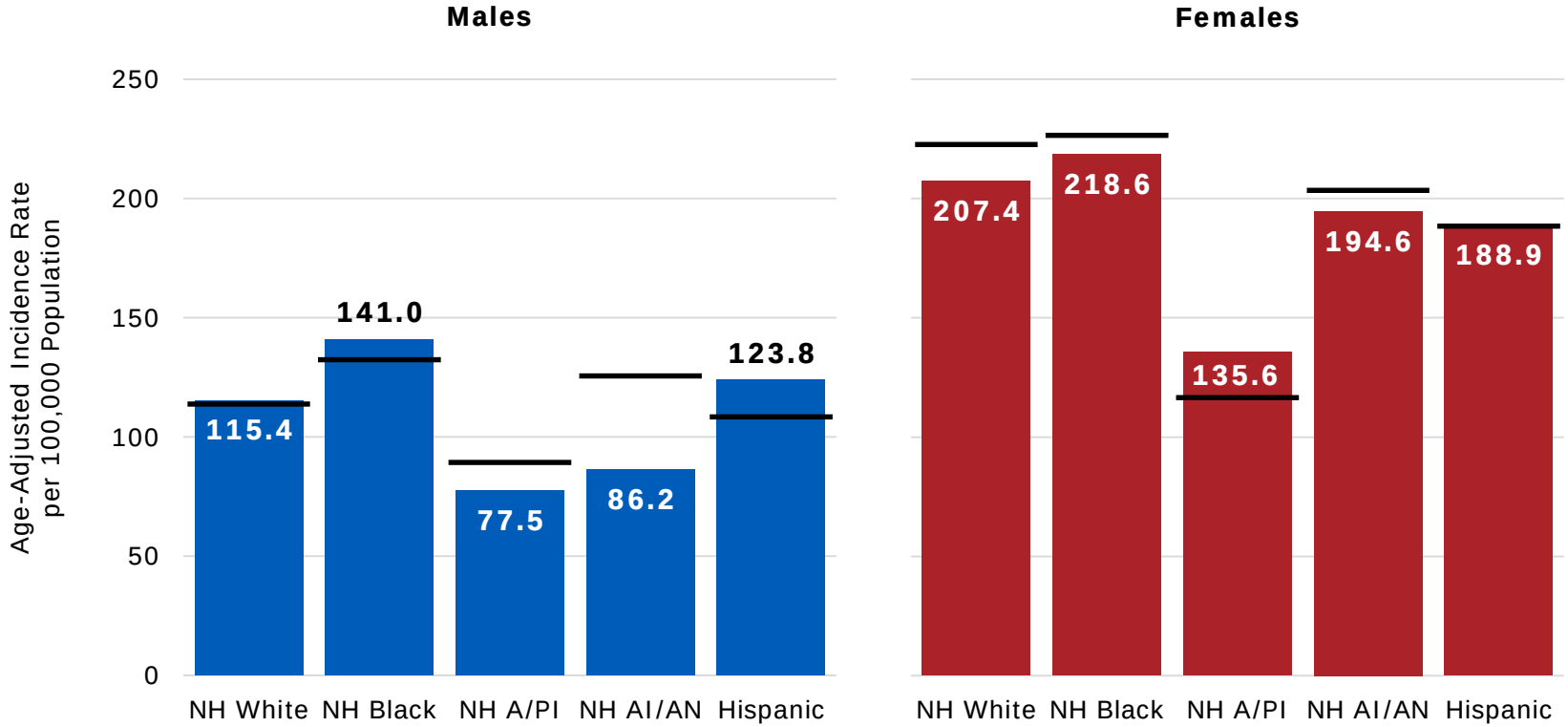
Excludes colorectal cancer. Lines represent the Joinpoint modeled trend, and points represent observed data.

Overweight/Obesity-Associated Cancers Incidence Rates by Sex and Race/Ethnicity

The highest overall incidence rate of overweight/obesity-associated cancers in Texas is for non-Hispanic black females, followed by NH white females.

Overweight/Obesity-Associated Cancers by Race/Ethnicity and Sex, Texas, 2013–2017

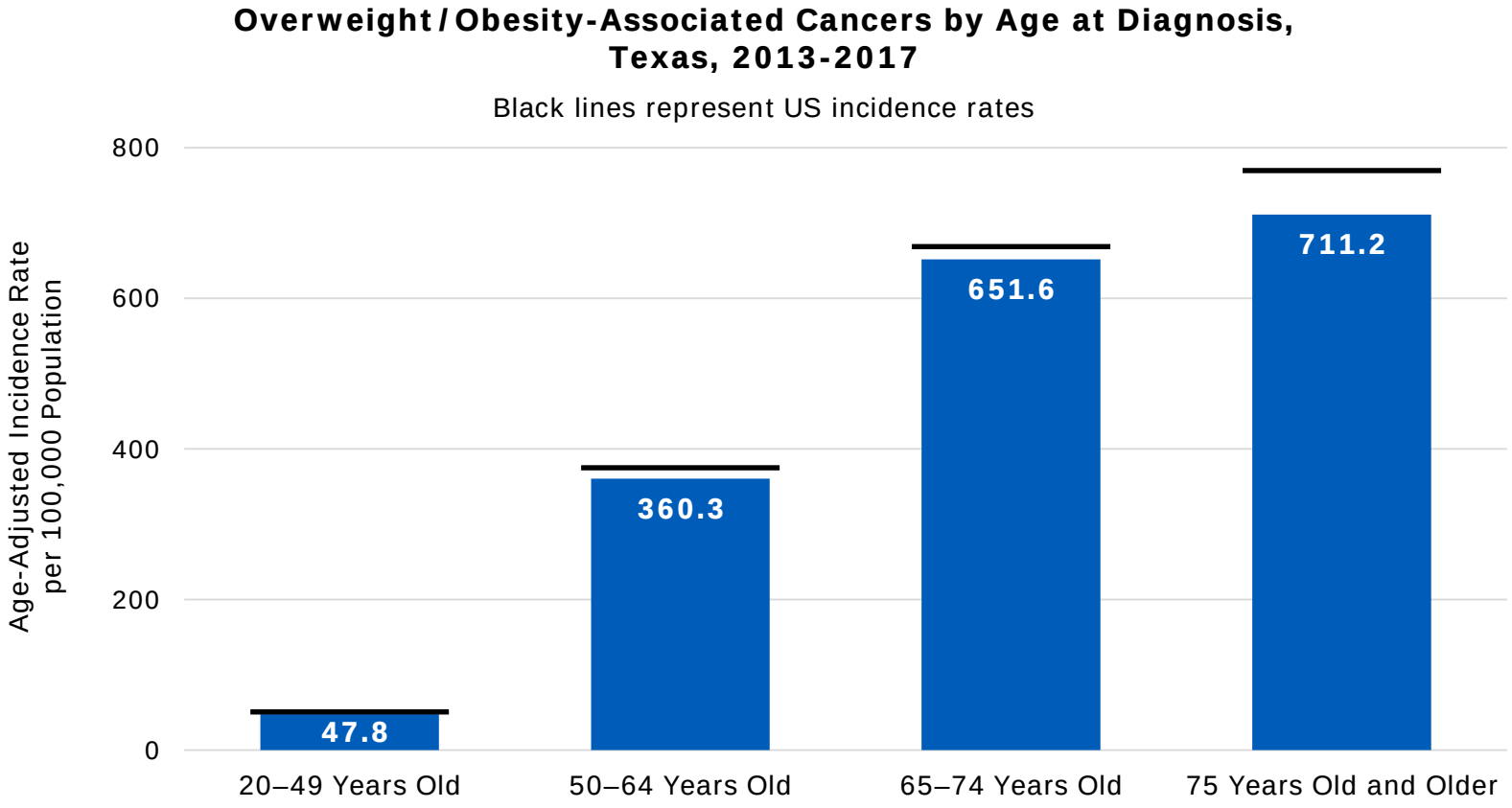
Black lines represent US incidence rates



NH = Non-Hispanic; A/PI = Asian/Pacific Islander; AI/AN = American Indian/Alaska Native.

Overweight/Obesity-Associated Cancer Incidence Rates By Age At Diagnosis

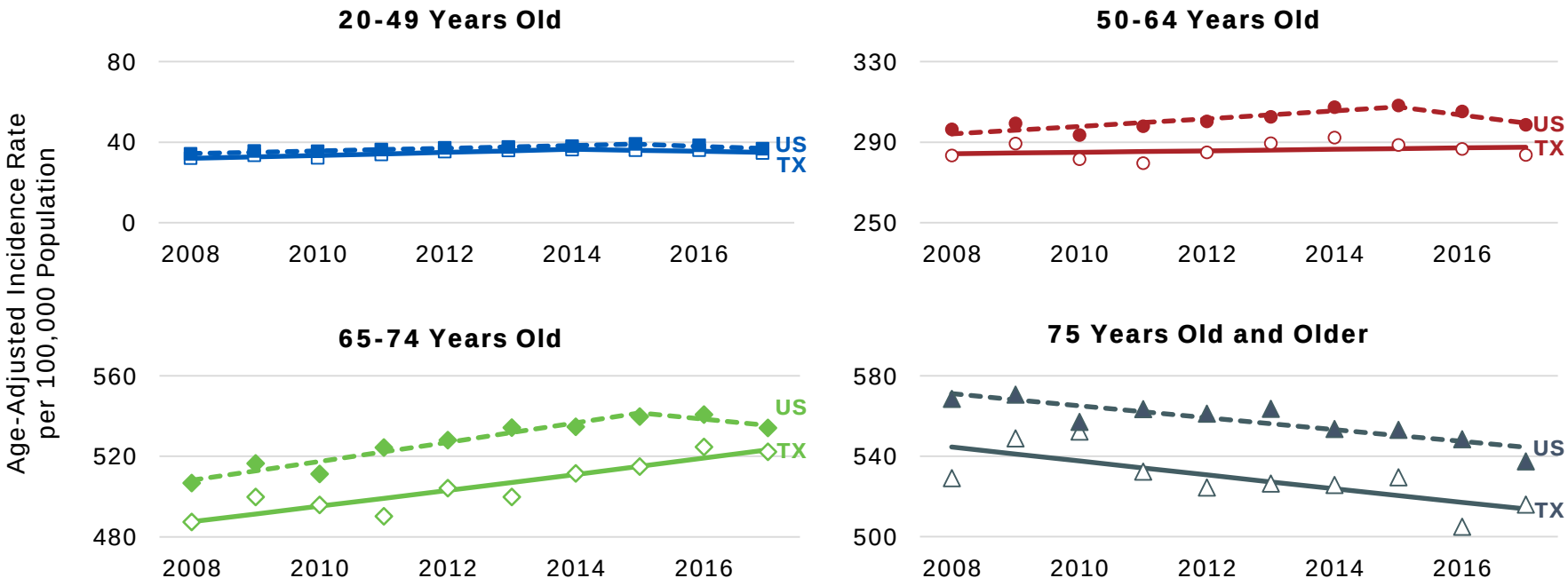
Across all ages, the incidence rate tends to be lower in Texas compared to the national average. This difference is largest for those ages 75 years and older.



Overweight/Obesity-Associated Cancer Incidence Rate Trends by Age at Diagnosis

- In Texas, the incidence rate for overweight/obesity-related cancers increased for ages 65–74 from 2008–2017 (0.8% AAPC).
- In Texas, the incidence rate decreased for ages 75 years and older (-0.6% AAPC). The rates were stable for other age groups.

Overweight/Obesity-Associated Cancers by Age at Diagnosis, Texas vs US, 2008-2017

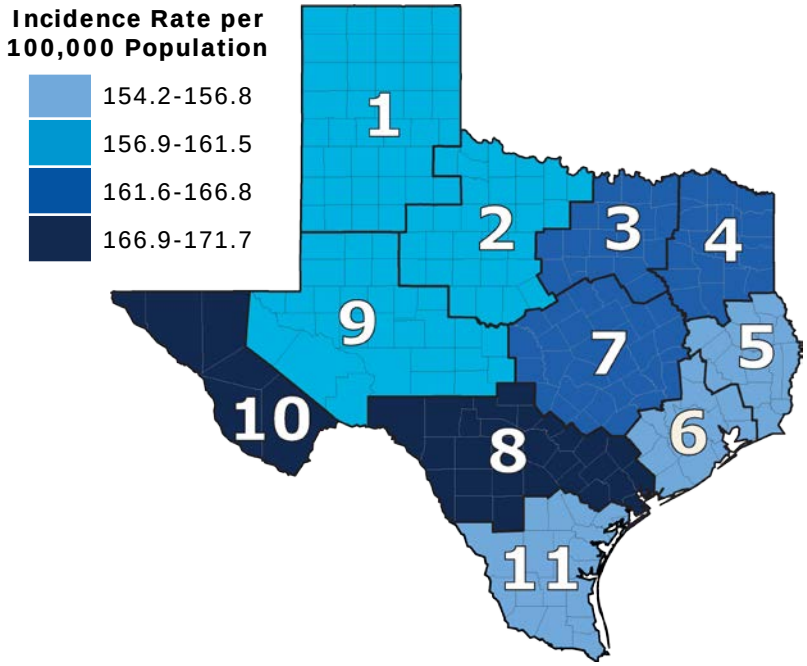


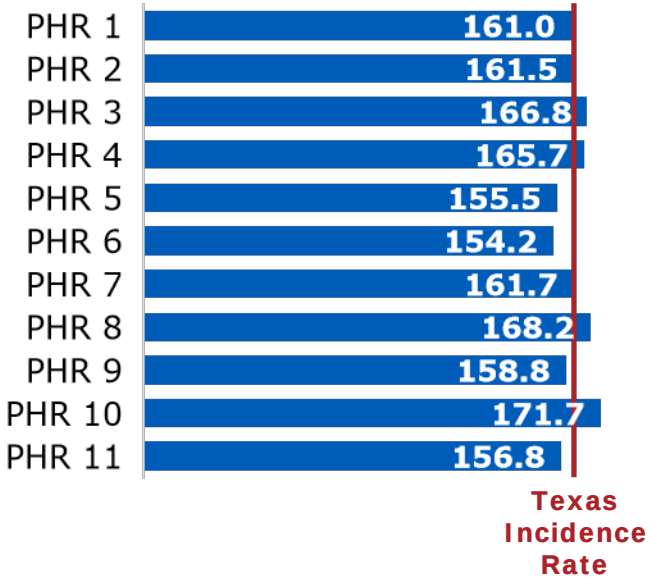
Excludes colorectal cancer. Lines represent the Joinpoint modeled trend, and points represent observed data.

Overweight/Obesity-Associated Cancer Incidence Rates And Trends By Texas Public Health Region

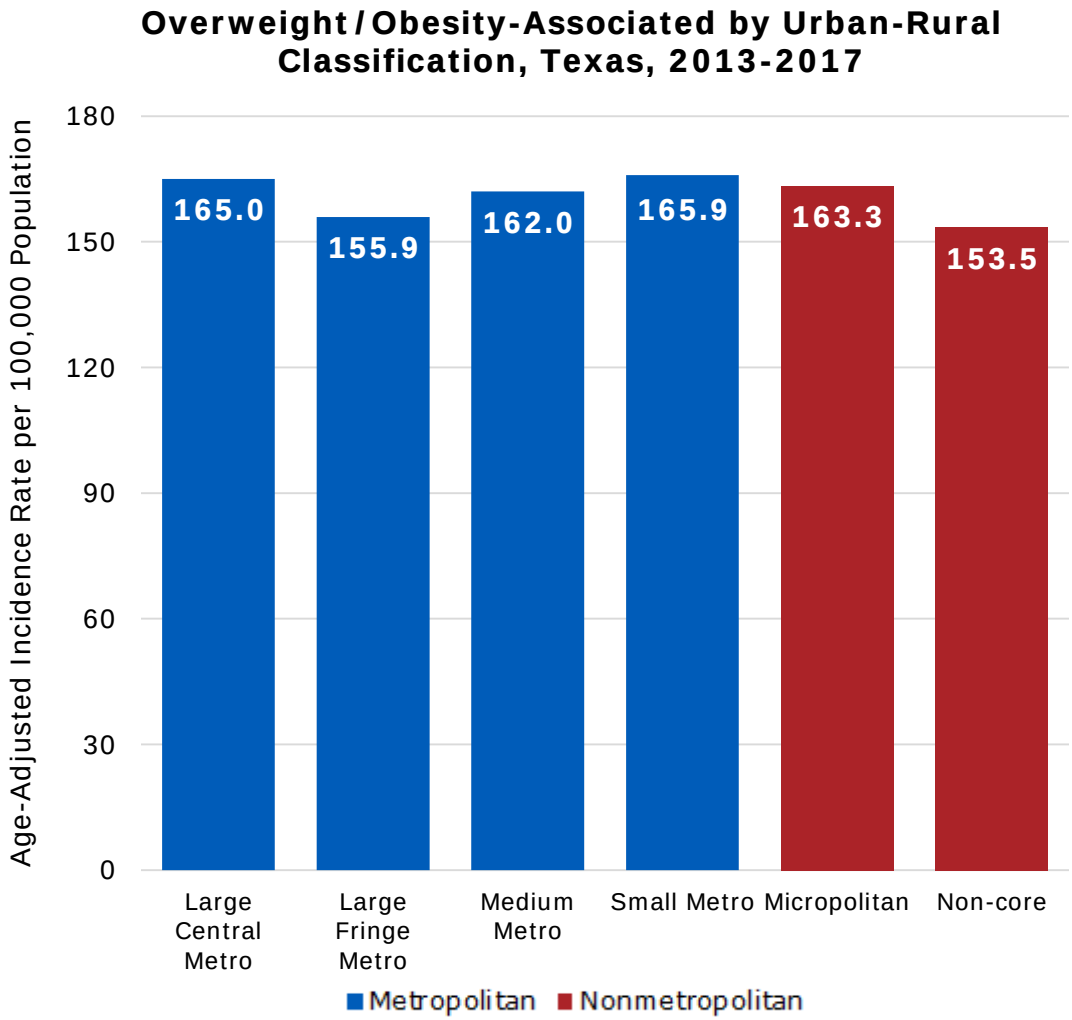
- Incidence rates of overweight/obesity-associate cancers area highest in PHRs 8 and 10.
- When colorectal cancer is excluded, incidence rates for obesity/overweight-associated cancers have been increasing in PHRs 4, 10 and 11 and decreasing in PHR 6.

