Obesity and Esophageal Adenocarcinoma in Ohio

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**Introduction**

Obesity (BMI ≥ 30) is a known risk factor for esophageal adenocarcinoma (EAC). The prevalence of obesity among adults (ages 18+) in Ohio has been increasing in the last 2 decades and is the 8th highest in the United States in 2014.

**Purpose of the study:** To determine if the increase in obesity in Ohio corresponds to the increase in both the rates of EAC and the percent of esophageal cancers that are EAC in Ohio, and how these compare to the U.S.

**Data & Methods**


**U.S. incidence rates:** Surveillance, Epidemiology, and End Results (SEER) Program, SEER Cancer Statistics Review 1975-2013, National Cancer Institute, 2016.

**County-level obesity estimates:** National Diabetes Surveillance System using 3 years of data from the Centers for Disease Control and Prevention (CDC) Behavioral Risk Factor Surveillance System (BRFSS), based on indirect model-dependent estimates using Bayesian multilevel modeling techniques. The most recent year for county-level obesity estimates is 2012. http://www.countyhealthrankings.org/app/ohio/2016/measure/factors/11/data


Incidence rates were age-adjusted per 100,000 persons using the 2000 U.S. standard population.

Terriles with approximately equal cut points were used to create the obesity and incidence maps. Rates were suppressed if case count <5.

**Results**

- Obesity in Ohio adults increased from 19% in 1996 to 31% in 2013 (Figure 1).
- Obesity ranged from 26%-39% in Ohio counties (Figure 2).
- EAC incidence rates ranged from 1.4 to 7.4 in Ohio counties (Figure 3).
- There were higher percentages obese and higher EAC incidence rates in the northwestern and southeastern regions of Ohio (Figures 2 & 3).

**Table 1:** Average-annual Incidence Rates of EAC in Ohio & U.S., 2009-2013

<table>
<thead>
<tr>
<th></th>
<th>Ohio Male</th>
<th>Ohio Female</th>
<th>Total Male</th>
<th>Total Female</th>
<th>Total Male</th>
<th>Total Female</th>
<th>Total Male</th>
<th>Total Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>6.6</td>
<td>1.0</td>
<td>3.5</td>
<td>4.9</td>
<td>6.0</td>
<td>2.4</td>
<td>35%</td>
<td>67%</td>
</tr>
<tr>
<td>Female</td>
<td>7.1</td>
<td>1.1</td>
<td>3.8</td>
<td>5.7</td>
<td>0.7</td>
<td>3.0</td>
<td>25%</td>
<td>57%</td>
</tr>
<tr>
<td>White</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>4.7</td>
<td>0.4</td>
<td>1.0</td>
<td>1.3</td>
<td>0.3</td>
<td>0.7</td>
<td>31%</td>
<td>33%</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60-69 years</td>
<td>2.1</td>
<td>0.3</td>
<td>1.2</td>
<td>1.9</td>
<td>0.2</td>
<td>0.7</td>
<td>62%</td>
<td>56%</td>
</tr>
<tr>
<td>70+ years</td>
<td>2.4</td>
<td>0.1</td>
<td>1.3</td>
<td>1.9</td>
<td>0.9</td>
<td>1.4</td>
<td>32%</td>
<td>35%</td>
</tr>
</tbody>
</table>

**Conclusions**

There is an increasing trend in obesity and incidence of EAC in Ohio which supports the previously established association of increased EAC to increased obesity. Notably, Ohio’s EAC incidence rate is 40% higher than the U.S. rate.

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