Overweight/Obesity-Associated Cancers in Texas, 2005-2014

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

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Background

• Overweight and obesity are associated with increased risk of at least 13 different types of cancer.

• This statistical report describes the burden of overweight- and obesity-related cancers in Texas and compares cancer rates and trends in Texas to recently published national data from 2005-2014.¹

• **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 Steele et al. 2017. MMWR, 66(39):1052-1058
Overweight and Obesity

- 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), which divides weight (in kilograms) by height (in meters squared), is the most widely used proxy for body fat, providing a better measure than weight alone.

- Overweight and obesity are associated with an increased risk of certain cancers and other diseases, including type II diabetes, stroke, hypertension, and cardiovascular disease.

- Excess body weight is estimated to be the second most important avoidable risk factor for cancer after tobacco.

<table>
<thead>
<tr>
<th>Adult BMI</th>
<th>Weight Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;18.5</td>
<td>Underweight</td>
</tr>
<tr>
<td>18.5-24.9</td>
<td>Normal/healthy weight</td>
</tr>
<tr>
<td>25.0-29.9</td>
<td>Overweight</td>
</tr>
<tr>
<td>≥30.0</td>
<td>Obese</td>
</tr>
</tbody>
</table>
Overweight and Obesity in Texas

- The Centers for Disease Control and Prevention (CDC) estimates that 34% of Texas adults are obese, and a further 35% are overweight. An estimated 33% of 10-17 year olds are overweight or obese.¹

- In the US, Texas has the 8th highest rate of adult obesity and 10th highest rate of adult overweight/obesity.

- Texas has the 17th highest rate of inactivity, a contributor to overweight/obesity, with one-quarter of adults considered to be physically inactive.

- 75% of Texas adults are projected to be overweight or obese by 2040.

Cancers Associated with Overweight and Obesity

• Strongest association (increase in risk) with BMI is for endometrial cancer and adenocarcinoma of the esophagus, followed by liver cancer, gallbladder cancer, and kidney cancer.

• 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.

• 3 sites occur only in females: ovarian cancer, endometrial cancer, and post-menopausal breast cancer.

• 3 sites also linked to lack of physical activity: colorectal cancer, breast cancer (in all females), and endometrial cancer (cancer of the lining of the uterus).

Definitions/Abbreviations

• **Age-adjusted incidence rate (rate):** number of new cases diagnosed per 100,000 people per year. Numbers are age-adjusted to allow for comparison between populations with different age compositions.

• **Annual percent change (APC):** measures the trend in rates over time, such as how quickly (or slowly) a cancer has increased or decreased in incidence over a given time period. For example, an APC of -2.0% over 10 years means that there was a 2% decrease in incidence rates per year. It is calculated by fitting a least squares regression line to the natural logarithm of the age-adjusted rates. The slope is tested for a significant difference from 0.

• **Overall rates/trends:** Where obesity-related cancers are analyzed as one group, incidence rates are typically presented including colorectal cancer, while percent changes are presented without colorectal cancer, unless otherwise specified. Colorectal cancer rates have declined in recent years due to increased screening to remove pre-cancerous polyps, therefore affecting rate changes from 2005-2014.

• **Relative risk (RR):** measures the risk (of cancer) between two groups. In this report, a RR > 1 means there is an increase in cancer risk associated with excess body weight. A RR of 1.5 means a 50% increase in risk.

• **Racial/ethnic group acronyms:** Non-Hispanic (NH), Asian/Pacific Islander (A/PI), American Indian/Alaska Native (AI/AN).

• **Note on confidence intervals:** A 95% confidence interval around the rate at least as large as the rate itself is generally considered unstable. Results with large confidence intervals should be interpreted with caution. Data for American Indian/Alaskan Native alone are not shown in all tables/graphs due to unstable rates and large confidence intervals.
Overweight/obesity-associated cancers in Texas, 2005-2014

- 41% of 105,821 new invasive cancers in 2014 were at overweight/obesity-associated sites; 56% of cancers in females and 28% of cancers in males.