Incidence Rates of All Overweight/Obesity-Associated Cancers by PHR, 2013–2017





Overweight/Obesity-Associated Cancer Incidence Rates by Rural-Urban Classification

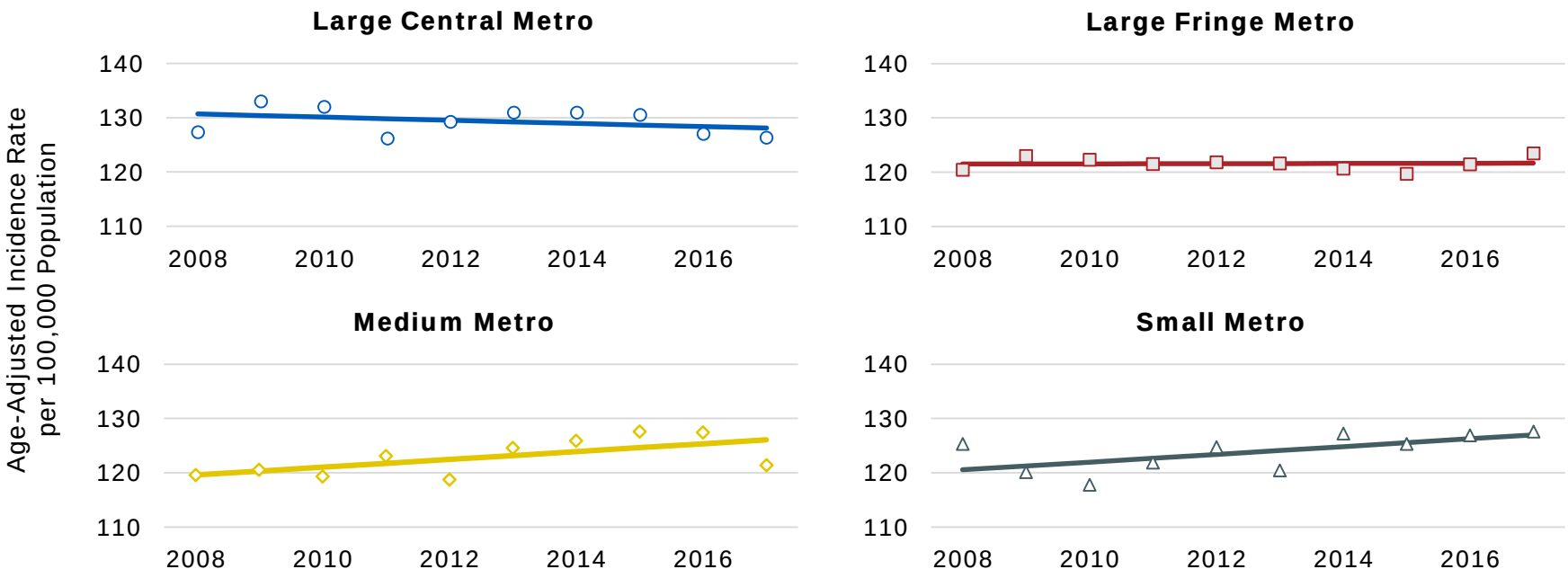


- In Texas, the incidence rate of overweight/obesity-related cancers is significantly higher in metro (162.3 per 100,000 population) than non-metro counties (158.4).
- The highest incidence rates are in small metro and large central metro counties.
- The lowest incidence rates are in large fringe metro and non-core counties.

Overweight/Obesity-Associated Cancer Incidence Rate Trends in Metropolitan Counties

- Incidence rates for overweight/obesity-associated cancers remained stable in large central metro and large fringe metro counties.
- Medium and small metro areas both saw incidence rates increase by an average annual percent change of 0.6%

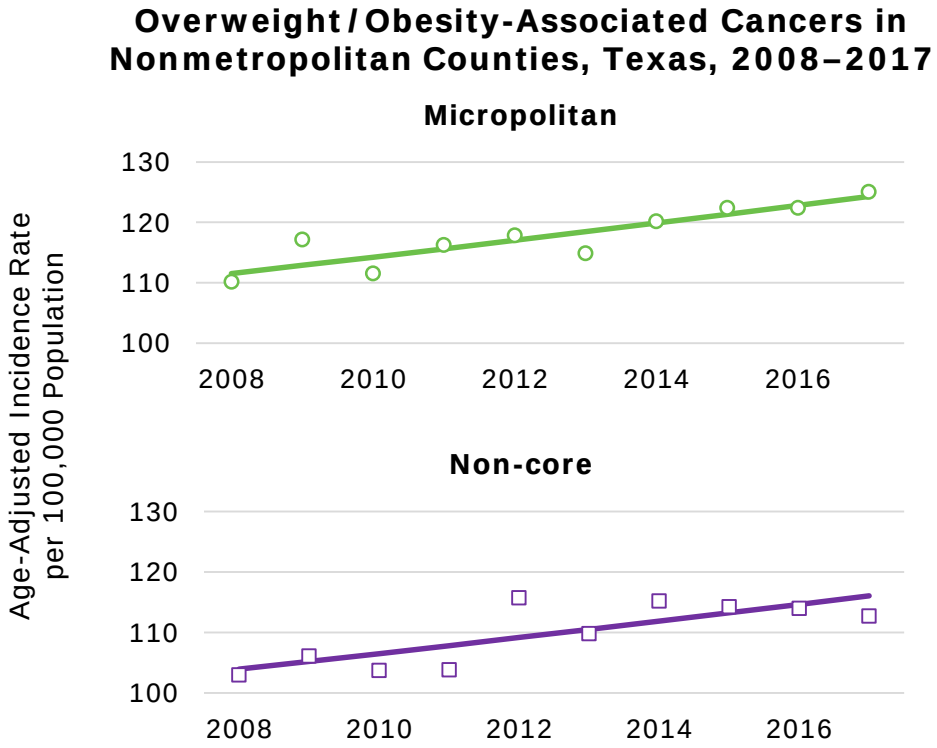
Overweight/Obesity-Associated Cancers in Metropolitan Counties, Texas, 2008-2017



Excludes colorectal cancer. Lines represent the Joinpoint modeled trend, and points represent observed data.

Overweight/Obesity-Associated Cancer Incidence Rate Trends in Nonmetropolitan Counties

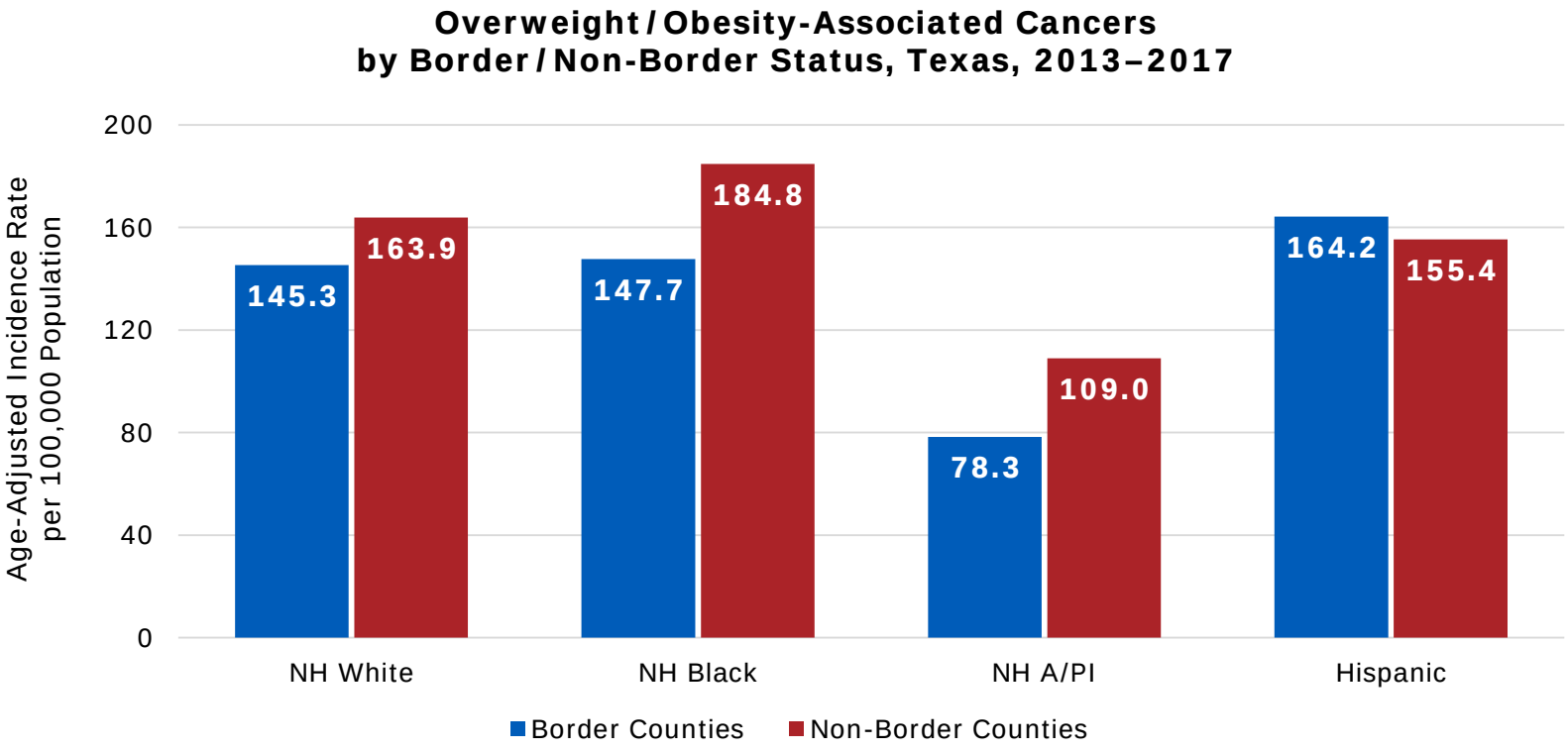
The incidence rates of overweight/obesity-related cancers increased in both micropolitan and non-core counties by an annual average percent change of 1.2%.



For comparison with US data, cases ascertained by death certificate or autopsy only are excluded for Texas. Lines represent the Joinpoint modeled trend, and points represent observed data.

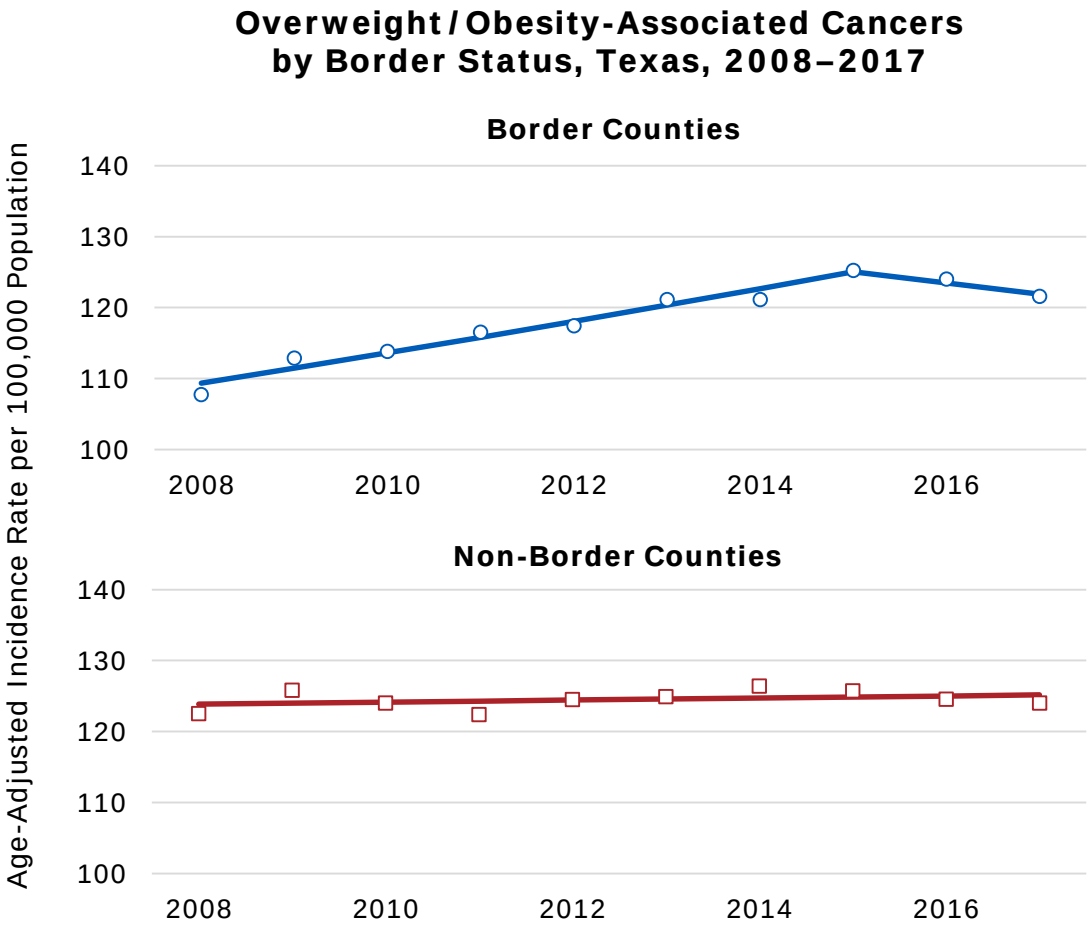
Overweight/Obesity-Associated Cancer Incidence Rates by Border/Non-Border Status

- Incidence rates for overweight/obesity-associated cancers are higher in border counties compared to the rest of Texas for Hispanics.
- Incidence rates are higher for non-Hispanic whites, NH blacks, and NH Asian/Pacific Islanders in non-border counties compared to border counties.



Border counties as defined by the La Paz agreement (see slide Texas Border Region).

Overweight/Obesity-Associated Cancer Incidence Rate Trends by Border Status



- For border counties, the incidence rate of overweight/obesity-related cancers increased by an overall average annual percent change of 1.2%.
  - The rate for Hispanics living in border counties increased significantly (1.3% AAPC).
- The incidence rate for non-border counties was stable.

Border counties as defined by the La Paz agreement (see slide Texas Border Region). Excludes colorectal cancer. Lines represent the Joinpoint modeled trend, and points represent observed data.

Overweight/Obesity-Associated Cancers, 2008–2017

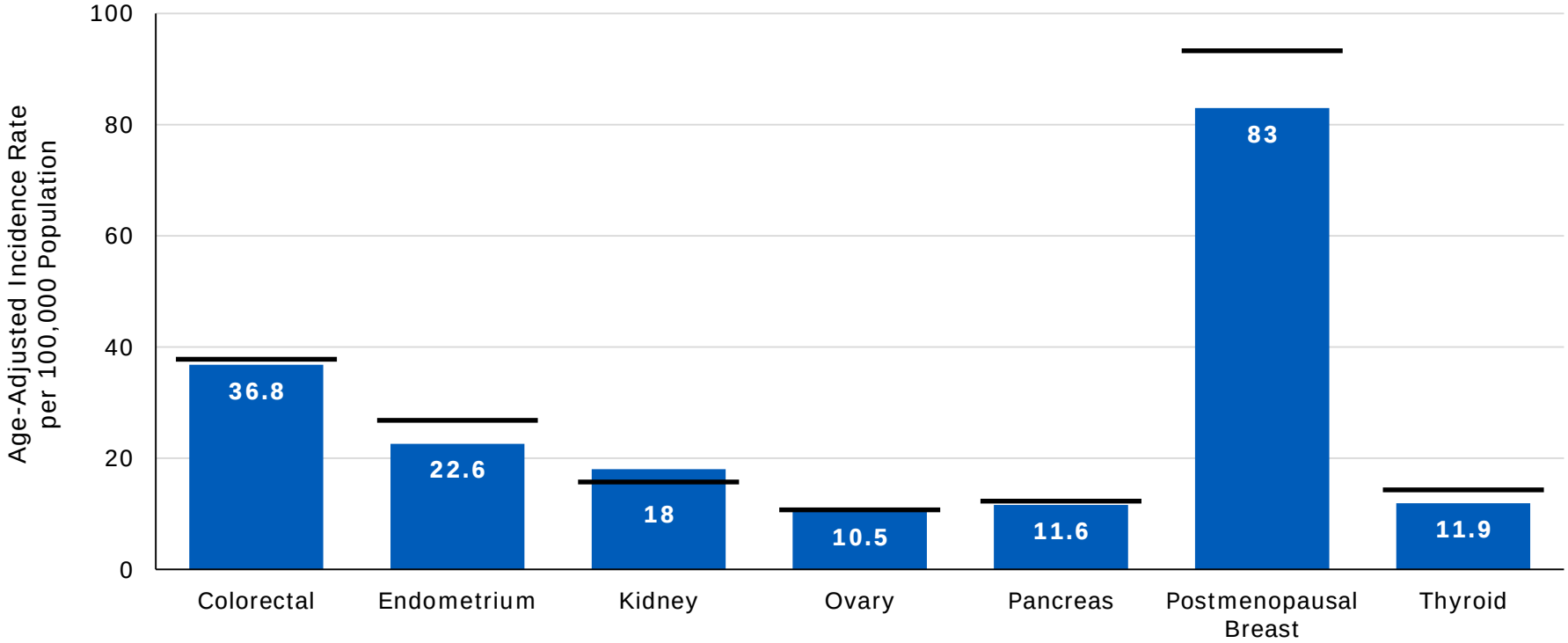
Rates & Trends for Specific Cancer Sites — Texas vs US

Overweight/Obesity-Associated Cancer Incidence Rates by Site (1 of 2)

- In Texas, the incidence rate of seven cancers associated with overweight/obesity is greater than 10 cases per 100,000 population.
- The incidence rate of kidney cancer is higher in Texas than in the US.

Overweight/Obesity-Associated Cancers by Site, Texas, 2013–2017

Black lines represent US incidence rates



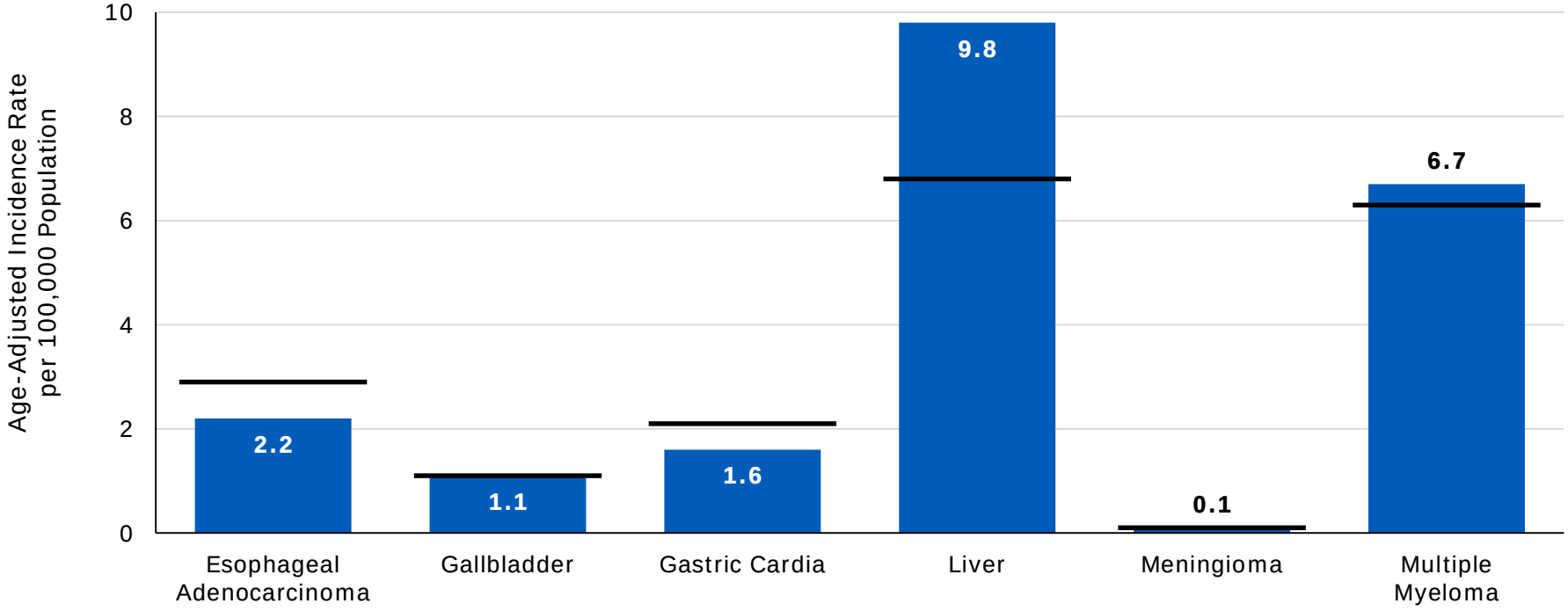
Postmenopausal breast cancer is presented per 100,000 females (all ages) for comparison.

