Gaps in screening mammography: Pierce County, WA

April 2015

Office of Assessment, Planning and Improvement
Tacoma-Pierce County Health Department
Pierce County, Washington
Gaps in screening mammography: Pierce County, WA

A needs assessment for the Carol Milgard Breast Center

Prepared by
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Executive Summary

The purpose of this needs assessment is to help answer the question: How can Carol Milgard Breast Center (CMBC) mammography screening marketing efforts best target underserved and at-risk populations in Pierce County, considering limited outreach capacity? Because breast screening resources have improved since the assessment conducted in 2011 this report focuses on opportunities to maximize outreach capacity. The goal is to apply a targeted outreach strategy that will expand the pool of women who undergo screening while optimizing the likelihood of identifying early cancer in that pool. The long term goal is to improve breast cancer outcomes for women in Pierce County. On occasion, this report may serve as an update to the 2011 assessment. When possible, we attempt to identify changes and improvements in needs for mammography screening; however, comparisons are limited due to changes in data collection since the original report’s creation.

We looked at three broad indicators of need:

- Breast cancer burden (incidence, mortality, etc.),
- Mammography utilization, and
- Economic need (poverty, health insurance, etc.)

For each indicator of need we tried to identify populations of particularly high need. We have also provided initial qualitative findings that explore barriers to accessing mammogram screenings among Hispanic women living within the CMBC catchment (service coverage) area.

Populations based on geography in Pierce County

We report by the same geographic areas in this report as the previous 2011 report. We use the term “County Areas of Interest” or “Areas” to geographically group women into equally populated areas.

- Breast cancer death rates from breast cancer were highest in Area 4: Central Tacoma to Ruston and in Area 3: Ashford/Mt Rainier. We recommend that Area 4: Central Tacoma to Ruston and Area 3: Ashford/Mt Rainier be prioritized if outreach efforts are to be based on breast cancer death incidence rates.
- By multiple measures, economic need was high in Area 4: Central Tacoma to Ruston and in Area 5: SE Tacoma to Spanaway, most strikingly among women ages 45-64. We recommend that Area 4: Central Tacoma to Ruston and Area 5: SE Tacoma to Spanaway be prioritized if outreach efforts are to be based on economic need.

Mammography use among 40-64 year old women was lowest in Area 5: SE Tacoma to Spanaway and in southern Pierce County, Area 3: Ashford/Mt Rainier. Geographical isolation may be a barrier to screening mammography for women aged 40-64 in Area 3. If strategic outreach efforts are to be based on potential geographic isolation, Area 3: Ashford/Mt Rainier could also benefit from focus group or key informant interviews to better understand the barriers of these women, living in rural areas.
Populations based on race

- Black women were more likely to be diagnosed at a regional or distant stage, to die of breast cancer and to die at a younger age than other women. We recommend that they continue to be targeted for outreach and intervention.
- Hispanic women appear to remain at a fairly low risk of breast cancer mortality. The paradox of low socioeconomic status with better than expected health and mortality outcomes may explain the low mortality (see Hispanic Paradox in glossary). Nonetheless, more exploration is recommended, as forced racial categorization may limit recognition of Hispanic-related cases. Additionally, recent anecdotal accounts identify barriers to screening and treatment such as cultural health beliefs around breast cancer causes and prognosis; fear of pain during screening; limited skills in navigating care systems; limited skills in health literacy/health communication; and/or limited self-advocacy in clinical settings. We recommend conducting focus groups or key informant interviews to better understand the barriers of these women.

Populations based on age

- Breast cancer incidence, hospitalization and death increase dramatically with age in Pierce County, remaining higher than the state averages among all three categories.
- Access to care tended to improve with age, particularly after age 65 when almost all women become eligible for Medicare. Nonetheless, 6.3% of women 65 or older in Area 5: SE Tacoma to Spanaway could not afford health care sometime in the previous year.
Introduction

The purpose of this needs assessment is to help answer the question: How can Carol Milgard Breast Center (CMBC) mammography screening marketing efforts best target underserved and at-risk populations in Pierce County, considering limited outreach capacity? Because breast screening resources have improved since the assessment conducted in 2011 this report focuses on maximizing outreach capacity as well as identifying new opportunities to expand and/or improve CMBC outreach efforts. The goal is to apply a targeted outreach strategy that will expand the pool of women who undergo screening while optimizing the likelihood of identifying early cancer in that pool. The long term goal is to improve breast cancer outcomes for women in Pierce County.

