Background
In 2014, Oklahoma ranked 6th highest in the U.S. for the proportion of the population that was obese. In Oklahoma, the proportion of overweight and/or obese individuals has risen over the past 15 years. It is thought that 56.9% of endometrial cancers in the U.S. are attributable to being overweight or obese. While most endometrial cancers occur among postmenopausal women, younger women exposed to high levels of estrogen as a result of obesity are also at risk. Currently, there are no screening tests to diagnose endometrial cancer. Patients who present with abnormal bleeding will have a biopsy. Surgery, which includes a hysterectomy, is the main treatment for endometrial cancer, causing infertility in the younger population. The effects of obesity can also complicate clinical management of endometrial cancer.

Objective
To provide descriptive statistics and time trends of new cases of type-I endometrial cancer cases in addition to reported BMI measures in Oklahoma.

Methods
The Oklahoma Central Cancer Registry (OCCR) is a population based system collecting data on cancer cases diagnosed and/or treated in Oklahoma residents with reference year 1997. Endometrioid adenocarcinoma (type-I endometrial cancer) was classified as cases with International Classification of Diseases for Oncology 3rd edition (ICD-O-3) histology code 8380. Type-I endometrial cancer diagnosed between January 1, 2000 and December 31, 2014 were extracted. Vital status (ICD-10th revision, reported comorbidity (ICD 9th Revision- Clinical Modification (CM)) and surgery on primary site codes (Facility Oncology Registry Data Standards Manual) among women diagnosed with type-I endometrial cancer were reviewed. The first three listed comorbidities were quantified. Incidence rates were age-adjusted using the U.S. standard population, 2000 Census. Time trends of age-adjusted incidence rates for type-I endometrial cancer were examined. The Body Mass Index (BMI) from self-reported height and weight in the Oklahoma Behavioral Risk Factor Surveillance System (BRFSS) by year among Oklahoma women was examined. BRFSS data was broken into two time frames (2000-2010 and 2011-2014), due to a change in weighting methodology in 2011 and the addition of cell phone only respondents.

Results
There were 3,853 type-I endometrial cancer cases extracted from OCCR database. Malignant neoplasm of endometrium was the top listed cause of death (22.1%) among cases identified as deceased. The majority of cases were diagnosed among white females aged 50+ (Figure 2). Time trends in Figure 3 indicate that type-I endometrial cancer has doubled from 7.9 cases per 100,000 females in 2000 to 16.1 cases per 100,000 females in 2014. While postmenopausal women (50+) are more at risk for type-I endometrial cancer, 14.6% of patients were < 50 years of age as seen in Figure 2. Concurrently, the proportions of women that were considered obese based on BRFSS self-reported BMI has increased from 20.3% in 2000 to 32.5% in 2014 and proportions of women considered overweight increased from 26.0% in 2000 to 30.6% in 2014 (Figure 4).

Figure 1. Type-I endometrial cancer patients, Oklahoma, 2000-2014

![Type-I endometrial cancer patients](image)

![Type-I endometrial cancer patients](image)

Figure 2. Demographics of type-I endometrial cancer patients, Oklahoma, 2000-2014

![Demographics of type-I endometrial cancer patients](image)

Table 1. Top five listed comorbidities/complications* among type-I endometrial cancer patients, Oklahoma, 2000-2014

<table>
<thead>
<tr>
<th>Comorbidity/Complication</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essential Hypertension-unspecified</td>
<td>301</td>
<td>14.8%</td>
</tr>
<tr>
<td>Postmenopausal bleeding</td>
<td>215</td>
<td>10.6%</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>91</td>
<td>4.5%</td>
</tr>
<tr>
<td>Overweight and obesity</td>
<td>60</td>
<td>3.0%</td>
</tr>
<tr>
<td>Other and unspecified anemia</td>
<td>49</td>
<td>2.4%</td>
</tr>
</tbody>
</table>

*This only includes the first listed comorbidity/complication reported

Conclusion
The primary form of treatment for all type-I endometrial cancer was a hysterectomy (91.8%) resulting in infertility. For patients who choose hormone treatment, there is still evidence of reduced births. Therefore, reduction in the incidence of endometrial cancer would directly impact the fertility of Oklahomans. In Table 1, hypertension and diabetes were included in the top 5 listed comorbidities, both of which are also associated with overweight/obesity. The rise in type-I endometrial cancer incidence rates and proportions of overweight/obesity, highlights the need to further evaluate the impact of obesity on cancer incidence and outcomes in Oklahoma.

While one of the limitations of this analysis was that the association between obesity and endometrial cancer outcomes were not directly measured, there are similar trends in the two that suggest this would be a recommended additional analysis.

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