Overweight/Obesity-Associated Cancer Incidence Rates by Site (2 of 2)

- In Texas, the incidence rate of six cancers associated with overweight/obesity is less than 10 cases per 100,000 population.
- The incidence rate of liver cancer and multiple myeloma is higher in Texas than in the US.

Overweight/Obesity-Associated Cancers by Site, Texas, 2013–2017

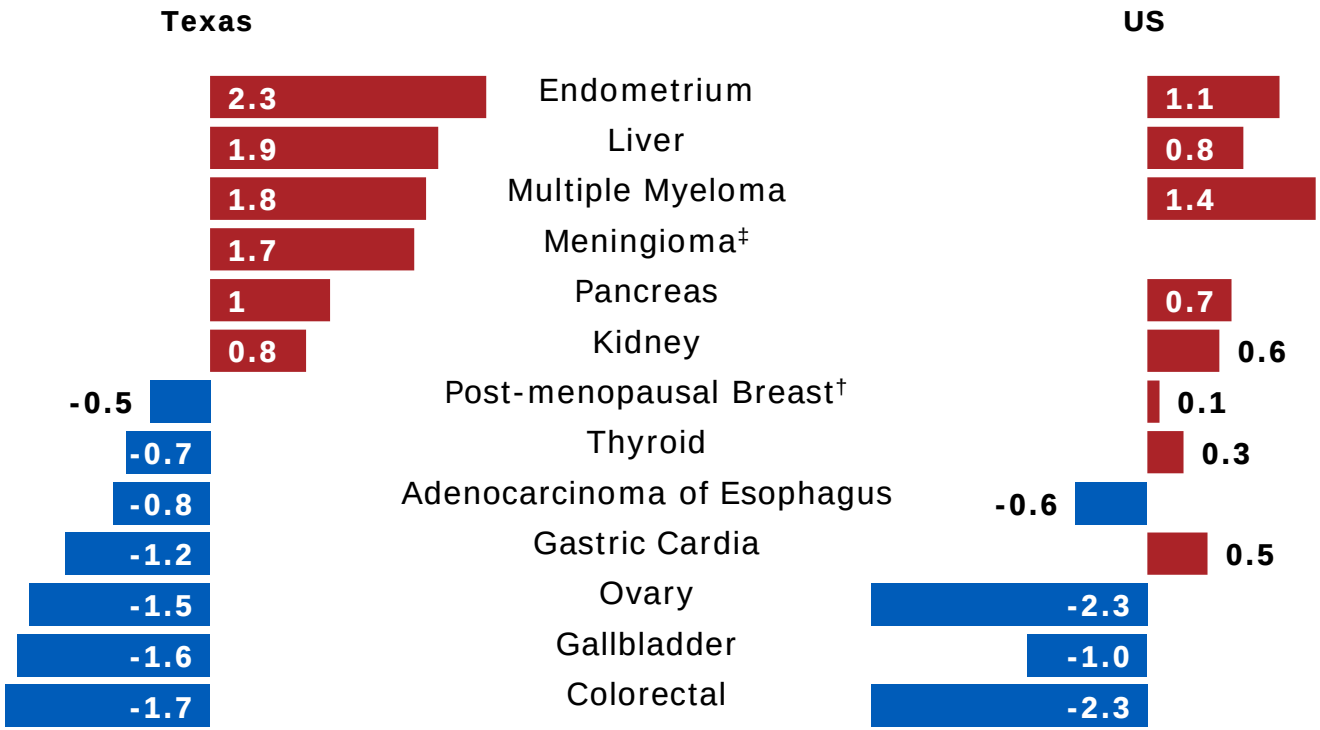
Black lines represent US incidence rates



Incidence Rate Trends for Overweight/Obesity-Associated Cancers by Site

In Texas, there were significant increases from 2008–2017 for 5 cancer sites: endometrium, liver, multiple myeloma, pancreas, kidney. A significant decrease occurred for two sites: colorectal and ovary.

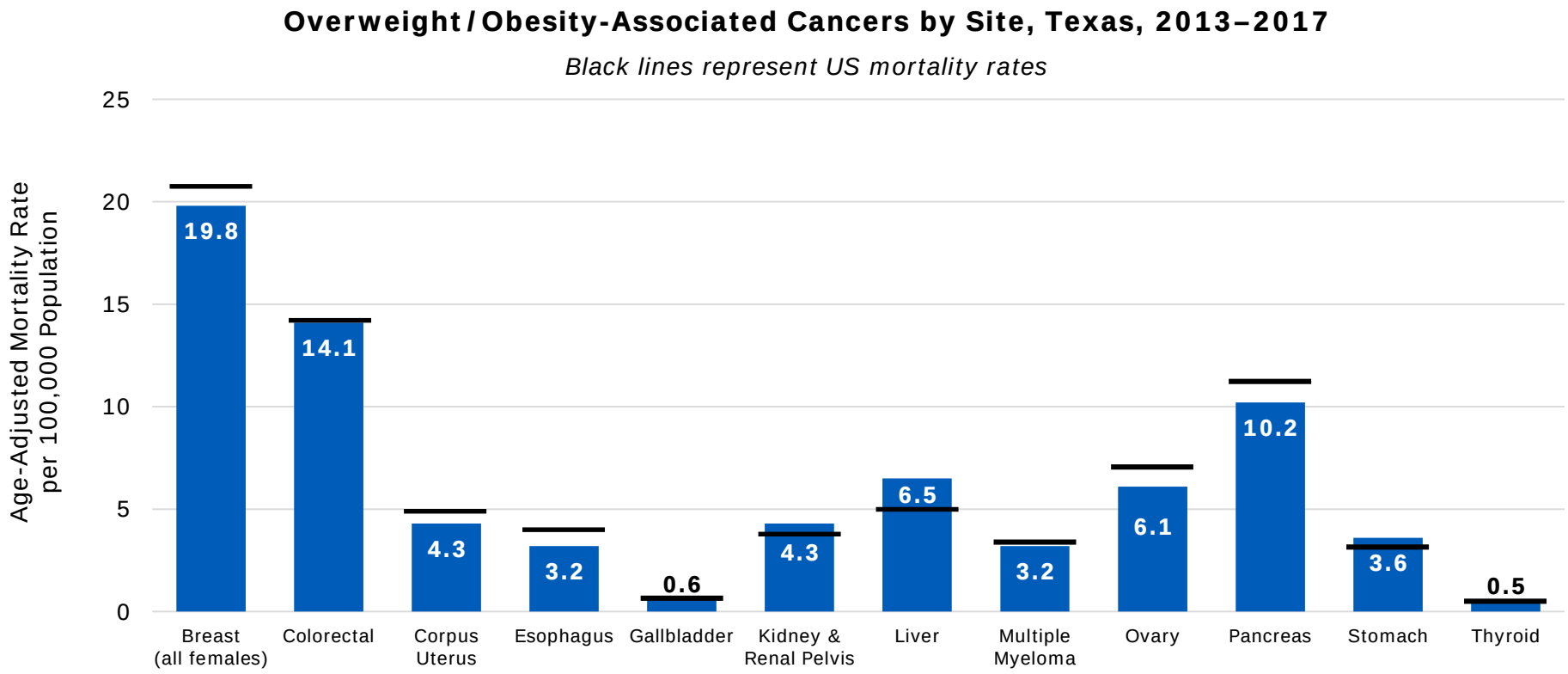
Annual Average Percent Change of Incidence Rates, Texas vs US, 2008-17



† Rate in is per 100,000 women ages 50 years and over.
‡ US rate for meningioma was too small for analysis.

Overweight/Obesity-Associated Cancer Mortality Rates by Site

The mortality rate for three cancers associated with overweight/obesity is higher in Texas compared to the US: kidney & renal pelvis, liver and stomach.



Mortality rates are based on ICD-10 codes from death certificates that do not directly align with ICDO-0-3 codes used to define the 13 sites associated with cancer incidence. Breast cancer includes all deaths across all ages, but overweight/obesity is only associated with breast cancer diagnosed in post-menopausal women.

Overweight/Obesity-Associated Cancers, 2008–2017

Rates & Trends for Select Cancer Sites in Texas

This section provides more information about select cancer sites with high incidence rates or significant trends when stratified for sex, race/ethnicity and age at diagnosis. For example, some sites have seen a significant increase in rates for ages 20-49 years.

Colorectal Cancer

- Colorectal cancer is the 3rd most commonly diagnosed cancer in both men and women, with 11,632 new cases and 4,276 deaths expected in Texas in 2020.
- As of January 1, 2017* there were 79,544 Texans living with colorectal cancer.
- Colorectal cancer risk is 30% higher for obese individuals compared to normal weight individuals, and higher for males than females.[1]
- An estimated 5% of cases are attributed to excess body weight.[2]
- For more information, see TCR's report Colorectal Cancer in Texas.

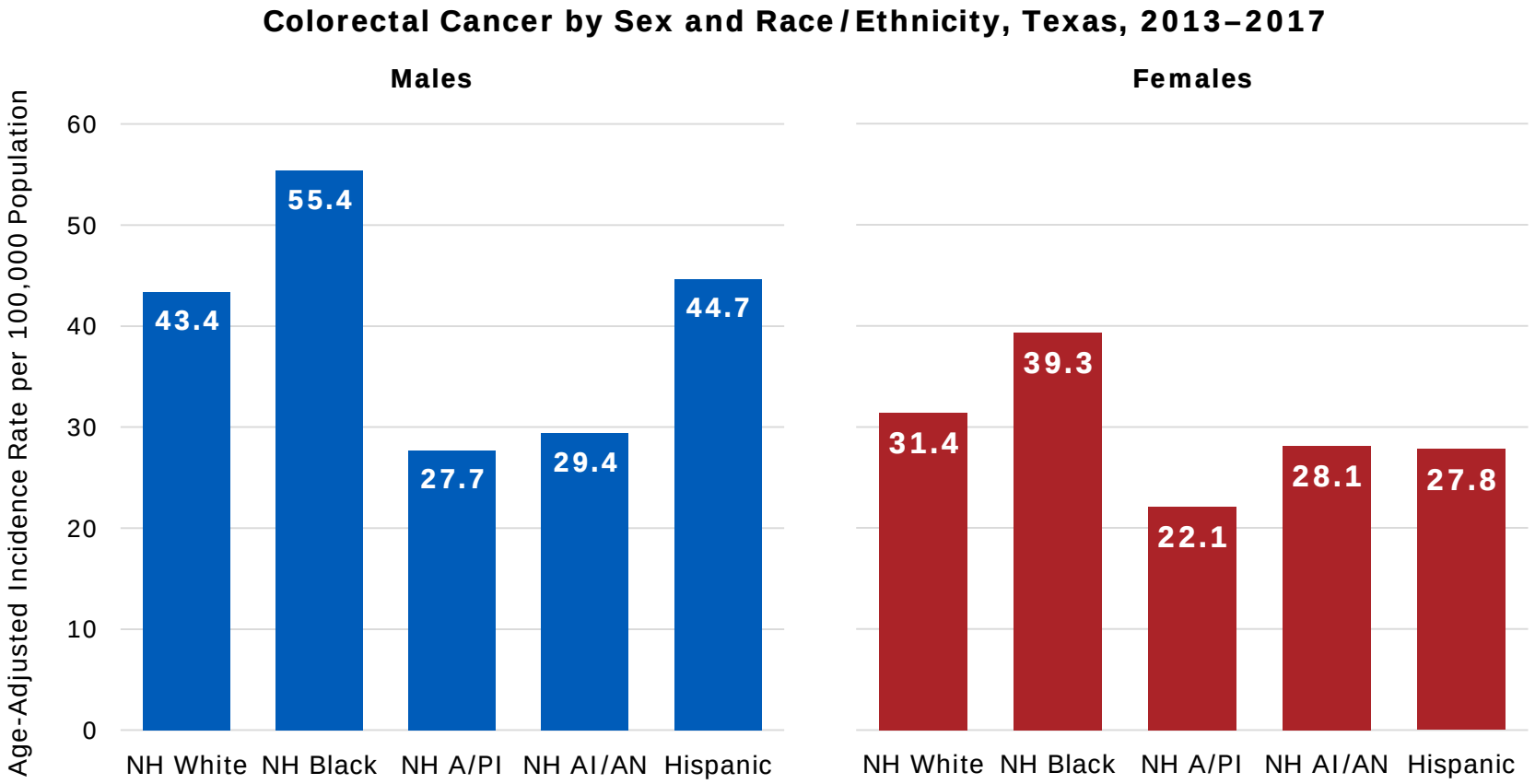
[1] Ma, et al., 2013. *PLoS One,* 8(1):e53916.

[2] Islami et al., 2018. CA Cancer J. Clin. 68(1):31-54.

* The most recent date for which prevalence data are available, includes all cases diagnosed since 1995.

Colorectal Cancer Incidence Rates by Sex and Race/Ethnicity

For 2013–2017, colorectal cancer incidence rates were highest in non-Hispanic black males, followed by Hispanic males and NH white males.

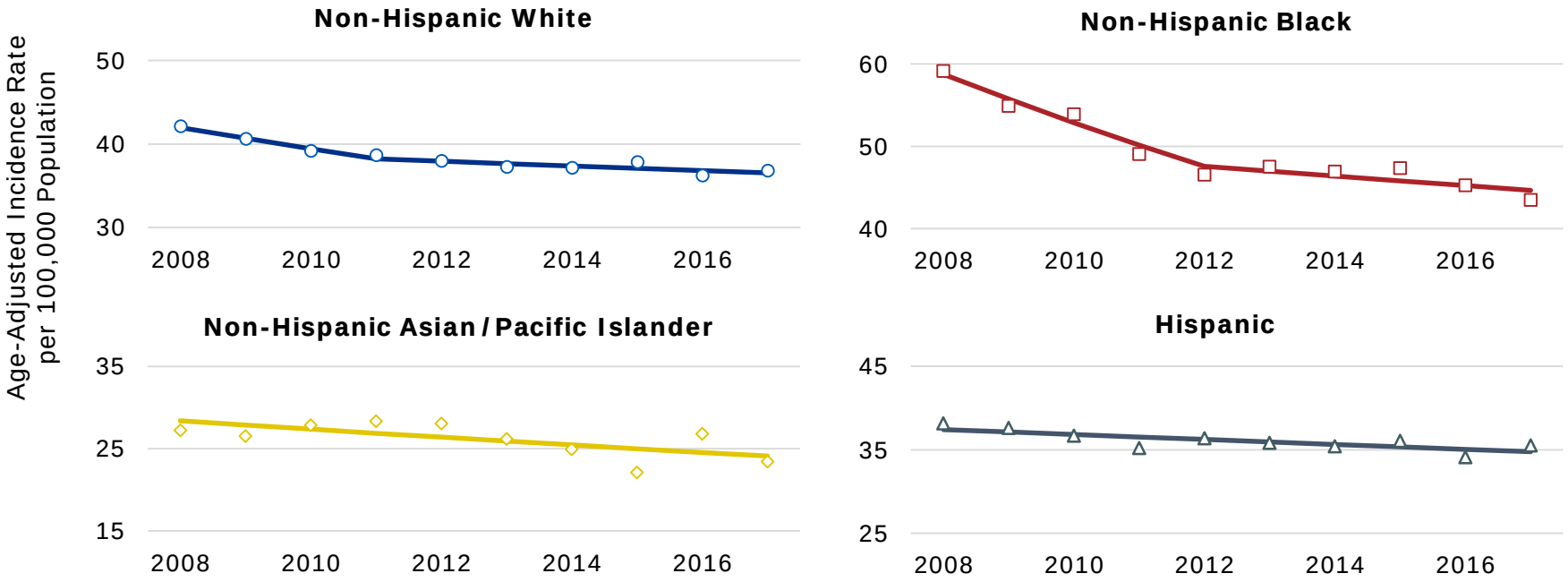


NH = Non-Hispanic; A/PI = Asian/Pacific Islander; AI/AN = American Indian/Alaska Native.

Colorectal Cancer Incidence Rate Trends by Race/Ethnicity

- Overall, incidence rates for colorectal cancer significantly decreased from 2008–2017 (-1.7% average annual percent change), with a similar trend in both sexes. Rates decreased faster from 2008-2011 (-3.2% annual percent change) compared to 2011–2017 (-1.0% APC).
- Incidence rates decreased significantly for non-Hispanic white (-1.5 AAPC), NH black (-3.0 AAPC), NH Asian/Pacific Islander (-1.8 AAPC) and Hispanic (-0.8 AAPC). Rates were stable for NH American Indian/Alaska Native (not shown).

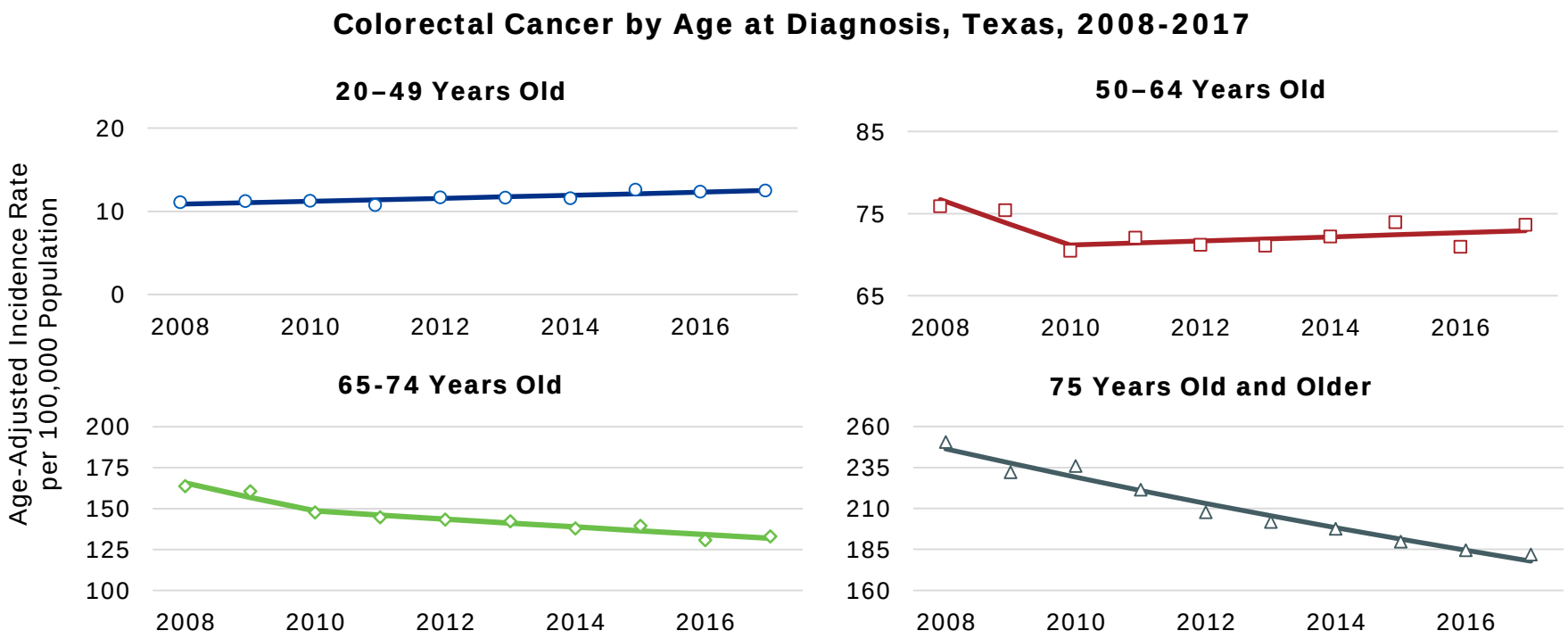
Colorectal Cancer by Race/Ethnicity, Texas, 2008-2017



Lines represent the Joinpoint modeled trend, and points represent observed data.