As in the 2011 report, we have taken a population-based approach by trying to identify populations in high need of mammography screening for CMBC outreach planning purposes. When possible, we attempt to identify changes and improvements in needs for mammography screening; however, comparisons are limited due to changes in data collection since the original report’s creation.

Methods
Concept definitions

Subpopulations
We defined subgroups based on race, age and geography because these subgroups were common to many of our data sources. Race is self-identified and generally indicates a social and cultural rather than a biological designation. Women of Hispanic ethnicity, regardless of race, were categorized as Hispanic. Non-Hispanic women were categorized by their race.

We used County Areas of Interest (County Council Districts in the 2011 report) to group women geographically. There are seven County Council districts in Pierce County whose boundaries are drawn to represent equally populated areas. These boundaries are periodically redrawn to adjust for changes in population based on Census data; such was the case in 2012. We elected to stay with the previous boundaries for comparison over the two report periods. In the majority of this updated report we indicate the geographic Areas of Interest as “Area” 1 and so on. These areas are described in greater detail in a later section of the report and in Attachment B.

Our data are too sparse to examine in fine detail other than County Areas of Interest (Areas), as available data sources do not provide for smaller geographic examination. While these areas are heterogeneous demographically, they are still useful for roughly describing the geographic distributions of women with different characteristics.

We used zip codes to group women within Areas. Because zip code boundaries did not coincide with Area boundaries, we included a zip code in an Area whenever a significant
portion of the zip code area overlapped Areas. Because of this, some zip codes were included in more than one Area.

**At risk/underserved populations**
Ideally we would like to identify subpopulations of women who:
- Have high breast cancer burden, i.e. have higher incidence or mortality, AND
- Do not receive mammograms regularly AND
- Are uninsured, have low income and/or other health care access barriers.

Generally, the data sources for disease burden are different than those providing information about mammography history or barriers to health care services. Therefore, we can only look for populations in which these characteristics may coincide, recognizing that what is true for the population may not be true for individuals. In other words, we can identify a population where, burden is high and screening mammography is low, but we can’t say that the individuals with high burden had infrequent screening mammography.

**Breast cancer**
Our data sources defined breast cancer using primary site ICD-0-3 codes C50.0-C50.9 excluding histology codes 9140 (Kaposi’s Sarcoma) and 9050-9055 (Mesothelioma), and 9590-9992 (Leukemia and Lymphoma). These codes include *in situ* cancers (see glossary). In this report we only discuss breast cancer in women, though breast cancer occurs in men as well.

**Data sources**
Much of the data in this report come from a few key sources. These sources and their limitations are briefly described below.

**American Community Survey (ACS)**
The American Community Survey is a mailed survey conducted every year by the U.S. government to estimate a wide variety of social and economic data for the U.S. population. The ACS replaces the long form of the census for collecting detailed population data and has the advantage of being released annually rather than at 10-year intervals.

**Behavioral Risk Factor Surveillance System (BRFSS)**
The Behavioral Risk Factor Surveillance System is an ongoing national telephone survey conducted by the Centers for Disease Control and Prevention. The survey includes adults age 18 years and older and provides state and county-level data for each calendar year. Topics are wide ranging and include disease prevalence, health care access and use, health behaviors and demographics. Please see Attachment F for a list of Behavioral Risk Factor Surveillance System (BRFSS) telephone survey questions utilized in this report.

There are several biases inherent to BRFSS. Firstly, BRFSS excludes people in institutions such as dormitories, hospitals, nursing homes, prisons and military bases and may underreport responses from people who are ill or in poor health. Secondly, cell phone-only households were previously excluded before 2011. These households with cell phones tended to be younger and
poorer than households with landlines. The 2011 BRFSS data reflects a change in weighting methodology (ranking) and the addition of cell phone only respondents. The aggregate BRFSS combined landline and cell phone dataset is based on the landline and cell phone data submitted for 2011. However, because of these methodological changes the BRFSS data values starting in 2011 are not comparable to prior years. Thirdly, data are self-reported and so are subject to social desirability bias and recall error. Lastly, BRFSS is conducted in English and Spanish only, and continues to underreport responses from individuals with other native languages.