- Not all cases can be attributed to excess body weight, but it is a key modifiable risk factor, contributing about 7.8% of all new cancer cases (4.8% in males and 10.9% in females), and 6.5% of cancer deaths (5.7% in males and 7.4% in females).

- While the incidence rate of all cancers overall decreased significantly from 2005-2014 (APC -1.8%), the rate of overweight/obesity-associated cancers (excluding colorectal cancer) increased (APC 0.3%).

- The incidence rate of overweight/obesity-associated cancers is higher in females than males, but only males showed a significant increase (after excluding colorectal cancer APC 1%).

Note: Since colorectal cancer incidence rates have declined due to increased screening for precancerous polyps, trends were analyzed both with and without colorectal cancer.

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

*Annual percent change from 2005-2014 was different from 0 (p<0.05)
Incidence rates of overweight/obesity-associated cancers, 2014

- Some of the overweight/obesity-associated cancers are common, including breast, colorectal, endometrial, and kidney cancers, while others are relatively rare, such as meningioma.

- Percentage of cases attributed to excess body weight varies with cancer site; e.g., 60% of endometrial cancers, >30% of gallbladder cancers, liver cancers, kidney cancers, and esophageal adenocarcinomas, compared to a smaller proportion of ovarian cancers (4%), and post-menopausal breast cancers (11%). The proportion attributable to excess body weight at each site also varies with sex.¹

- Rates differed significantly between males and females for all sites except meningioma.

Note: Female post-menopausal breast cancer is presented per 100,000 females (all ages) for comparison.

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

Texas Cancer Registry

Obesity-Associated Cancers, April 2018
Some sites experienced increases in incidence rates between 2005-2014, others experienced decreases. For most sites, males and females showed similar trends, except for esophageal adenocarcinoma that showed a much larger decrease (and higher rate) in males, and meningioma that is rare and accounts for <1% of overweight/obesity-associated cancers. Meningioma not shown due to large confidence intervals (and low rates).
Overweight/obesity-related sites with increasing trends in incidence rates, 2005-2014

- Liver cancer and thyroid cancer in males and females, and endometrial cancer and pancreatic cancer in females increased significantly from 2005-2014.
- Thyroid cancer increased by an average of 4.2% per year from 2005-2010, then 0.8% per year to 2014.
- Both liver and endometrial cancer are strongly linked to excess body weight.
- Pancreatic cancer and thyroid cancer are less strongly linked to excess body weight.

Incidence rate per 100,000

^ Annual percent change significantly different from 0
2005-2014 incidence rates trends in overweight/obesity-associated sites: Joinpoint results

Most sites showed a single trend line for 2005-2014, but 1 joinpoint (change in slope) was found for the following sites:

- Colorectal cancer, overall and in females, decreased at a higher rate from 2005-2011, and a lower rate from 2011-2014.
- Gallbladder cancer was uncommon but tended to increase from 2005-2007 in males, then decreased significantly from 2007-2014.
- Thyroid cancer overall increased significantly from 2005-2010, then stabilized. In females, it increased significantly until 2012 then tended to decrease.
- Ovarian cancer decreased significantly from 2005-2012, then tended to show a non-significant increase from 2012-2014.

^ Annual percent change significantly different from 0
Texas showed similar trends in overweight/obesity sites to recently published national data.  