Colorectal Cancer Incidence Rate Trends by Age at Diagnosis

- One age group saw an increase in incidence rates: ages 20–49 years (1.6% per year).
- Rates remained stable for ages 50–64 years.
- Rates declined for ages 65–74 years (-2.5% per year) and for ages 75 years and older (-3.6% per year).

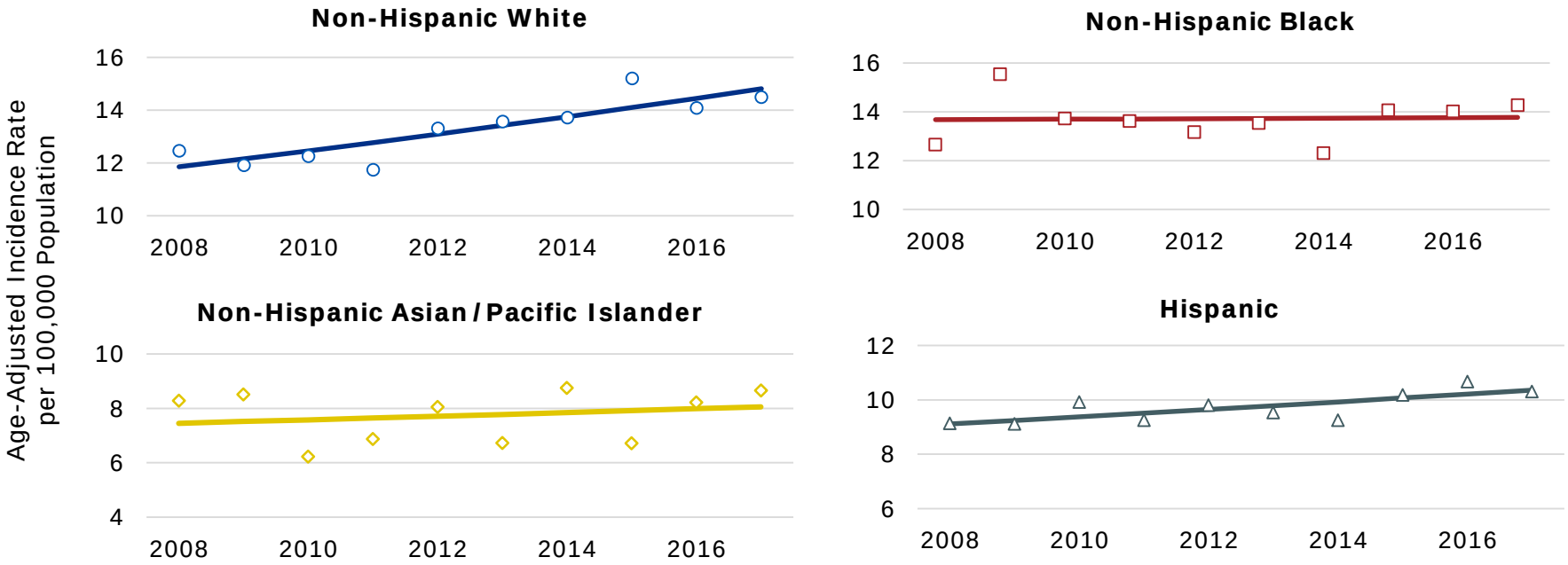


Lines represent the Joinpoint modeled trend, and points represent observed data.

Colorectal Cancer Incidence Rate Trends in Ages 20-49 Years by Race/Ethnicity

- The fastest rate of increase in colorectal cancer incidence rates for ages 20-49 years old was in non-Hispanic whites, who saw a total increase of 16% over 10 years.
- Hispanics also saw a significant increase of 13% over 10 years.

Colorectal Cancer in Adults 20-49 Years Old by Race/Ethnicity, Texas, 2008-2017

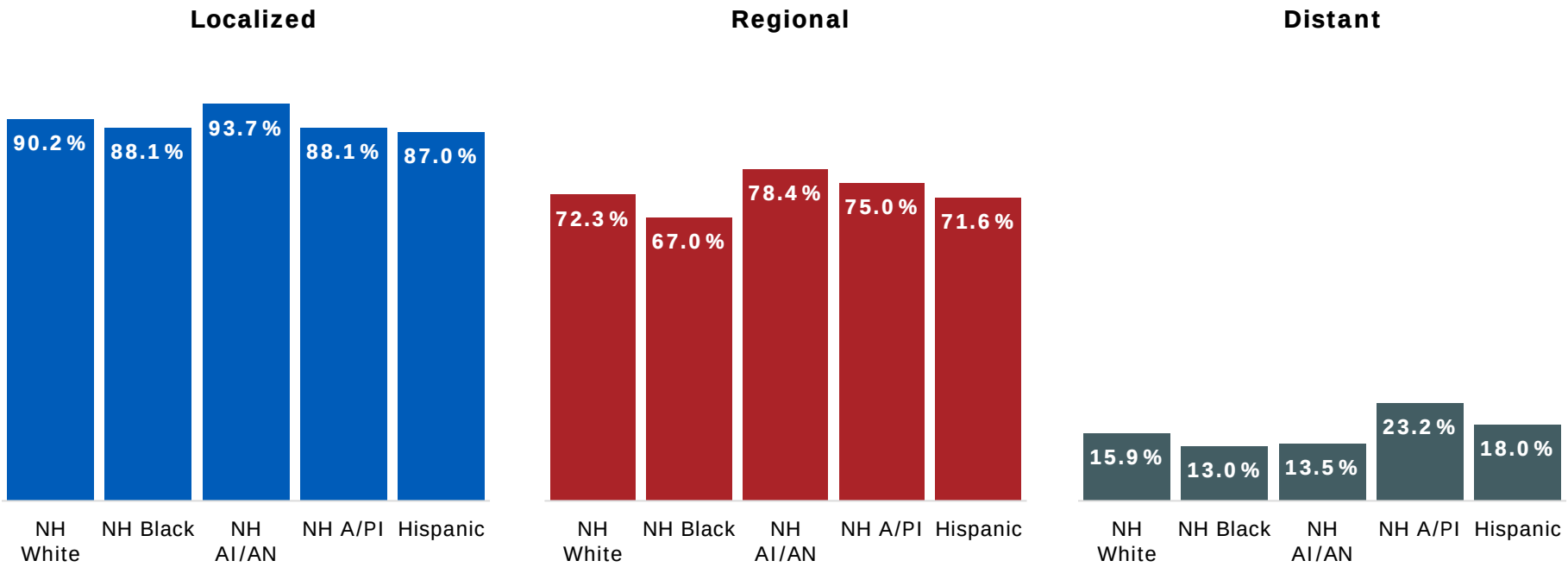


Rates for non-Hispanic American Indian/Alaska Native are suppressed because fewer than 16 cases were reported for this age group.
Lines represent the Joinpoint modeled trend, and points represent observed data.

Five-Year Relative Survival for Colorectal Cancer by Stage and Race/Ethnicity

- Overall survival was 89% for patients diagnosed at the localized stage, 72% for those diagnosed at the regional stage, and 16% for those diagnosed at the distant stage.
- Survival was lower for non-Hispanic blacks compared to other race/ethnicity groups across all stages of diagnosis.

Five-Year Relative Survival for Colorectal Cancer by Stage and Race/Ethnicity, Texas, 2008-2017



Cases diagnosed between 2008–2017 are included, with follow-up through 2018. 10% of colorectal cancer cases were reported to TCR with an unknown stage.
NH = Non-Hispanic; A/PI = Asian/Pacific Islander; AI/AN = American Indian/Alaska Native.
Expected survival table: US by SES/geography/race (NHW, NHB, NHAIAN, NHAPI, HISP) 1992-2013, Ages 0-99, State-county.

Liver Cancer

- Liver (and intrahepatic bile duct) cancer is the 9th most commonly diagnosed cancer in males and 4th leading cause of cancer mortality in males, with 3,958 new cases and 2,678 deaths expected in Texas in 2020.
- As of January 1, 2017 there are 7,548 Texans living with liver (and intrahepatic bile duct) cancer.*
- An estimated 34% cases of liver cancer are attributed to excess body weight.[1]
- Overweight individuals have a 21% higher liver cancer risk and obese individuals have an 8–142% higher risk than normal weight individuals depending upon the class of obesity.[2]
- For more information, see TCR's report Liver Cancer in Texas.

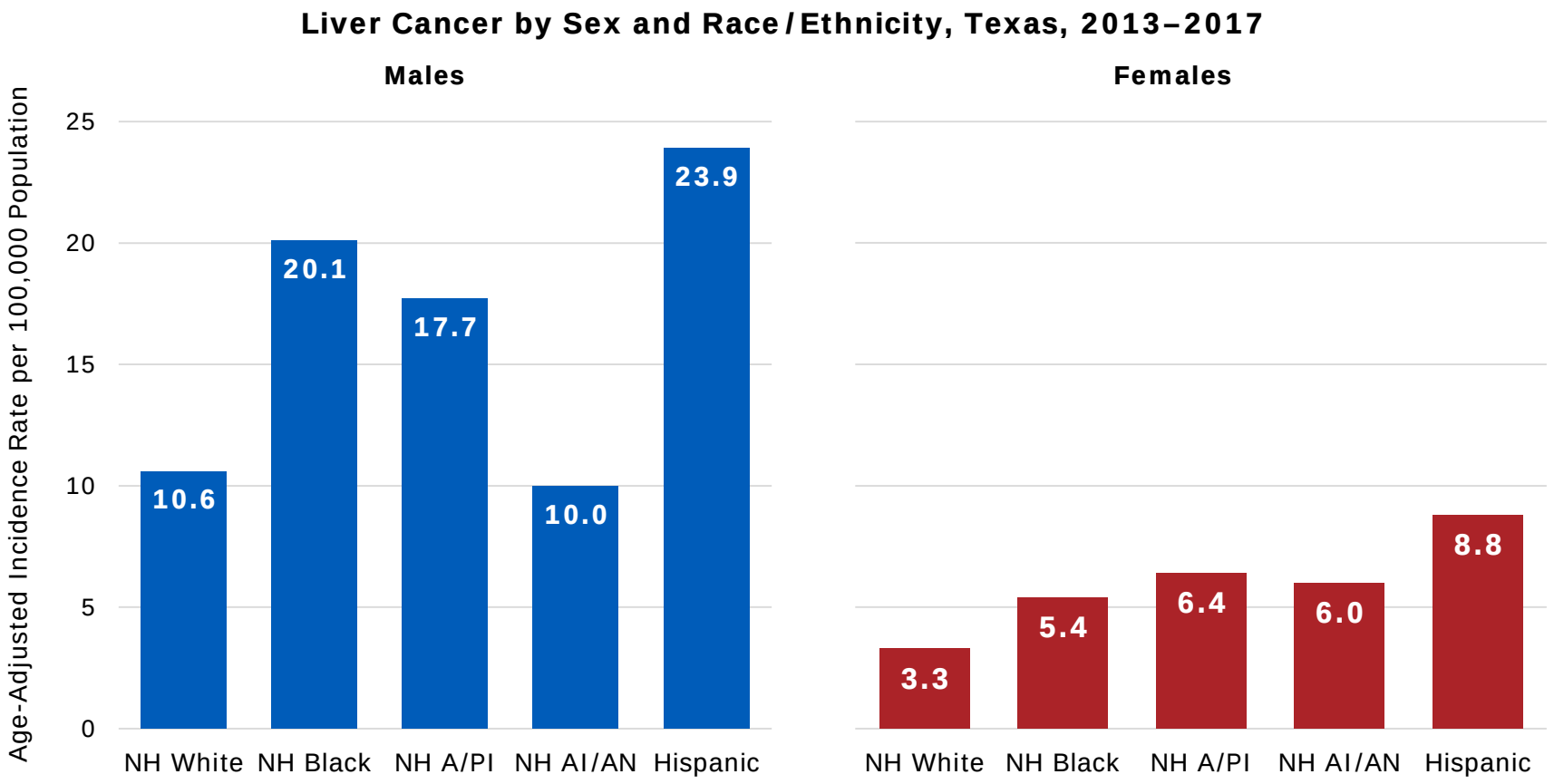
[1] Islami et al., 2018. *CA Cancer J. Clin*. 68(1):31-54

[2] Campbell et al., 2016, *Cancer Res.*, 76:6076-6083.

* The most recent date for which prevalence data are available, includes all cases diagnosed since 1995.

Liver Cancer Incidence Rates by Sex and Race/Ethnicity

For 2013–2017, liver cancer incidence rates were highest in Hispanics in both males and females.

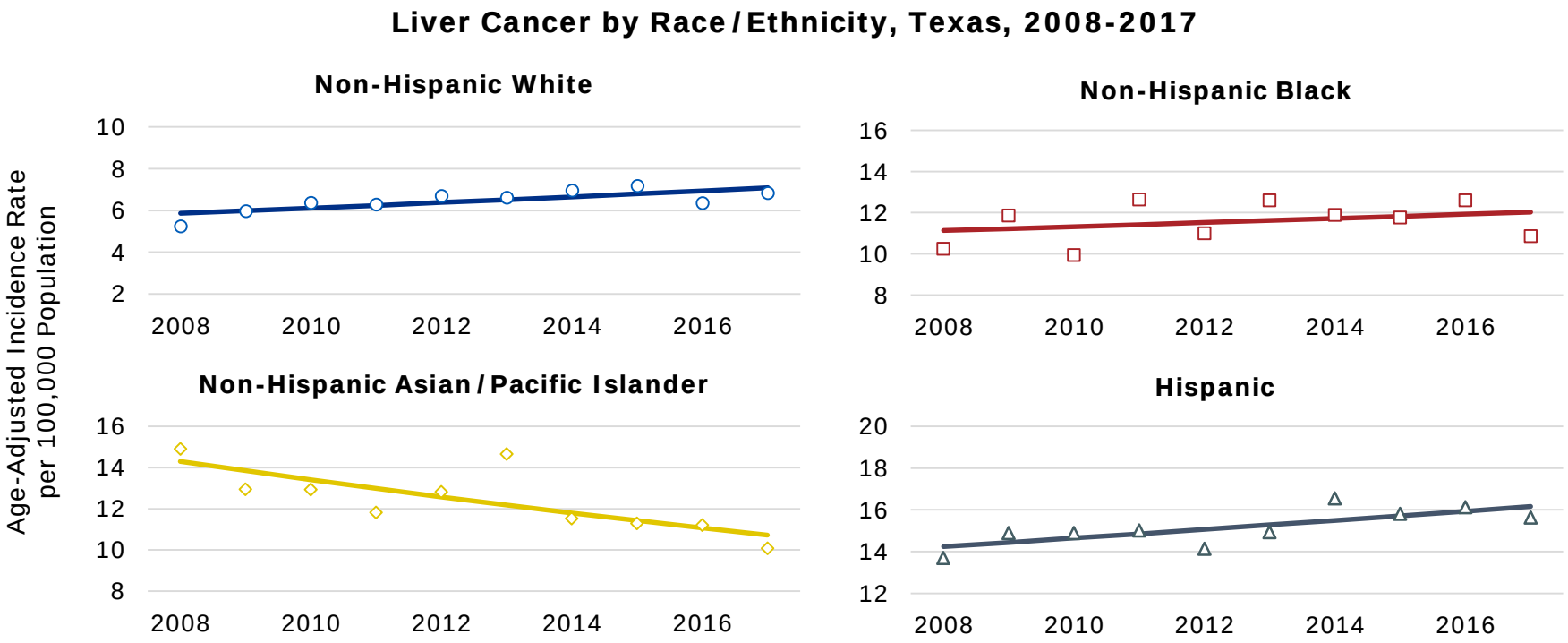


NH = Non-Hispanic; A/PI = Asian/Pacific Islander; AI/AN = American Indian/Alaska Native.

Liver Cancer Incidence Rate Trends by Race/Ethnicity

Overall, the incidence rate of liver cancer increased by 1.9% per year from 2008–2017.

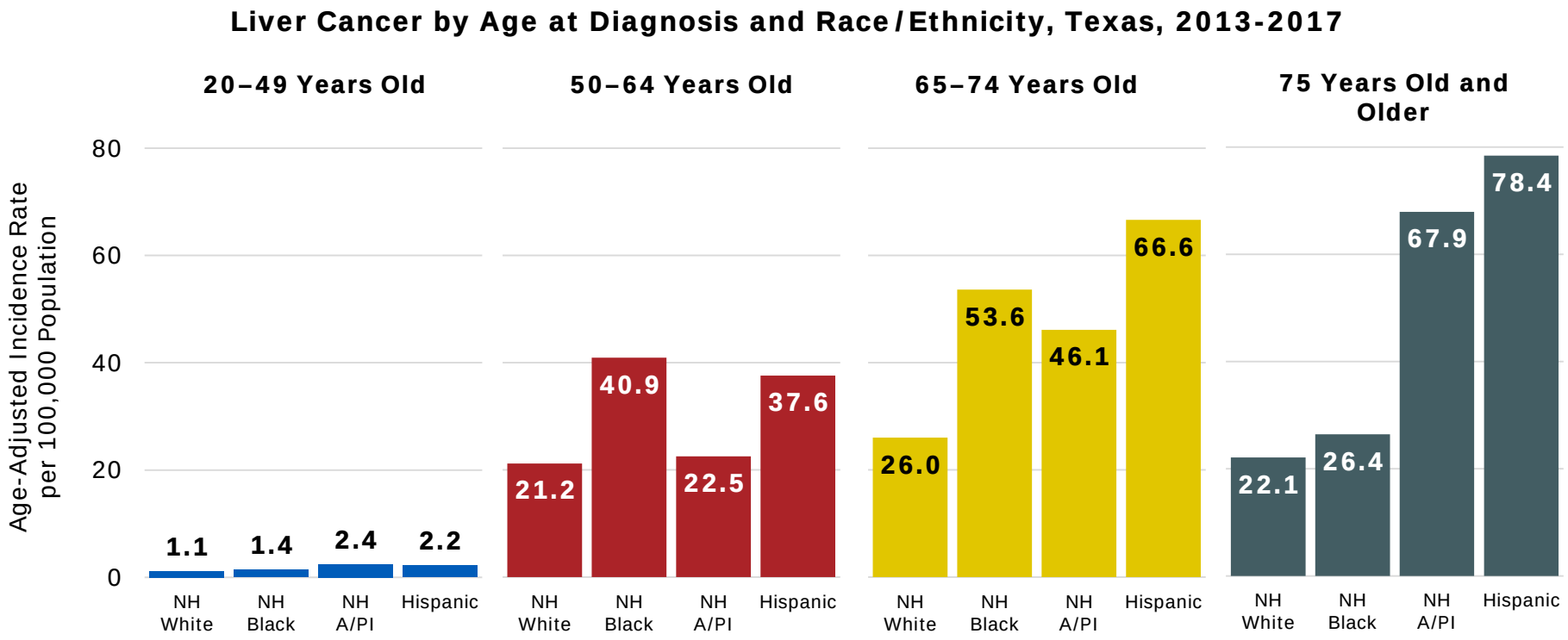
- The incidence rate increased for two race/ethnicity groups: non-Hispanic white (2.1% average annual percent change) and Hispanic (1.4% AAPC).
- The incidence rate decreased for NH Asian/Pacific Islander (-3.2% AAPC).