**Death Certificate Data**

For death certificates, funeral directors collect information about the deceased person, including race and ethnicity, from an informant who is usually a family member or close personal friend of the deceased person. A certifying physician, medical examiner, or coroner generally provides cause-of-death information. Cause-of-death data come from underlying causes of death and not immediate causes. For example, if a person dies of a complication or metastasis of breast cancer, breast cancer would be the underlying cause of death. Data are compiled by the Washington State Department of Health, Center for Health Statistics.

**Washington State Cancer Registry**

The Washington State Cancer Registry was established in 1990 to monitor cancer incidence, stage at diagnosis, tumor size, nodal involvement and other demographic and clinical information in a standardized fashion. Cancer case information is reported to the Washington State Cancer Registry from a variety of reporting sources. These reporting sources include hospitals and other health care facilities, pathology laboratories, ambulatory surgery centers, freestanding radiation and oncology centers, medical clinics and health care providers who diagnose and/or treat cancers or conditions that meet the criteria for reporting. It includes information on Washington residents who may have been diagnosed or treated elsewhere, and is estimated to be 95% complete.

**Washington State Comprehensive Hospitalization and Recording System**

This is an administrative database that includes the discharge or death diagnosis of all patients hospitalized in non-federal hospitals in the state. Madigan Army Medical Center, a federal facility, does not report to this data source. A hospitalization for breast cancer means that breast cancer is based on the *Principal Diagnosis Code* defined as the ICD-9-CM code describing the principal diagnosis (i.e., the condition established after study to be chiefly responsible for occasioning the admission of the patient for care).

In these data, the unit of analysis is the hospitalization event, not the patient (i.e., a patient may have multiple admissions with the principal diagnosis of breast cancer). Geography for hospitalization data refers to the patient’s residence, not the location of the hospital. Hospitalization data are recorded for billing purposes, and so may not always fully and accurately capture the clinical diagnosis.
Other data considerations

- In order to describe breast cancer for subgroups of interest, data were usually averaged over multiple years to provide accurate estimates.
- For some measures, data have been age-adjusted. Age-adjustment is a statistical method for standardizing different populations with different age distributions. Because breast cancer burden is strongly age-dependent, two populations can differ significantly in breast cancer burden if they are very different in age. If age-adjusted values are different for two populations, it means the difference must be attributable to something other than age. Age-adjusted measures are indicated in the figure legends.
- For many of the measures we used, we have provided data for Washington state when most useful as a comparative.
- Error bars in the figures show 95% confidence intervals. These indicate the margin of error for the value estimated.
- A rate is defined as a ratio where the count of an event is divided by the number of those exposed to the risk of the event—in this case the risk of breast cancer. The greater the number of women who are exposed to a risk, the lower the rate when the count of an event remains the same.
- Graphs are primarily used in the body of this report; however, data tables are provided in Attachment E for review.
- County and local data can tell us what has occurred, but usually not why. For that we have used studies in the medical literature that were designed to answer just such questions. References are listed at the end of this report.

Description of the service area

Pierce County is the second most populous county in Washington state. As of 2012, the Pierce County population was 808,200. This number included 137,226 females 40-64 years of age.

Geography

Pierce County is divided into seven geographic units to group women geographically whose boundaries are drawn to represent equally populated areas (Figure 1). These geographic units are called “County Areas of Interest” or “Area” throughout this report. The geographic areas included in each County Area of Interest are shown in greater detail in Attachment B.

Female population

The size of the female population varied among the seven Pierce County Areas of Interest (Figures 2-3). Area 3: Ashford/Mt Rainier, Area 5: South East Tacoma to Ruston, and Area 1: Bonney Lake to Mt Rainier tended to have larger numbers of women all ages, while Area 3: Ashford/Mt Rainier, Area 7: UP/Key Peninsula and Area 1: Bonney Lake to Mt Rainier tended to have larger numbers of women aged 40-64.
Figure 1 Pierce County Areas of Interest