<table>
<thead>
<tr>
<th>Cancer Site</th>
<th>Texas (Rate/AAPC)</th>
<th>USA (Rate/AAPC)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall (incl. colorectal)</td>
<td>163.6 / -0.5*</td>
<td>170.0 / -0.3*</td>
<td>Incidence rate lower in Texas</td>
</tr>
<tr>
<td>Overall (excl. colorectal)</td>
<td>126.3 / 0.3*</td>
<td>132.0 / 0.8*</td>
<td>Incidence rate and AAPC lower in Texas</td>
</tr>
<tr>
<td>Post-menopausal breast cancer</td>
<td>83.0 / -0.7*</td>
<td>92.6 / 0.2</td>
<td>Decreased in Texas but not nationally. Lower incidence rate in Texas.</td>
</tr>
<tr>
<td>Colorectal</td>
<td>37.2 / -2.7*</td>
<td>38.4 / -2.9*</td>
<td></td>
</tr>
<tr>
<td>Endometrium</td>
<td>22.0 / 1.8*</td>
<td>26.5 / 1.1*</td>
<td>Lower incidence rate but higher AAPC in Texas</td>
</tr>
<tr>
<td>Kidney</td>
<td>17.5 / 0.4</td>
<td>15.4 / 0.7*</td>
<td></td>
</tr>
<tr>
<td>Thyroid</td>
<td>12.5 / 2.7*</td>
<td>14.4 / 4.0*</td>
<td>Smaller AAPC in Texas</td>
</tr>
<tr>
<td>Pancreas</td>
<td>11.9 / 0.7</td>
<td>12.6 / 0.8*</td>
<td></td>
</tr>
<tr>
<td>Ovary</td>
<td>11.1 / -1.8*</td>
<td>11.0 / -2.0*</td>
<td></td>
</tr>
<tr>
<td>Liver</td>
<td>10.5 / 3.6*</td>
<td>7.0 / 2.9*</td>
<td>Higher incidence rate and AAPC in Texas</td>
</tr>
<tr>
<td>Multiple myeloma</td>
<td>6.5 / 0.8</td>
<td>6.0 / 1.1</td>
<td></td>
</tr>
<tr>
<td>Adenocarcinoma of esophagus</td>
<td>2.2 / -1.8</td>
<td>2.9 / -0.5</td>
<td></td>
</tr>
<tr>
<td>Gastric cardia</td>
<td>1.8 / -0.3</td>
<td>2.1 / 1.2*</td>
<td></td>
</tr>
<tr>
<td>Gallbladder</td>
<td>1.2 / -0.9</td>
<td>1.1 / -0.1</td>
<td></td>
</tr>
<tr>
<td>Meningioma</td>
<td>0.1 / -3.4</td>
<td>0.1 / -3.8*</td>
<td></td>
</tr>
</tbody>
</table>

Average annual percent change was calculated in Joinpoint for comparison with national data. This measure allows the use of a single number to account for any change in trend over multiple years. *APC 2005-2014 was significantly different to 0 (p<0.05)
Overall incidence rate trends in overweight/obesity-associated sites by age at diagnosis

• Non-obesity/overweight-associated cancer incidence rate decreased across all ages at diagnosis.

• Colorectal cancer decreased in most age groups, but significantly increased in 20-39 year olds (APC 1.8%) with 4.3 cases per 100,000 in 2005 and 4.9 cases per 100,000 in 2014.

• After excluding colorectal cancer, overweight/obesity-associated cancers increased in all age groups except for those aged 75 years and above. The largest percentage increase was in 20-39 year olds (APC 3.3%).

*Annual percent change was significantly different to 0 (p<0.05)
Overall incidence rate trends in overweight/obesity-associated sites by race/ethnicity

- Obesity rates tend to be higher in Blacks and Hispanics than NH whites.¹

2014 Rates
- Overall rates of overweight/obesity-associated cancers were highest for NH blacks and NH whites, followed by Hispanics. However, for males, rates were highest for NH blacks, followed by Hispanics, then NH whites.
- The percentage of all cancers that were diagnosed at overweight/obesity-associated sites was highest for Hispanics (48%) and lowest for NH whites (39%).

2005-2014 Trends (after excluding colorectal cancer)
- Rates tended to increase in all racial/ethnic groups; none tended to decrease.
- Overall, overweight/obesity-associated cancer rates increased for NH whites only (APC 0.3%).
- By sex: rates increased significantly for NH white males and NH black males only.

# Urban-Rural Classifications

The Texas Cancer Registry uses the National Center for Health Statistics (NCHS) Urban-Rural Classification Scheme for Counties\(^1\) to classify population areas across the state.