Lines represent the Joinpoint modeled trend, and points represent observed data.
Rates for NH American Indian/Alaska Native are suppressed because fewer than 16 cases were reported.

Liver Cancer Incidence Rate by Age at Diagnosis and Race/Ethnicity

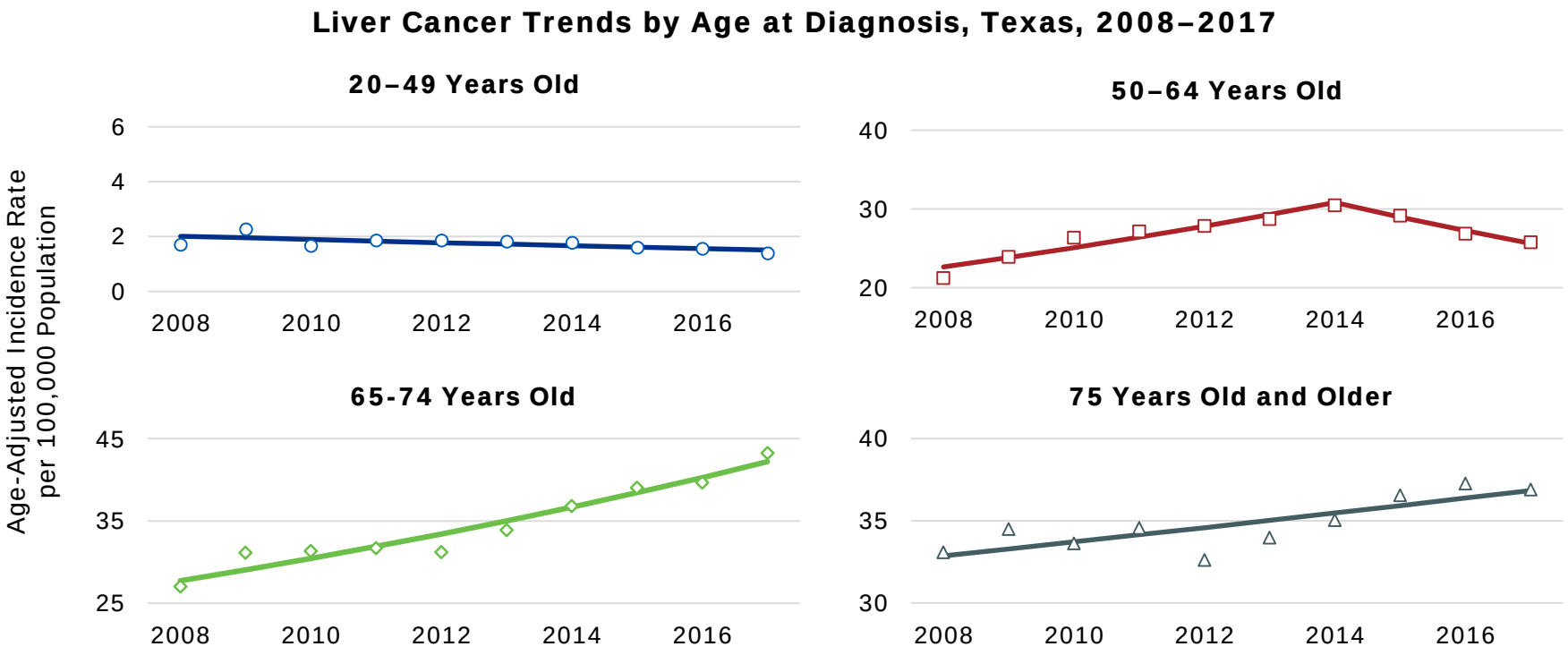
During 2013–2017, incidence rates for liver cancer peaked at ages 65–74 years in non-Hispanic blacks and NH whites, but continued to increase with age in Hispanics and NH Asian/Pacific Islanders.



Rates for NH American Indian/Alaska Native are suppressed because fewer than 16 cases were reported.
NH = Non-Hispanic; A/PI = Asian/Pacific Islander.

Liver Cancer Incidence Rate Trends by Age at Diagnosis

- The liver cancer incidence rate decreased for ages 20–49 years and increased for ages 65-74 years and 75 years and older.
- For ages 50–64 years, the overall rate was stable, but with an underlying increase from 2008-2014 followed by a decrease.

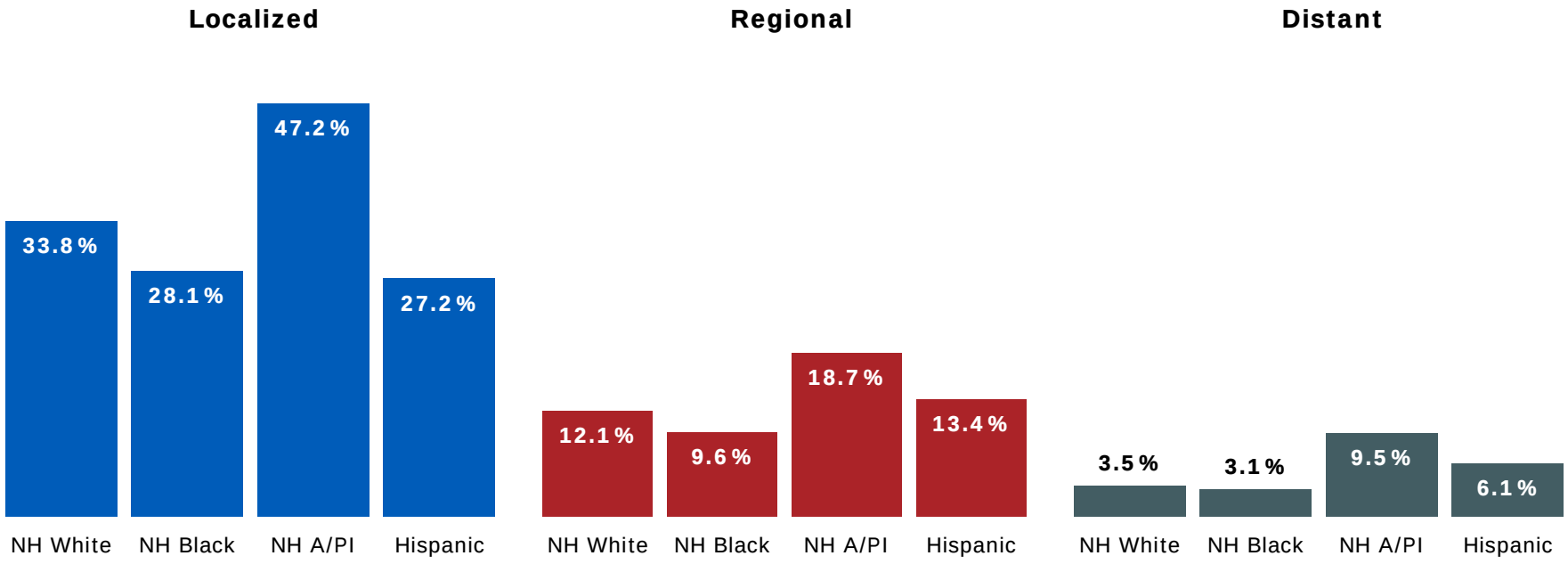


Lines represent the Joinpoint modeled trend, and points represent observed data.

Five-Year Relative Survival for Liver Cancer by Stage and Race/Ethnicity

Overall, survival was 31% for those diagnosed at the localized stage, 12.5% for those diagnosed at the regional stage, and 4.8% for those diagnosed at the distant stage.

Five-Year Relative Survival for Liver Cancer by Stage and Race/Ethnicity, Texas, 2008-2017



Cases diagnosed between 2008–2017 are included, with follow-up through 2018. 18% of liver cancer cases were reported to TCR with an unknown stage.
NH = Non-Hispanic; A/PI = Asian/Pacific Islander; AI/AN = American Indian/Alaska Native.
Expected survival table: US by SES/geography/race (NHW, NHB, NHAIAN, NHAPI, HISP) 1992-2013, Ages 0-99, State-county.

Esophageal Adenocarcinoma

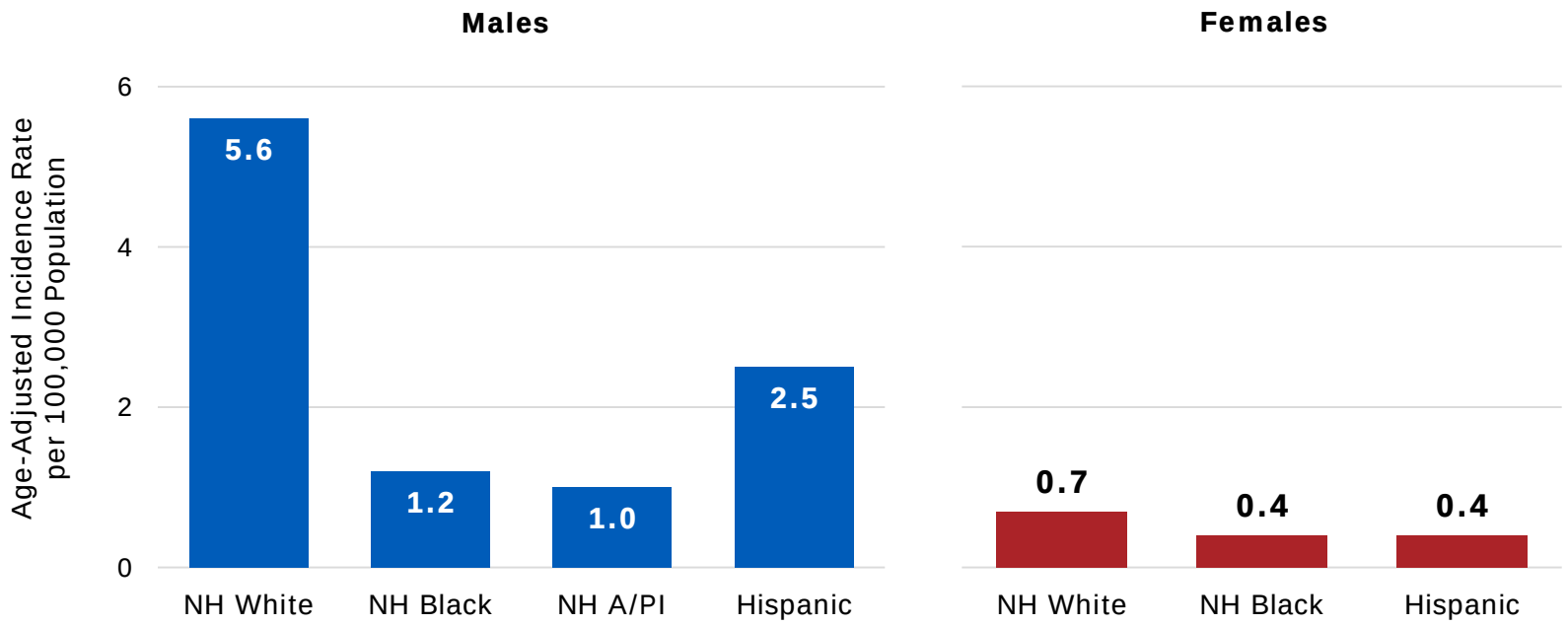
- Esophageal adenocarcinoma is strongly linked to excess body weight. The risk for esophageal adenocarcinoma is up to four times higher for obese versus normal weight individuals.[1]
- An estimated 32% of cases are attributable to elevated BMI (35% in males and 22% in females).[2]

[1] Hoyo et al., 2012. In. J. Epi., 41(6):1706-18.
[2] Islami et al., 2018. CA Cancer J. Clin. 68(1):31-54

Esophageal Adenocarcinoma Incidence Rates by Sex and Race/Ethnicity

- The incidence rate of esophageal adenocarcinoma is substantially higher in non-Hispanic white males compared to other groups.
- Incidence rates remained stable overall from 2008–2017. They also remained stable when stratified by sex, age, or race/ethnicity.

Esophageal Adenocarcinoma by Sex and Race/Ethnicity, Texas, 2013–2017



Cases ascertained by death certificate or autopsy only are excluded. Rates are suppressed if fewer than 16 cases were reported in a specific category, such as sex and race/ethnicity. NH = Non-Hispanic; A/PI = Asian/Pacific Islander.

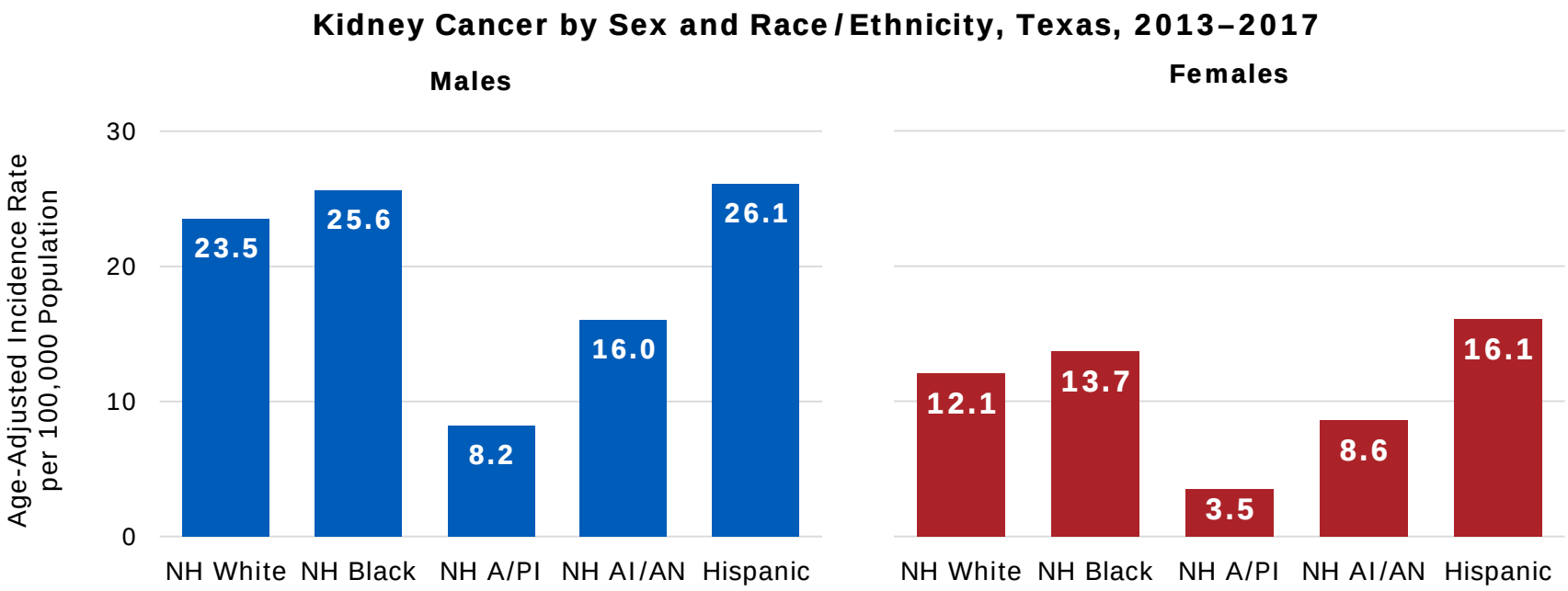
Kidney Cancer

- Kidney (and renal pelvis) cancer is the 5th most common cancer in males, and 7th in females, with 5,948 new cases and 1,311 deaths expected in Texas in 2020.
- As of January 1, 2017* there were 40,693 Texans living with kidney (and renal pelvis) cancer.
- Elevated BMI is a strong risk factor for kidney cancer.
- An estimated 33% of kidney cancer cases are attributable to excess body weight.[1]
- Overweight individuals have a 30% higher risk, and obese individuals an 80% higher risk of kidney cancer compared to normal weight individuals.[2]

[1] Islami et al., 2018. CA Cancer J. Clin. 68(1):31-54
[2] Wang et al., 2014. Int. J. Cancer, 135:1673-86

Kidney Cancer Incidence Rates by Race/Ethnicity and Sex

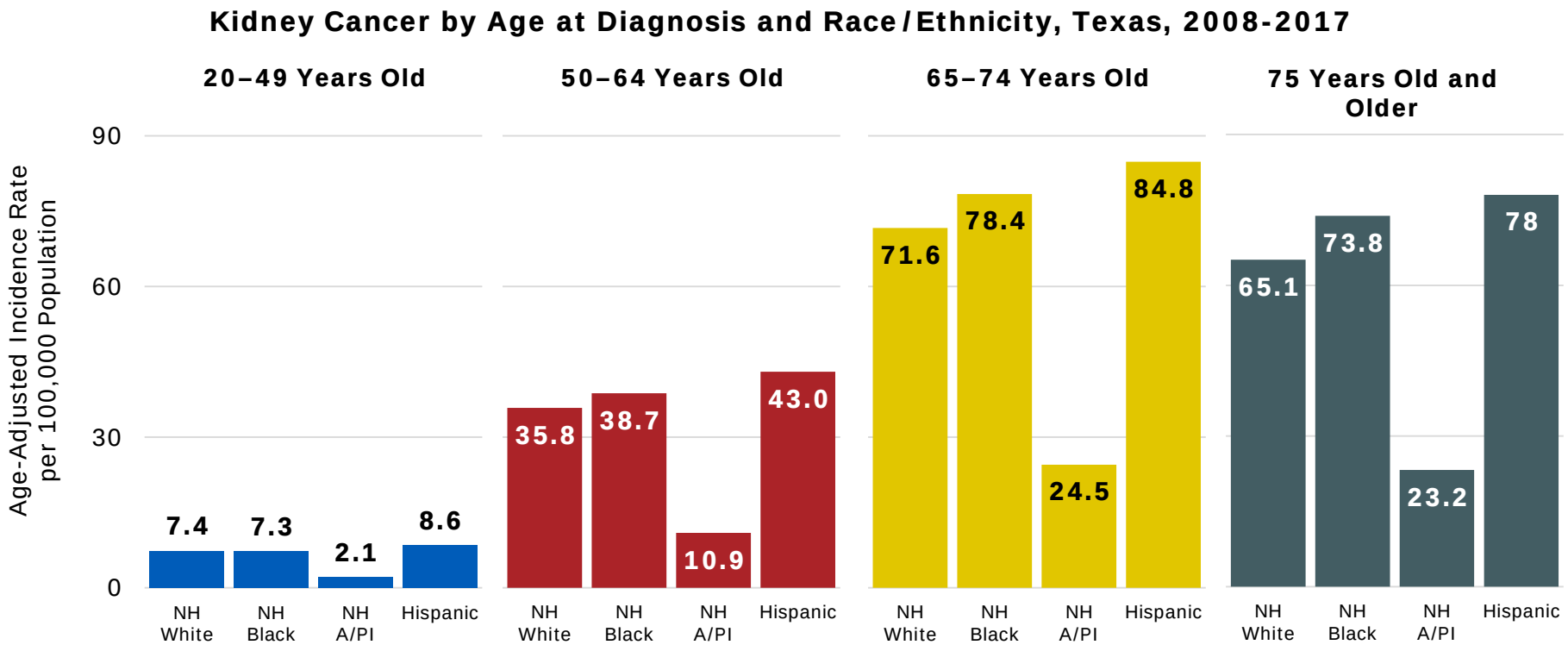
- During 2013–2017, the highest kidney cancer incidence rates were in Hispanic males and NH black males.
- Overall, incidence rates of kidney cancer increased by 0.8% per year from 2008–2017, with a similar increase in males and females. The largest increase was in Hispanic females (1.3% per year). Rates also increased in NH white and Hispanic males.