Source: Pierce County GIS

Figure 2 Pierce County Females all ages by Area: Pierce County, 2013

Pierce County females, all ages, 2013

<table>
<thead>
<tr>
<th>Area Description</th>
<th>Number of Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>4: Central Tacoma to Ruston</td>
<td>47,212</td>
</tr>
<tr>
<td>6: Lakewood/JBLM</td>
<td>50,043</td>
</tr>
<tr>
<td>2: NE Tacoma to Meridian E.</td>
<td>57,018</td>
</tr>
<tr>
<td>7: UP/Key Peninsula</td>
<td>58,763</td>
</tr>
<tr>
<td>1: Bonney Lake to Mt Rainier</td>
<td>60,768</td>
</tr>
<tr>
<td>5: SE Tacoma to Spanaway</td>
<td>64,011</td>
</tr>
<tr>
<td>3: Ashford/Mt Rainier</td>
<td>70,143</td>
</tr>
</tbody>
</table>

Source: Community Health Assessment Tool (CHAT): Center for Health Statistics, Washington State Department of Health
Figure 3 Females 40-64 years old by Area: Pierce County, 2013

Pierce County compared to neighboring King County had proportionately more Black women aged 35-64 than nearby counties (Table 1 and Figure 4). Pierce County had the second highest proportion of non-Hispanic Asian/Pacific Islander women, after King County. There was no significant difference in distribution of Hispanic women when compared to other nearby counties. Of note, a higher proportion of Pierce County women aged 35-64 were reported to be living in poverty than women in nearby counties (Table 1).

Table 1 Female population 35-64 years old in selected counties: Race composition (2008-2012) and percent in poverty (2009-2013)

<table>
<thead>
<tr>
<th></th>
<th>White-NH</th>
<th>Black-NH</th>
<th>American Indian/Alaskan Native-NH</th>
<th>Asian/Pacific Islander-NH</th>
<th>Hispanic as Race</th>
<th>% in poverty</th>
</tr>
</thead>
<tbody>
<tr>
<td>King</td>
<td>77.5%</td>
<td>5.1%</td>
<td>0.8%</td>
<td>12.8%</td>
<td>3.8%</td>
<td>7.4</td>
</tr>
<tr>
<td>Snohomish</td>
<td>86.4%</td>
<td>1.3%</td>
<td>1.3%</td>
<td>7.9%</td>
<td>3.2%</td>
<td>7.1</td>
</tr>
<tr>
<td>Pierce</td>
<td><strong>80.2%</strong></td>
<td><strong>5.9%</strong></td>
<td><strong>1.4%</strong></td>
<td><strong>8.8%</strong></td>
<td><strong>3.7%</strong></td>
<td><strong>9.8</strong></td>
</tr>
<tr>
<td>Kitsap</td>
<td>85.4%</td>
<td>1.9%</td>
<td>1.5%</td>
<td>8.2%</td>
<td>3.0%</td>
<td>7.6</td>
</tr>
<tr>
<td>Thurston</td>
<td>86.4%</td>
<td>1.9%</td>
<td>1.4%</td>
<td>7.2%</td>
<td>3.2%</td>
<td>7.9</td>
</tr>
</tbody>
</table>

Sources: Population: Community Health Assessment Tool (CHAT): Center for Health Statistics, Washington State Department of Health
Poverty: American Community Survey
Women age 40-64 of different races tended to live in different parts of Pierce County (Table 2). Black-NH women were more frequent in Tacoma, Spanaway, Ruston, Lakewood and JBLM (Areas 4, 5 and 6), with the majority residing in Area 5: SE Tacoma to Spanaway. Asian/Pacific Islander-NH women tended to live in S. Tacoma and Spanaway (Area 5). Hispanic women tended to live predominantly in Area 5: S. Tacoma to Spanaway (Area 5) and in the area around Lakewood/JBLM (Area 6). This information is further represented graphically in Attachment C.