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metropolitan</td>
<td>Counties in metropolitan statistical areas (MSA) with populations of 1 million or more that contain entire populations in the largest principal city, have entire populations contained in largest principal city, or contain at least 250,000 inhabitants of any principal city.</td>
</tr>
<tr>
<td>Large central metro</td>
<td>Counties in MSAs with populations of 1 million or more that do not qualify as large central metro counties.</td>
</tr>
<tr>
<td>Large fringe metro</td>
<td>Counties in MSAs of populations between 250,000 – 999,999.</td>
</tr>
<tr>
<td>Medium metro</td>
<td>Counties in MSAs of populations between 250,000 – 999,999.</td>
</tr>
<tr>
<td>Small metro</td>
<td>Counties in MSAs of populations less than 250,000.</td>
</tr>
<tr>
<td>Nonmetropolitan</td>
<td>Counties with an urban cluster population of 10,000-49,999.</td>
</tr>
<tr>
<td>Micropolitan</td>
<td>Nonmetro counties that do not qualify as micropolitan.</td>
</tr>
</tbody>
</table>

\(^1\)NCHS Urban-Rural Classification Scheme for Counties, NCHS/CDC, Updated June 2017.
Urban-Rural Classifications of Texas Counties

NCHS Urban-Rural Classification Scheme for Counties, NCHS/CDC, Updated June 2017.
Texas Cancer Registry

Alcohol-Associated Cancers, May 2018
Incidence rates of overweight/obesity-associated cancer by urban-rural classification

- Overweight/obesity rates tend to be higher in non-metro areas than metro areas.¹

2014 Rates
- Overall, rates of overweight/obesity-associated cancers were highest in small and large metro areas, and lowest in large fringe metro and non-core areas.

2005-2014 Trends (after excluding colorectal cancer)
- From 2005-2014, overall incidence increased significantly in medium metro (APC 0.4%) and non-core areas (APC 1.4%).
- In females, rates increased in micropolitan and non-core areas only. In males, rates increased in large central metro, medium metro, and non-core areas. Largest increase was seen for males in non-core areas (APC 2.7%).

*Average percent change from 2005-2014 was significantly different to 0 (p<0.05)
Incidence rate trends in overweight/obesity-associated cancer by urban-rural classification

- Incidence rates of post-menopausal breast cancer decreased significantly only in large central metro areas, but tended to decline in most areas.
- Ovarian cancer rates declined significantly in metropolitan areas only, but tended to decline in all areas.
- Endometrial and thyroid cancer incidence rates increased the most in non-core areas, but tended to have lower incidence rates in non-metropolitan than metropolitan areas in 2005.
- Pancreatic and kidney cancer incidence rates increased significantly in non-core areas only.
- Colorectal cancer incidence rates decreased in all areas but APC was higher in metropolitan areas.
- Liver cancer incidence rates increased significantly in all regions, but APC was highest in non-core areas.
- Esophageal adenocarcinoma incidence rates tended to decrease in most areas, except non-core areas where it tended to increase (although this was not significant).