NH = Non-Hispanic; A/PI = Asian/Pacific Islander; AI/AN = American Indian/Alaska Native.

Kidney Cancer Incidence Rates by Age at Diagnosis and Race/Ethnicity

For every race/ethnicity group, the incidence rate of kidney cancer is greatest for ages 65–75 years.

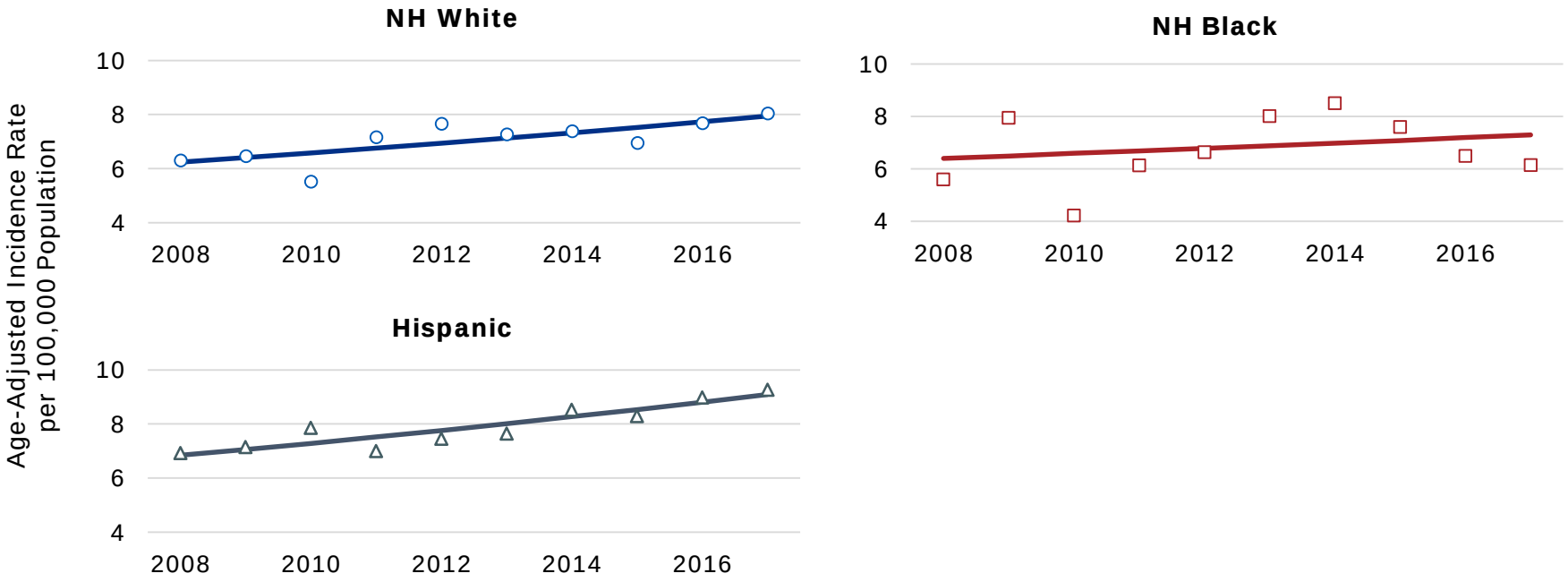


Rates for NH American Indian/Alaska Native are suppressed because fewer than 16 cases were reported.
NH = Non-Hispanic; A/PI = Asian/Pacific Islander.

Kidney Cancer Incidence Rate Trends in Ages 20–49 Years by Ethnicity/Race

- Kidney cancer is one of the fastest growing cancers in young adults.
- The largest increases for kidney cancer incidence rates were seen in adults ages 20–49 years. It increased by 34% over 10 years in Hispanics and by 27% over ten years in NH whites.

Kidney Cancer in Ages 20-49 Years by Race/Ethnicity, Texas, 2008-2017

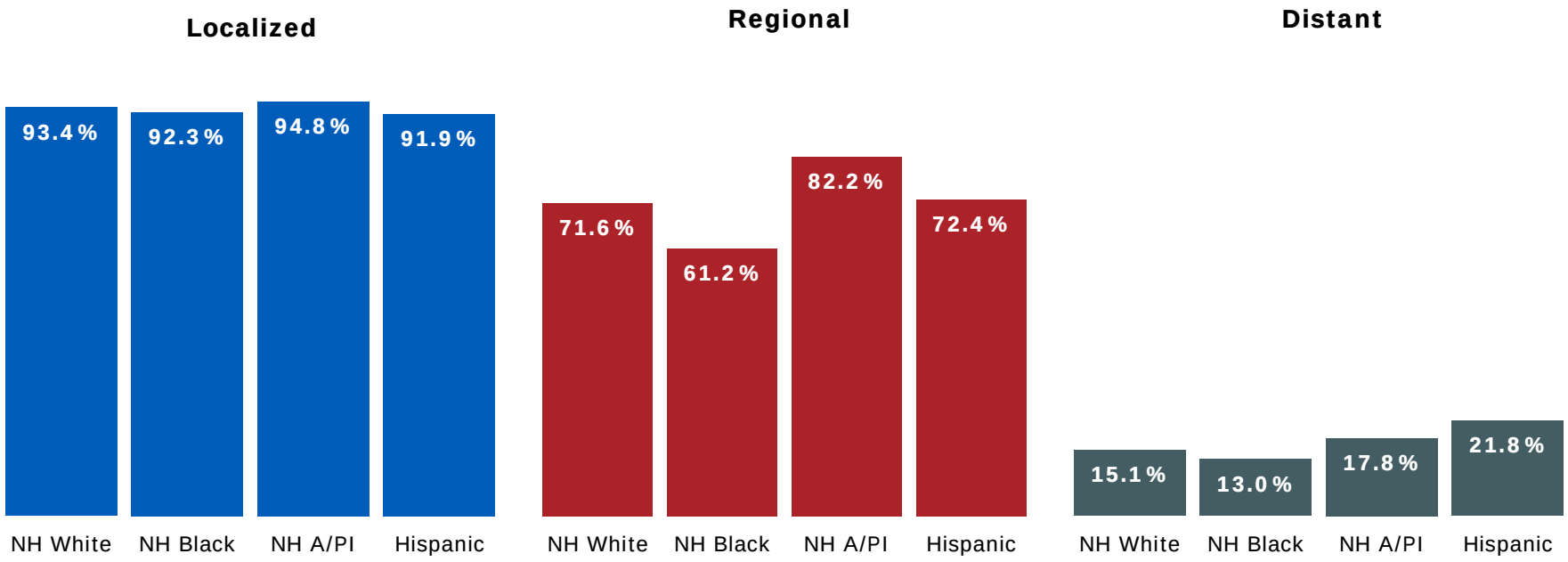


Lines represent the Joinpoint modeled trend, and points represent observed data. Rates for NH Asian/Pacific Islander and American Indian/Alaska Native are suppressed because fewer than 16 cases were reported.

Five-Year Relative Survival for Kidney Cancer by Stage and Race/Ethnicity

- Survival for cases diagnosed at the localized stage is more than 90%.
- For cases diagnosed at the regional or distant stage, survival is lower for non-Hispanic blacks compared to other race/ethnicity groups.

Five-Year Relative Survival for Kidney Cancer by Stage and Race/Ethnicity, Texas, 2008-2017



Cases diagnosed between 2008–2017 are included, with follow-up through 2018. 7% of kidney cancer cases were reported to TCR with an unknown stage.
NH = Non-Hispanic; A/PI = Asian/Pacific Islander. Data for NH American Indian/Alaska Native are suppressed because fewer than 16 cases were reported.
Expected survival table: US by SES/geography/race (NHW, NHB, NHAIAN, NHAPI, HISP) 1992-2013, Ages 0-99, State-county.

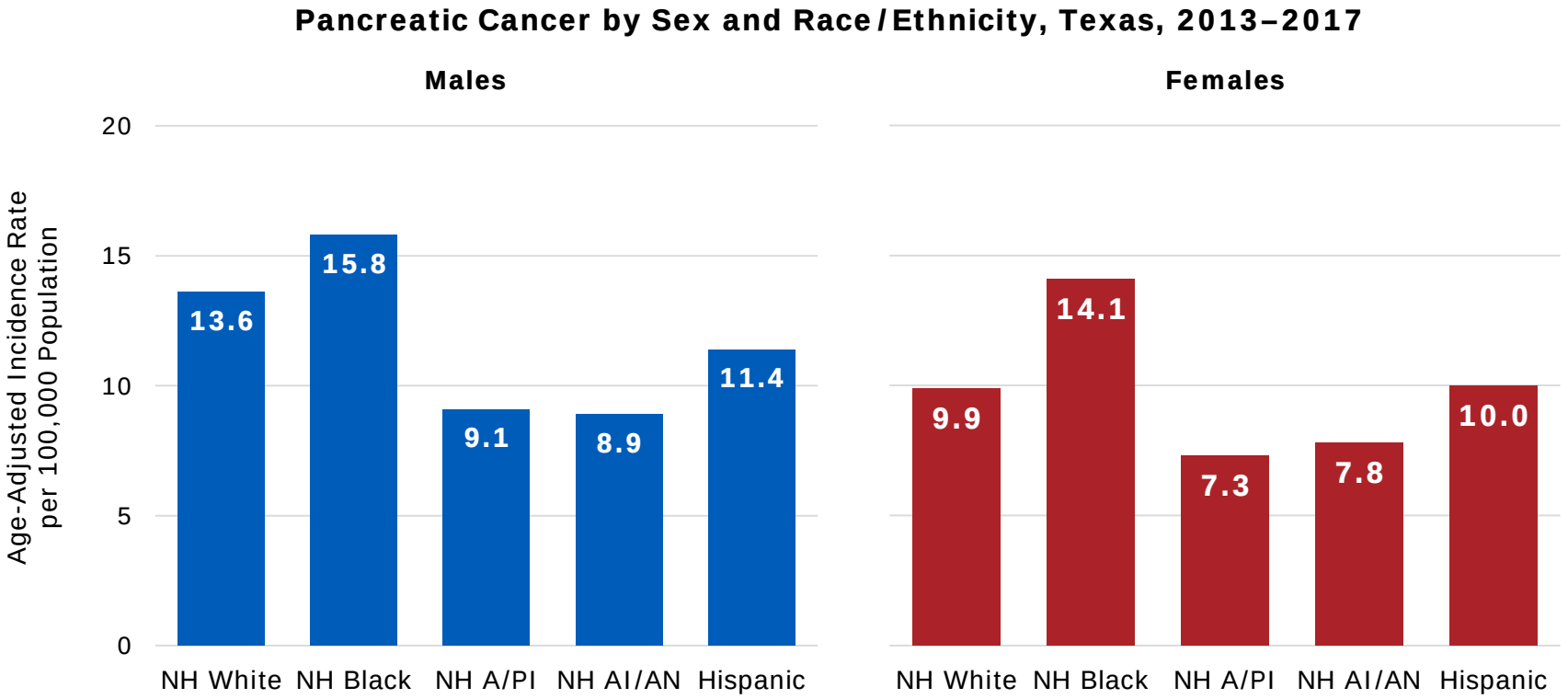
Pancreatic Cancer

- Pancreatic cancer is the 10th most commonly diagnosed cancer in females and 11th most commonly diagnosed cancer in males, with 3,830 new cases and 3,120 deaths expected in Texas in 2020.
- As of January 1, 2017* there were 5,534 Texans living with pancreatic cancer.
- The relative survival rate is low. Only 10% survive 5 years or more.
- Pancreatic cancer risk is 47% higher for obese than normal weight individuals.[1]
- An estimated 17% of cases are linked to excess body weight.[2]

[1] Genkinger et al., 2011. Int. J. Cancer, 129(7):1708-1717.
[2] Islami et al., 2018. CA Cancer J. Clin. 68(1):31-54.

Pancreatic Cancer Incidence Rates by Race/Ethnicity and Sex

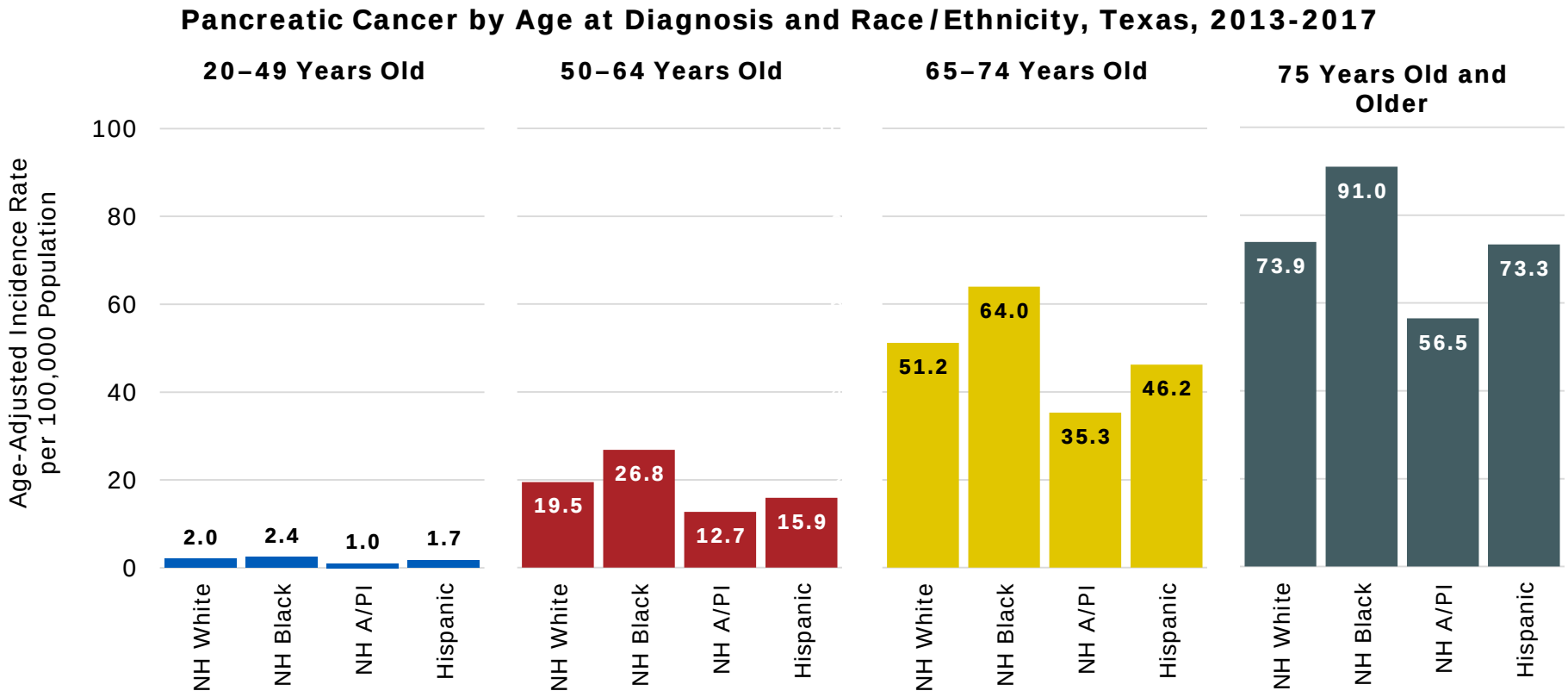
In both males and females, the highest incidence rate of pancreatic cancer is in non-Hispanic blacks.



NH = Non-Hispanic; A/PI = Asian/Pacific Islander; AI/AN = American Indian/Alaska Native.

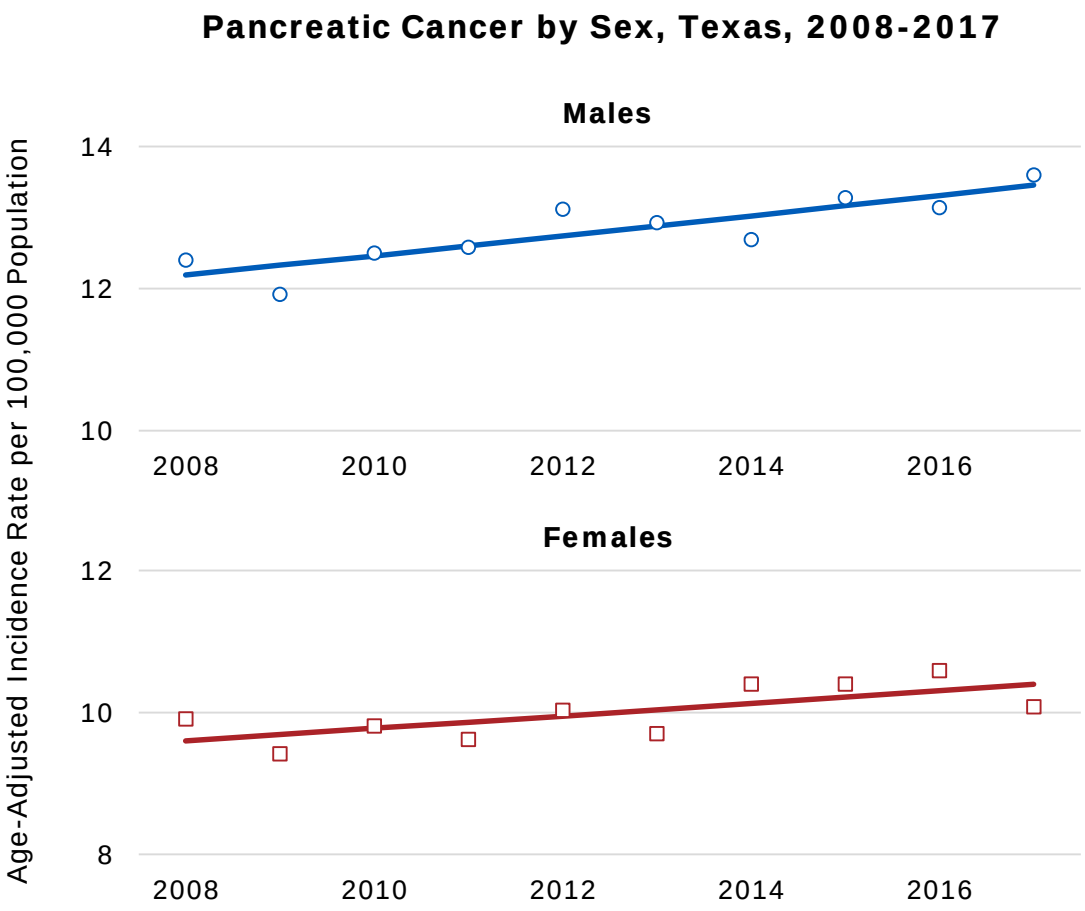
Pancreatic Cancer Incidence Rates by Age at Diagnosis and Race/Ethnicity

For every race/ethnicity group, the incidence rate of pancreatic cancer is greatest for ages 75 years and older.