<table>
<thead>
<tr>
<th>Cancer Type</th>
<th>Large Central Metro</th>
<th>Large Fringe Metro</th>
<th>Medium Metro</th>
<th>Small Metro</th>
<th>Micropolitan</th>
<th>Non-Core</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-menopausal breast cancer</td>
<td>85.5 -1.1*</td>
<td>86.8 -0.4</td>
<td>75.9 -0.4</td>
<td>84.2 -0.8</td>
<td>82.6 0.2</td>
<td>73.6 -0.4</td>
</tr>
<tr>
<td>Ovary</td>
<td>10.9 -2.3*</td>
<td>11.4 -2.5*</td>
<td>10.3 -2.3*</td>
<td>12.6 -1.3</td>
<td>12.2 -1.6</td>
<td>13.1 -0.5</td>
</tr>
<tr>
<td>Endometrium</td>
<td>24.0 1.9*</td>
<td>19.5 0.4</td>
<td>21.0 1.7*</td>
<td>20.6 2.3*</td>
<td>19.7 1.7</td>
<td>22.5 4.3*</td>
</tr>
<tr>
<td>Thyroid</td>
<td>13.2 2.9*</td>
<td>12.2 2.0*</td>
<td>12.4 0.7</td>
<td>11.9 4.3*</td>
<td>10.4 2.0</td>
<td>11.0 5.5*</td>
</tr>
<tr>
<td>Pancreas</td>
<td>12.4 0.8</td>
<td>11.2 -0.8</td>
<td>11.4 0.8</td>
<td>12.6 1.2</td>
<td>11.8 0.6</td>
<td>11.6 2.8*</td>
</tr>
<tr>
<td>Kidney</td>
<td>17.5 0.1</td>
<td>15.7 -0.4</td>
<td>19.1 1.1</td>
<td>20.3 1.1</td>
<td>16.3 0.1</td>
<td>17.2 1.6*</td>
</tr>
<tr>
<td>Colon &amp; rectum</td>
<td>36.9 -2.8*</td>
<td>34.6 -3.3*</td>
<td>37.5 -2.8*</td>
<td>40.3 -2.5*</td>
<td>42.4 -1.6*</td>
<td>38.5 -2.0*</td>
</tr>
<tr>
<td>Liver</td>
<td>10.8 2.8*</td>
<td>8.6 4.4*</td>
<td>12.7 3.9*</td>
<td>8.6 4.5*</td>
<td>12.2 4.5*</td>
<td>8.7 5.2*</td>
</tr>
<tr>
<td>Esophageal adenocarcinoma</td>
<td>1.9 -1.5</td>
<td>2.5 -2.5</td>
<td>1.6 -3.8*</td>
<td>3.2 -1</td>
<td>2.1 -2.1</td>
<td>3.3 3.1</td>
</tr>
<tr>
<td>Gastric cardia</td>
<td>1.7 -0.2</td>
<td>1.9 -2.5</td>
<td>1.7 -0.7</td>
<td>2.1 1.7</td>
<td>1.9 -0.3</td>
<td>2.3 1.7</td>
</tr>
<tr>
<td>Gallbladder</td>
<td>1.3 -0.2</td>
<td>0.9 -2.4*</td>
<td>1.2 -2.5</td>
<td>0.7 -3.4</td>
<td>1.3 2.0</td>
<td>1.0 -1.6</td>
</tr>
<tr>
<td>Meningioma</td>
<td>0.1 -1.8</td>
<td>0.2 ~</td>
<td>0.1 -6.3</td>
<td>0.5 -3.1</td>
<td>0.1 -7.1</td>
<td>0.2 -6.7</td>
</tr>
<tr>
<td>Multiple myeloma</td>
<td>7.2 0.8</td>
<td>5.7 -0.1</td>
<td>6.5 1.8*</td>
<td>6.0 -0.2</td>
<td>6.2 0.7</td>
<td>5.8 0.7</td>
</tr>
</tbody>
</table>

*Annual percent change significantly different from 0

Significantly decreased from 2005-2014

Significantly increased from 2005-2014
Overweight/Obesity-Associated Cancers in Texas, 2005-2014:

Incidence Rate Trends for Specific Cancers
Incidence rate trends, 2005-2014: Colorectal cancer by race/ethnicity

- In Texas, colorectal cancer is the 3rd most commonly diagnosed cancer in men and the 3rd most commonly diagnosed cancer in women.

- Colorectal cancer risk increases with overweight/obesity; relative risk for colorectal cancer is 1.3 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


- Higher rates in males than females; NH blacks experienced the highest incidence rate across all years.

- Rates decreased in all racial/ethnic groups, except NH AI/AN that tended to increase (although rates varied considerably).


² Islami et al., 2018. CA Cancer J. Clin. 68(1):31-54
**Incidence rate trends, 2005-2014:**
Colorectal cancer by age & race/ethnicity

### 2014 Rates
- NH whites had the highest incidence rates for those aged 20-49y.
- For other age groups, incidence rates were highest for NH blacks.

### 2005-2014 Trends
- Rates decreased in most age/race/ethnicity groups; Only increase was for NH whites aged 20-49y (10.6/100,000 in 2005 to 13.5/100,000 in 2014).
- Similar trends were seen for males & females, except for:
  - Hispanics aged 50-64y, where females but not males showed a significant decline
  - Hispanics aged 18-49y, where rates were stable in males but decreased in females
  - NH blacks aged 18-49y, where there were significant declines in males but not females

*Annual percent change from 2005-2014 was significantly different to 0 (p<0.05)
Incidence rate trends, 2005-2014: Postmenopausal breast cancer by race/ethnicity

- Breast cancer is the most commonly diagnosed cancer among women in Texas.
- An estimated 11% of postmenopausal breast cancer cases are linked to overweight/obesity.$^1$ Relative risk for postmenopausal breast cancer is 1.2 per 5 BMI-unit increase.$^2$

- Incidence rates were highest in NH whites, followed by NH blacks.
- By race/ethnicity, only NH whites showed a statistically significant decrease, but rates in NH blacks and Hispanics also tended to decrease.
- Rates tended to increase in NH A/PI but rates were variable.

Incidence rate trends, 2005-2014: Endometrial cancer by race/ethnicity

- 4th most commonly diagnosed cancer among women in Texas.
- Elevated BMI is main modifiable risk factor; relative risk for endometrial cancer is 1.5 for overweight, 2.5 for class 1 obesity, 4.5 for class 2 obesity, and 7.1 for class 3 obesity compared to normal weight individuals.\(^1\)
- An estimated 60.3% of endometrial cancer cases are linked to excess body weight.\(^2\)
- Incidence rates were similar for NH whites, NH blacks, and Hispanics in 2005, but by 2014, rates were higher in NH blacks.
- Rates significantly increased for all races combined, and for NH whites, NH blacks, and Hispanics.
- Highest APC for NH blacks (3% per year).

\(^2\) Islami et al., 2018. CA Cancer J. Clin. 68(1):31-54
Incidence rate trends, 2005-2014: Endometrial cancer by age & race/ethnicity

2014 Rates

- For those aged 20-49y, incidence rates were highest for Hispanics. For those aged 50-64y, rates were highest for NH whites. For those aged 65y and older, rates were highest for NH blacks.

- NH blacks aged 65-74y had the highest incidence rate (104/100,000).

2005-2014 Trends

- Overall, rates increased for those aged 20-74y, but the largest increase was seen for those aged 20-49y (APC 3.5%), where the rate increased from 8.1 to 10.8.

- Largest APC was for NH blacks aged 20-49y (9%), followed by NH blacks aged 50-64y (3.9%).

- Only Hispanics showed an increase among those 65y and older (APC 3.6%).

*Annual percent change from 2005-2014 was significantly different from 0
Incidence rate trends, 2005-2014: Endometrial cancer in 20-49 year olds

- Although the incidence rate in those under 50y is relatively low (10.8 new cases per 100,000 in 2014), rates are increasing.
- Incidence rates are highest for Hispanics.
- APC was 3.4% for all races aged 20-49y.
- Highest APC (9%) was observed in NH blacks, where the rate changed from 5.0/100,000 in 2005 to 8.3/100,000 in 2014.

^ Annual percent change significantly different from 0
Incidence rate trends, 2005-2014: Kidney (renal cell) cancer by age & race/ethnicity

- Elevated BMI is one of the strongest risk factors for chronic kidney disease, including renal cell cancer.
- Risk of kidney cancer increases as BMI increases. A 5-unit increase in BMI increases kidney cancer risk by 20%, with overweight/obese individuals twice as likely as normal weight individuals to develop renal cell cancer.\(^1\)
- An estimated 33% of cases are attributable to excess body weight.\(^2\)
- Rates higher in males than females.