Rates for NH American Indian/Alaska Native are suppressed because fewer than 16 cases were reported. NH = Non-Hispanic; A/PI = Asian/Pacific Islander.

Pancreatic Cancer Incidence Rate Trends by Sex



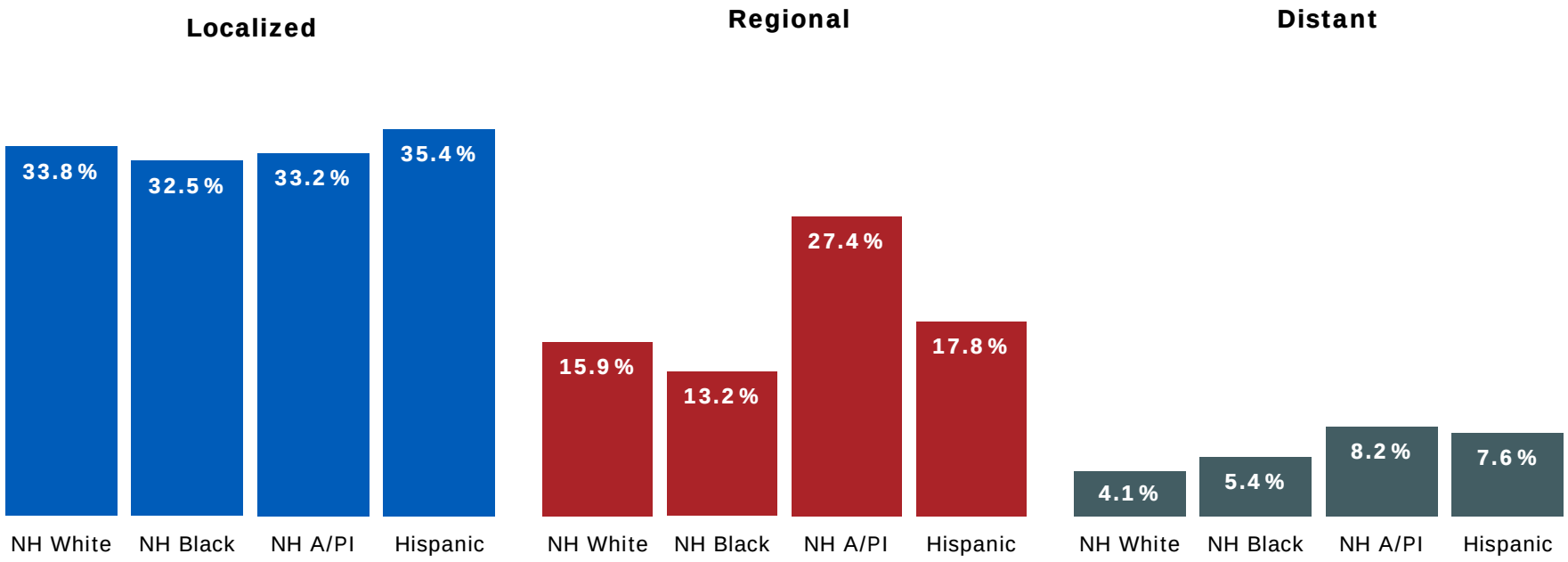
- Overall, the incidence rate for pancreatic cancer increased by 1% per year from 2008–2017. Similar significant increases occurred in both males and females.
- Rates for non-Hispanic whites increased by 1.5% per year but remained stable in other race/ethnicity groups.
- Rates increased in three age groups: 20–49 years by 1.6% per year, 50–64 years by 1.1% per year, and 65–74 years by 1.3% per year.

Lines represent the Joinpoint modeled trend, and points represent observed data.

Five-Year Relative Survival for Pancreatic Cancer by Stage and Race/Ethnicity

The 5-year relative survival rate for patients diagnosed with pancreatic is low (less than 35% for all stages and race/ethnicity groups) when compared to many other common cancers.

Five-Year Relative Survival for Pancreatic Cancer by Stage and Race/Ethnicity, Texas, 2008-2017



Cases diagnosed between 2008–2017 are included, with follow-up through 2018. 13% of pancreatic cancer cases were reported to TCR with an unknown stage.
NH = Non-Hispanic; A/PI = Asian/Pacific Islander. Data for NH American Indian/Alaska Native are suppressed because fewer than 16 cases were reported.
Expected survival table: US by SES/geography/race (NHW, NHB, NHAIAN, NHAPI, HISP) 1992-2013, Ages 0-99, State-county.

Multiple Myeloma

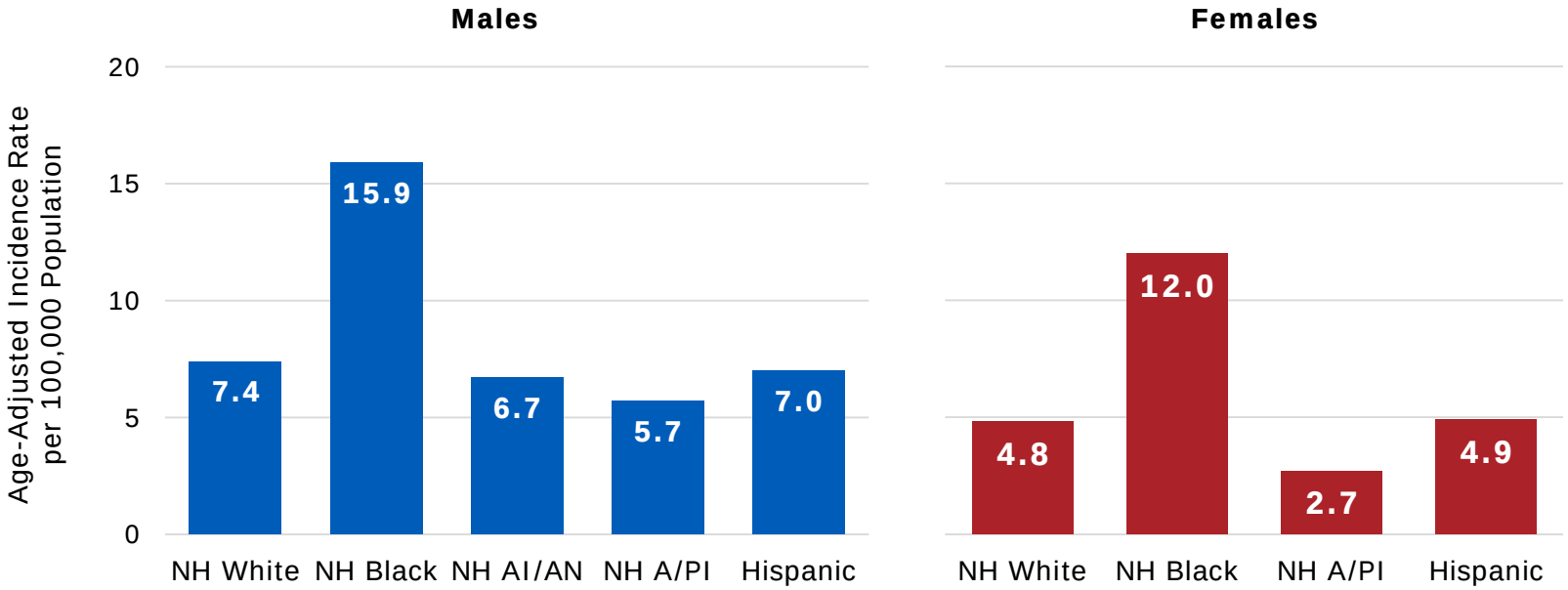
- An estimated 2,246 new cases and 964 deaths expected in Texas in 2020.
- As of January 1, 2017* there were 10,029 Texans living with multiple myeloma.
- 11% of multiple myeloma cases are attributable to overweight and obesity.[1]
- Persons with overweight and obesity are more likely to progress to multiple myeloma from monoclonal gammopathy of undetermined significance (MGUS) a precursor to multiple myeloma).[2]
- Relative risk increases by 55% for those who are overweight and 100% for those with obesity.[2]

[1] Islami et al., 2018. CA Cancer J. Clin. 68(1):31-54
[2] Chang et al., 2016. J. Natl. Cancer Inst. 109(5):jw264

Multiple Myeloma Incidence Rates by Race/Ethnicity and Sex

- In both males and females, the highest incidence rate of multiple myeloma is in non-Hispanic blacks.
- Overall, the incidence rate of multiple myeloma increased by 1.8% per year from 2008–2017. There were significant increases in NH white males (1.5% per year) and NH white females (1.6% per year).

Multiple Myeloma by Sex and Race/Ethnicity, Texas, 2013–2017



. Rates are suppressed if fewer than 16 cases were reported in a specific category, such as sex and race/ethnicity. NH = Non-Hispanic; A/PI = Asian/Pacific Islander; AI/AN = American Indian/Alaska Native.

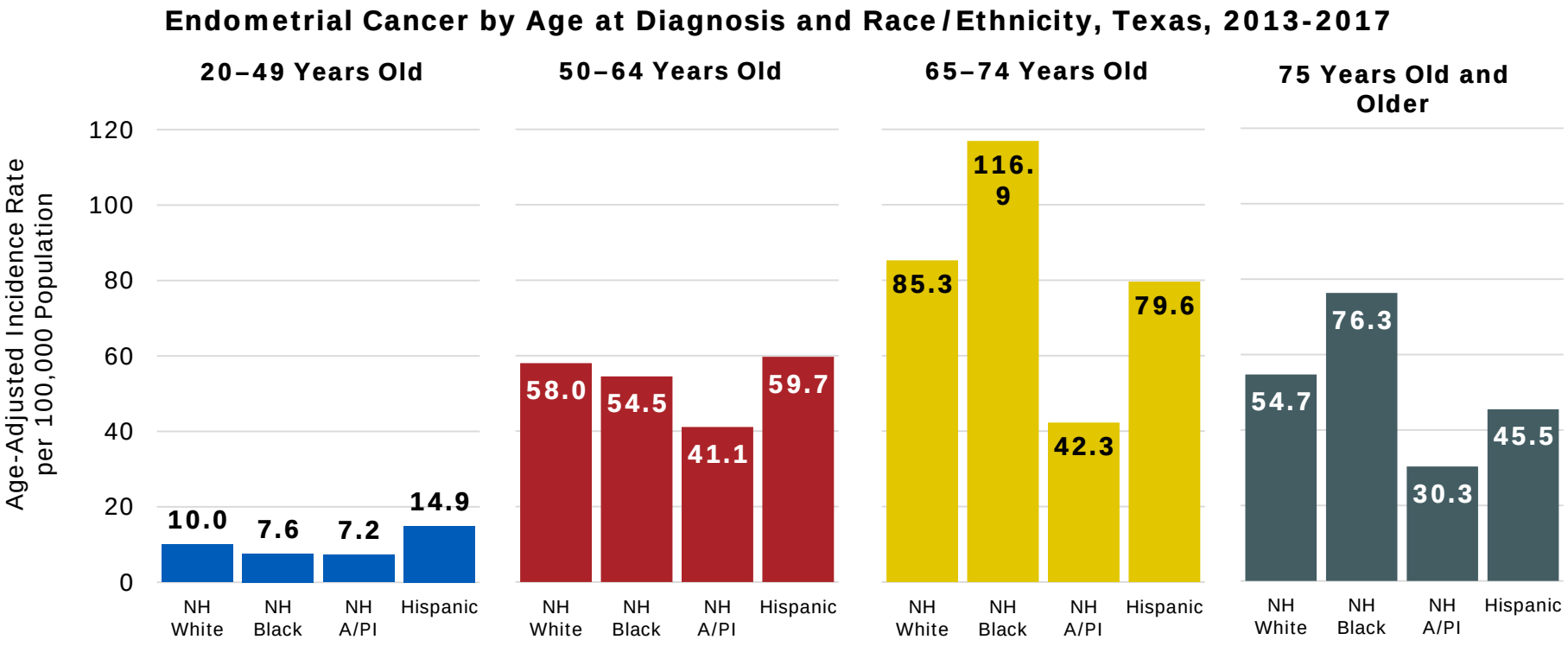
Endometrial Cancer

- Endometrial cancer is the 4th most commonly diagnosed cancer in females, with 3,838 new cases and 735 deaths in Texas in 2020.
- As of January 1, 2017* there were 32,658 Texans living with endometrium cancer.
- 60% of cases are attributed to overweight/obesity.[1]
- Risk is 50%-600% higher for individuals with overweight and obesity compared to normal weight individuals.[2]

1. Islami et al., 2018. CA Cancer J. Clin. 68(1):31-54
2. Setiawan et al., 2013. *J. Clin. Oncol.*, 31:2607-18.

Endometrial Cancer Incidence Rates by Race/Ethnicity and Age at Diagnosis

Non-Hispanic black females ages 65–74 years have the highest rate of endometrial cancer.

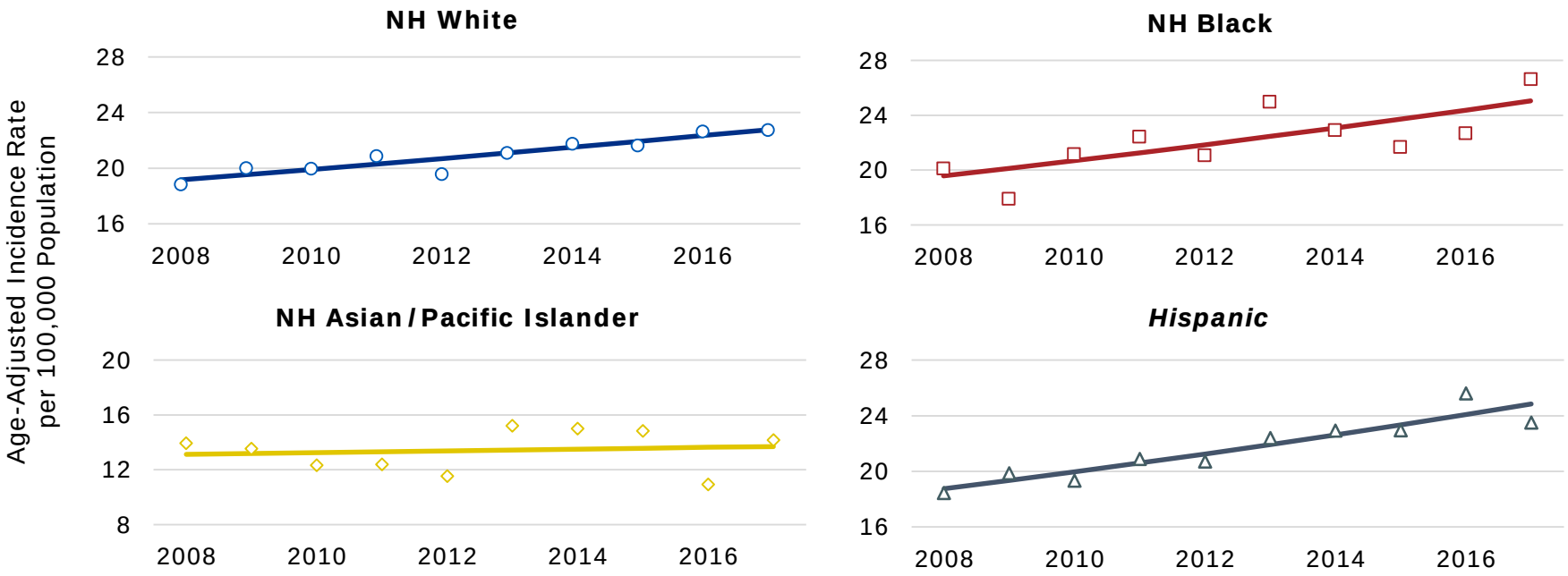


Rates for NH American Indian/Alaska Native are suppressed because fewer than 16 cases were reported.
NH = Non-Hispanic; A/PI = Asian/Pacific Islander.

Endometrial Cancer Incidence Rate Trends by Race/Ethnicity

- Overall, incidence rates increased by 2.3% per year.
- The fastest rate of increase was in Hispanics (average annual percent change of 3.2%). There were also significant increases in non-Hispanic whites (1.9% AAPC) and NH blacks (2.8% AAPC).
- The rate was stable for NH Asian/Pacific Islanders.

Endometrial Cancer by Race/Ethnicity, Texas, 2008-2017

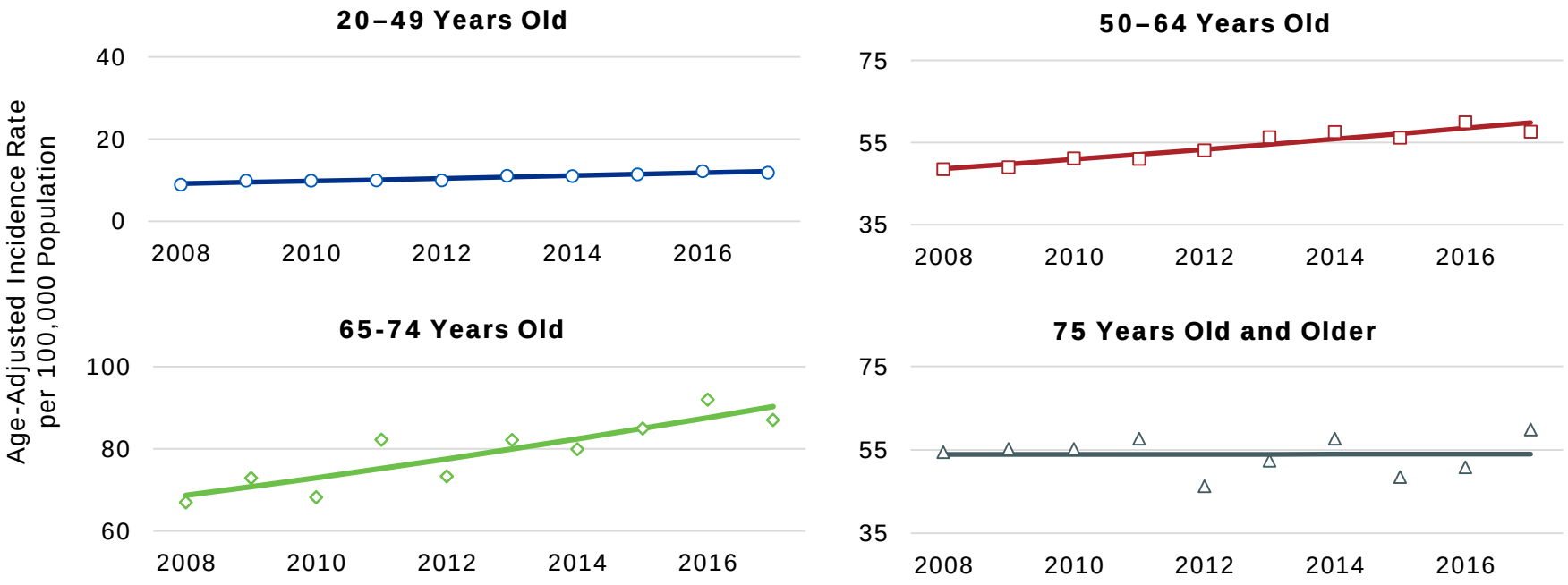


Lines represent the Joinpoint modeled trend, and points represent observed data. Rates for NH American Indian/Alaska Native are suppressed because fewer than 16 cases were reported.