**2014 Rates**
- Incidence rates were highest for NH blacks and Hispanics for all age groups.

**2005-2014 Trends**
- Rates increased significantly for those aged 20-49y, increasing overall from 5.9/100,000 to 7.5/100,000 in 2014, with highest APC for NH blacks, followed by NH whites. Rates also increased in Hispanics.
- Among Hispanics aged 65-74y, rates significantly increased (APC 2.0%) from 71.6/100,000 to 83.6/100,000.
- Rates tended to decrease in those ≥75 years of age.
- Trends tended to be similar for males and females, except for NH blacks aged ≥75y, where rates declined significantly in males (APC -1.5%) but showed a non-significant increase in females (APC 0.5%).

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\(^1\) Wang et al., 2014. Int. J. Cancer, 135:1673-86
\(^2\) Islami et al., 2018. CA Cancer J. Clin. 68(1):31-54
Incidence rate trends, 2005-2014: Liver cancer by age

- It is estimated that 70% of cases are attributable to lifestyle factors, including excess weight, smoking, infections (Hepatitis B and C), and alcohol.
- An estimated 34% cases are attributed to excess body weight.¹
- 9th most commonly diagnosed cancer and 4th leading cause of cancer mortality in males. Relative survival rate is low (16% survive 5 years or more).

- Overweight individuals have an 18% higher liver cancer risk and obese individuals have an 83% higher risk than normal weight individuals.²
- Incidence rates for those under 50 years of age remained relatively low and stable.
- Incidence rates for those aged 50-64y and 65-74y increased.
- For those aged 50-64y, APC was higher from 2005-2010 than 2010-2014.
- Increased incidence rates in those aged 50-74y has been linked to hepatitis C infection in people born in 1945-1965.

¹ Islami et al., 2018. CA Cancer J. Clin. 68(1):31-54
Incidence rate trends, 2005-2014: Liver cancer by age & race/ethnicity

2014 Rates

• For Texans aged 20-49y and 65y or older, rates were highest for Hispanics. For Texans aged 50-64y, rates were highest for NH blacks.

• Rates in Hispanics aged ≥75y were more than 3-times higher than in NH whites or NH blacks.

2005-2014 Trends

• Increased for those aged 50-74y in NH whites, NH blacks, and Hispanics.

• Large increases in NH whites aged 50-64y (APC 8.0%) whose rate changed from 11.4 in 2005 to 24.0 in 2014, and NH blacks aged 65-74y (APC 6.8%) whose rate changed from 25.6 in 2005 to 50.8 in 2014.

• Rates were low in 20-49 year olds but tended to decrease. Rates also tended to decrease in NH A/PI.

*Annual percent change from 2005-2014 was significantly different from 0 (P<0.05)
Incidence rate trends, 2005-2014: Liver cancer by sex, age, & race/ethnicity

When further stratified by sex:

- For 18-49 year olds, male NH whites and male NH blacks showed larger declines than females.
- For 50-64 year olds, females tended to show larger increases compared to males.
- For 65-74 year olds, male NH white and male NH blacks showed larger increases than females, whereas in Hispanics, females showed larger increase than males.
- For those 75y and older, no APPC was significant but female NH whites and NH blacks tended to show increases, while male NH blacks and male Hispanics tended to show decreases.

*Annual percent change from 2005-2014 was significantly different from 0 (P<0.05)
Incidence rate trends, 2005-2014: Liver cancer among those aged 50-74y

- Overall, for ages 50-74y combined, incidence rates increased at a faster rate for 2005-2010 (APC 6.9%) than for 2011-2014 (APC 3.5%).
- Rates were highest in NH A/PI in 2005, but decreased by 2.4% per year.
- By 2014, incidence rates were highest for Hispanics and NH blacks; APC was higher for NH blacks.
- NH whites experienced the largest APC (but also lowest rate).
- Hispanics in Texas have among the highest incidence rates in the US.

^ Annual percent change significantly different from 0
Incidence rate trends, 2005-2014: Pancreatic cancer by age & race/ethnicity

- 10th most commonly diagnosed cancer in females and 11th most commonly diagnosed cancer in males.
- Relative survival rate is low (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

2014 Rates
- In most age groups, incidence rates were highest for NH blacks, followed by NH whites.

2005-2014 Trends
- For those aged 50-64y, incidence rates increased significantly for all races combined, and for NH whites and Hispanics.
- Although uncommon in younger adults, 20-49 year olds showed the largest APC, but this increase was significant for NH whites only, increasing from 1.5 to 2 cases per 100,000.
- Rates in those aged 65-74y and 75y and older tended to remain stable, but decreased significantly in NH blacks.

Incidence rate trends, 2005-2014: Pancreatic cancer by sex, age, & race/ethnicity

When further stratified by sex:

- In 18-49 year olds, significant increases were seen in females only (NH whites, NH blacks, and Hispanics).
- In 50-64 year olds, increases were seen in female NH whites and female Hispanics but not in males.
- In ≥75 year olds, the overall decrease in NH blacks was not significant when males and females were examined separately, although both sexes tended to see declines.

*Annual percent change from 2005-2014 was significantly different from 0 (P<0.05)
Incidence rate trends, 2005-2014: Adenocarcinoma of the esophagus

- Strongly linked to excess body weight; relative risk for esophageal adenocarcinoma is 2.0 for obese and 4.8 for morbidly obese (BMI >40) versus normal weight individuals.¹
- An estimated 32% of cases attributable to elevated BMI (35% in males and 22% in females).²
- More common among males than females (4.1 per 100,000 vs. 0.5 per 100,000).

### 2014 Rates
- Rate considerably higher in NH whites compared to other racial/ethnic groups across all age groups.

### 2005-2014 Rates
- Rates tended to decline but the only significant changes were for all races combined ages 50-64y, and Hispanics ages 20-49y.
- Decreased overall for males only (APC -2.3%).

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² Islami et al., 2018. CA Cancer J. Clin. 68(1):31-54
Incidence rate trends, 2005-2014: Ovarian cancer

- 8th most commonly diagnosed cancer in females, with approximately 1,500 new cases diagnosed in Texas each year.
- Relative risk is 1.1 per 5-unit increase in BMI.¹
- ~4% of cases linked to elevated BMI.²

2014 Rates
- In most age groups highest incidence rates for NH whites, except 50-64 where rate highest for Hispanics.

2005-2014 Trends
- Overall, incidence rates significantly decreased for those aged 65y and older.
- By age and race/ethnicity, rates significantly decreased for NH whites only.
- Rates in other racial/ethnic groups tended to decrease, but this change was not significant.

Technical notes:

- Data Source: Texas Cancer Registry (www.dshs.state.tx.us/tcr) SEER*Stat Database, Incidence - Texas, 1995-2014, statewide, Texas Department of State Health Services, created January 2017, based on NPCR-CSS Submission, cut-off 11/14/16.


- Average percentage change (APC) was calculated using SEER*Stat by fitting a least squares regression line to the natural logarithm of the age-adjusted rates, with calendar year as the regressor variable. Joinpoint was also used to determine whether the APC changed over the assessed time period (i.e. whether there was a joinpoint that resulted 2 lines of different slope) and to plot changes in incidence rates over time.

- Error bars represent 95% confidence intervals around rates.

- The CDC’s National Center for Health Statistics (NCHS) Urban-Rural Classification Scheme for Counties was used in this report. This scheme is a six-level urban-rural classification scheme for US counties. The most urban category consists of “central” counties of large metropolitan areas; the most rural category consists of nonmetropolitan “noncore” counties. (Source: NCHS Urban-Rural Classification Scheme for Counties, NCHS/CDC, Updated June 2017. Accessed April 2018. https://www.cdc.gov/nchs/data_access/urban_rural.htm).
References:


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