Endometrial Cancer Incidence Rate Trends by Age at Diagnosis

- During 2008–2017, there were significant increases in three age groups: 20–49 years (3.2% average annual percent change), 50–64 years (2.3% AAPC) and 65–74 years (3.1% AAPC).
- Rates were stable for females ages 75 years and older.

Endometrial Cancer Trends by Age at Diagnosis, Texas, 2008–2017

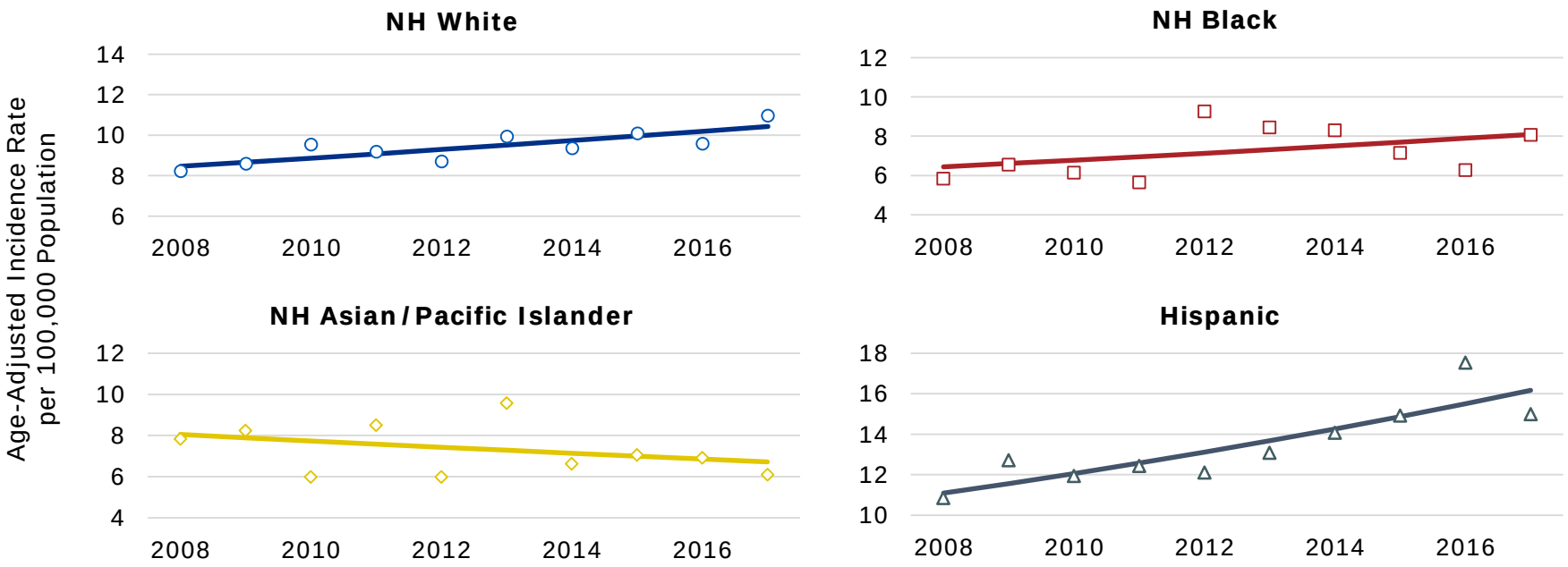


Lines represent the Joinpoint modeled trend, and points represent observed data.

Endometrial Cancer Incidence Rate Trends in Ages 20–49 Years by Ethnicity/Race

- Endometrial cancer is one of the fastest growing cancers in young adults.
- Rates increased fastest in Hispanics, with a 4.3% increase per year. Rates also increased in non-Hispanic whites (2.4% per year)
- Rates remained stable in other race/ethnicity groups.

Endometrial Cancer in Ages 20-49 Years by Race/Ethnicity, Texas, 2008-2017

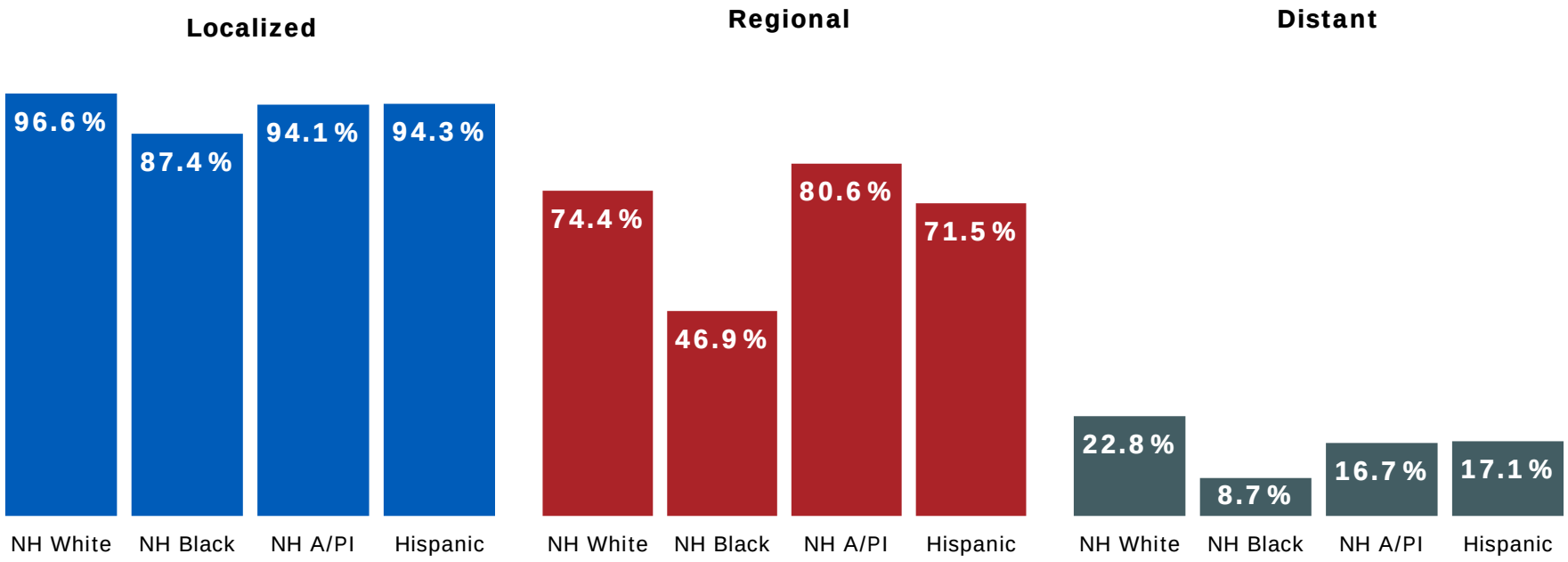


Lines represent the Joinpoint modeled trend, and points represent observed data. Rates for NH American Indian/Alaska Native are suppressed because fewer than 16 cases were reported.

Five-Year Relative Survival for Endometrial Cancer by Stage and Race/Ethnicity

Non-Hispanic black females have significantly lower 5-year relative survival compared to other racial/ethnic groups, particularly for tumors diagnosed at the regional or distant stage.

Five-Year Relative Survival for Endometrial Cancer by Stage and Race/Ethnicity, Texas, 2008-2017



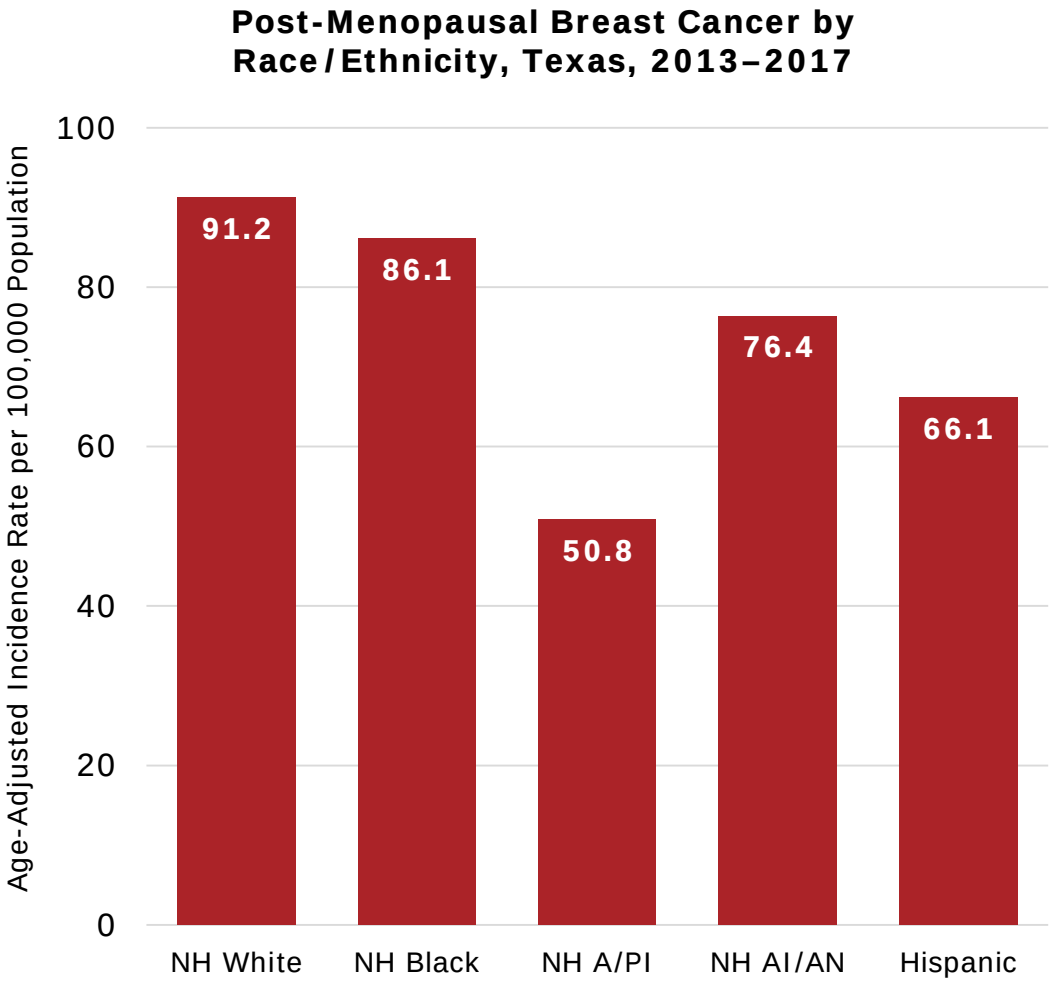
Cases diagnosed between 2008–2017 are included, with follow-up through 2018. 9% of kidney cancer cases were reported to TCR with an unknown stage.
NH = Non-Hispanic; A/PI = Asian/Pacific Islander. Rates for NH American Indian/Alaska Native are suppressed because fewer than 16 cases were reported.
Expected survival table: US by SES/geography/race (NHW, NHB, NHAIAN, NHAPI, HISP) 1992-2013, Ages 0-99, State-county.

Post-Menopausal Breast Cancer

- Although only 11% of post-menopausal breast cancer cases are estimated to be directly attributable to overweight/obesity in the US, given the relatively high incidence rate of breast cancer, this corresponds to approximately 1,500 breast cancer cases per year in Texas.
- Risk of breast cancer is increased by 20% per 5 BMI-unit increase, with the highest risk for women with a BMI of over 35.[2,3]

[1] Islami et al., 2018. CA Cancer J. Clin. 68(1):31-54.
[2] Renehan et al., 2008. *Lancet*, 371:569-78.
[3] Neuhouser, et al. 2015. JAMA Oncol.

Post-Menopausal Breast Cancer Incidence Rates by Race/Ethnicity



- Non-Hispanic whites have the highest incidence rate of post-menopausal breast cancer, followed by non-Hispanic blacks.
- Incidence rates remained stable during 2008–2017 overall and across all race/ethnicity groups.

Cases are restricted to females diagnosed aged 50 years and over but rates are shown per 100,000 females of all ages for comparison with other sites.
NH = Non-Hispanic; A/PI = Asian/Pacific Islander; AI/AN = American Indian/Alaska Native.

Report Information

Definitions and Abbreviations

- **Age-adjusted incidence rate:** number of new cancers of a specific site/type occurring in a specified population during a year, usually expressed as the number of cancers per 100,000 population at risk. An age-adjusted rate is a weighted average of the age-specific rates, where the weights are the proportions of persons in the corresponding age groups of a standard population. The potential confounding effect of age is reduced when comparing age-adjusted rates computed using the same standard population.
- **Age-adjusted mortality rate:** number of deaths, with cancer as the underlying cause of death, occurring in a specified population during a year. Cancer mortality is usually expressed as the number of deaths due to cancer per 100,000 population. Numbers are age-adjusted to allow for comparison between populations with different age compositions.
- **Annual percent change (APC):** one way to characterize trends in cancer rates over time. With this approach, the cancer rates are assumed to change at a constant percentage of the rate of the previous year. For example, if the APC is 1%, and the rate is 50 per 100,000 in 1990, the rate is 50 x 1.01 = 50.5 in 1991 and 50.5 x 1.01 = 51.005 in 1992. Rates that change at a constant percentage every year change linearly on a log scale.
- **Average annual percent change (AAPC):** a summary measure of the trend over a pre-specified fixed interval. It allows us to use a single number to describe the average APCs over a period of multiple years. It is valid even if the joinpoint model indicates that there were changes in trends during those years. It is computed as a weighted average of the APCs from the joinpoint model, with the weights equal to the length of the APC interval.
- **Race/ethnicity group abbreviations:** Non-Hispanic (NH), Asian/Pacific Islander (A/PI), American Indian/Alaska Native (AI/AN).

For more information about defining cancer statistics, visit seer.cancer.gov/statistics/types.html.

Technical Notes

- Texas incidence data source: Texas Cancer Registry (www.dshs.texas.gov/tcr) SEER*Stat Database, 1995-2017 Incidence, Texas statewide, created December 2019, based on NPCR-CSS Submission, cut-off 11/07/2019. **Note: Cases diagnosed by death certificate or autopsy only are excluded from all data in this report to allow direct comparison with national rates.**
- Texas mortality data source: Texas Cancer Registry (www.dshs.texas.gov/tcr) SEER*Stat Database, 1990-2017 Mortality, Texas statewide, created December 2019.
- US incidence data source: SEER*Stat Database: NPCR and SEER Incidence - U.S. Cancer Statistics Public Use Database, Nov 2019 submission (2001-2017). United States Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute. Released June 2020, based on the Nov 2019 submission. Accessed at cdc.gov/cancer/npcr/public-use
- US mortality data source: Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Mortality - All COD, Aggregated With State, Total U.S. (1990-2017) <Katrina/Rita Population Adjustment>, National Cancer Institute, DCCPS, Surveillance Research Program, released December 2019. Underlying mortality data provided by NCHS (www.cdc.gov/nchs).
- Rates are per 100,000 and age-adjusted to the 2000 U.S. Standard Population (19 age groups - Census P25-1130). Confidence Intervals (CI) are 95% for rates and ratios (Tiwari mod). Small counts frequently produced unstable rates for Texas NH Native American/Alaska Natives and are therefore not always presented.
- The Joinpoint Regression Program is statistical software for the analysis of trends using joinpoint models. The software enables the user to test whether an apparent change in trend is statistically significant. Joinpoint fits the selected trend data (e.g., cancer rates) into the simplest joinpoint model that the data allow.
  - Annual Percent Change (APC) is calculated by fitting a least squares regression line to the natural logarithm of the age-adjusted rates, with year as the regressor variable. This method allows for more than one APC to describe the trend over a time period. The joinpoint model uses statistical criteria to determine when and how often the APC changes. Cancer rates are fit using joined log-linear segments, so each segment can be characterized using an APC.
  - Average Annual Percent Change (AAPC) is computed as a weighted average of the APCs from the joinpoint model. AAPC is derived by first estimating the underlying joinpoint model that best fits the data. The AAPC over any fixed interval is calculated using a weighted average of the slope coefficients of the underlying joinpoint regression line with the weights equal to the length of each segment over the interval.
  - In this report, if the AAPC was significantly greater than zero, rates were reported to have increased. If the AAPC was significantly lower than zero, rates were reported to have decreased. If the AAPC was not significantly different from zero, rates were reported as stable.
- Joinpoint Regression Program, Version 4.7.0.0 – Feb 2019; Statistical Methodology and Applications Branch, Surveillance Research Program, National Cancer Institute.

Overweight/Obesity-Associated Cancer Site Specifications

Cancer	ICD-O-3 Site Codes	ICD-O-3 Histology Codes	Additional Restrictions
Esophageal adenocarcinoma	C15.0–15.9	8140–8575	Restrict to microscopically confirmed
Gastric cardia	C16.0	8000-9049, 9056–9139, 9141–9589	
Colon and rectum	C18.0–20.9, C26.0	8000–9049, 9056–9139, 9141–9589	
Liver	C22.0	8000–9049, 9056–9139, 9141–9589	
Gallbladder	C23.9	8000–9049, 9056–9139, 9141–9589	
Pancreas	C25.0–25.9	8000–9049, 9056–9139, 9141–9589	
Multiple myeloma	C42.1	9732	
Postmenopausal female breast	C50.0–50.9	8000–9049, 9056–9139, 9141–9589	Restrict to females and restrict to ages 50 years and over
Corpus and uterus, NOS (not otherwise specified)	C54.0–54.9, C55.9	8000–9049, 9056–9139, 9141–9589	Restrict to females
Ovary	C56.9	8000–9049, 9056–9139, 9141–9589	Restrict to females
Kidney	C64.9	8000–9049, 9056–9139, 9141–9589	
Meningioma	C70.0-70.1, 70.9	9530-9539	
Thyroid	C73.9	8000–9049, 9056–9139, 9141–9589	

https://www.cdc.gov/cancer/uscs/public-use/predefined-seer-stat-variables.htm

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