Table 2 Pierce County female population by race, 2012

<table>
<thead>
<tr>
<th>Area</th>
<th>White-NH</th>
<th>Black-NH</th>
<th>Amer Ind./Alask. Nat.-NH</th>
<th>Asian/Pac.Isl.-NH</th>
<th>Hispanic as Race</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area 1:</td>
<td>All ages</td>
<td>52,900</td>
<td>1,095</td>
<td>621</td>
<td>2,640</td>
<td>3,512</td>
</tr>
<tr>
<td>Bonney Lake to Mt Rainier</td>
<td>Ages 40-64</td>
<td>19,899</td>
<td>290</td>
<td>229</td>
<td>905</td>
<td>767</td>
</tr>
<tr>
<td>Area 2:</td>
<td>All ages</td>
<td>41,849</td>
<td>3,215</td>
<td>1,092</td>
<td>5,466</td>
<td>5,396</td>
</tr>
<tr>
<td>NE Tacoma to Meridian E.</td>
<td>Ages 40-64</td>
<td>15,519</td>
<td>910</td>
<td>352</td>
<td>1,831</td>
<td>985</td>
</tr>
<tr>
<td>Area 3:</td>
<td>All ages</td>
<td>53,279</td>
<td>4,195</td>
<td>775</td>
<td>5,987</td>
<td>5,908</td>
</tr>
<tr>
<td>Ashford/Mt Rainier</td>
<td>Ages 40-64</td>
<td>18,734</td>
<td>1,198</td>
<td>250</td>
<td>2,157</td>
<td>1,151</td>
</tr>
<tr>
<td>Area 4:</td>
<td>All ages</td>
<td>34,363</td>
<td>5,467</td>
<td>628</td>
<td>3,140</td>
<td>3,613</td>
</tr>
<tr>
<td>Central Tacoma to Ruston</td>
<td>Ages 40-64</td>
<td>11,851</td>
<td>1,688</td>
<td>206</td>
<td>948</td>
<td>707</td>
</tr>
<tr>
<td>Area 5:</td>
<td>All ages</td>
<td>36,942</td>
<td>8,042</td>
<td>1,038</td>
<td>9,296</td>
<td>8,694</td>
</tr>
<tr>
<td>SE Tacoma to Spanaway</td>
<td>Ages 40-64</td>
<td>12,474</td>
<td>2,224</td>
<td>326</td>
<td>3,106</td>
<td>1,387</td>
</tr>
<tr>
<td>Area 6:</td>
<td>All ages</td>
<td>30,954</td>
<td>5,471</td>
<td>640</td>
<td>6,173</td>
<td>6,805</td>
</tr>
<tr>
<td>Lakewood/JBLM</td>
<td>Ages 40-64</td>
<td>9,402</td>
<td>1,357</td>
<td>199</td>
<td>2,172</td>
<td>1,010</td>
</tr>
<tr>
<td>Area 7:</td>
<td>All ages</td>
<td>48,099</td>
<td>3,036</td>
<td>517</td>
<td>3,835</td>
<td>3,276</td>
</tr>
<tr>
<td>UP/Key Peninsula</td>
<td>Ages 40-64</td>
<td>19,188</td>
<td>912</td>
<td>178</td>
<td>1,527</td>
<td>771</td>
</tr>
</tbody>
</table>
Overview

The remainder of this report is organized in three major sections corresponding to the three broad ways of defining high risk/underserved, namely breast cancer burden, mammography utilization and barriers to accessing health services. Breast cancer burden is further subdivided into several subsections. Within each section or subsection we examine the high risk/underserved indicator in the county as a whole and for subgroups defined by geography, race and age, when data on subgroups were available. Barriers to screening among Hispanic-Latina women are also included when applicable.

Burden of breast cancer

The effect of breast cancer on the health of the population can be summarized by using a number of different measures. Such measures can be used for estimating resources needed for breast cancer screening. We consider the following measures of breast cancer burden in this report:

- Breast cancer incidence;
- Breast cancer stage at diagnosis;
- Hospitalizations for breast cancer;
- Breast cancer mortality;
- Years of potential life lost due to breast cancer.

Breast cancer incidence

Incidence rate is the number of new breast cancer cases diagnosed in one year divided by the total female population, multiplied by 100,000.

\[ \text{Incidence} = \text{(new cases/female population/year)} \times 100,000 \]

Incident cases do not include reoccurrence of a previously reported breast cancer case, or metastatic sites.

In order to create a reliable picture of breast cancer incidence in Pierce County, data from 2002 to 2011 were averaged (Figure 5). There were 3,884 new breast cancer cases among women 40-64 years old in Pierce County in the ten-year period 2002-2011. The overall breast cancer incidence rate for Pierce County averaged for the period 2002-2011 was 305.3 cases per year, per 100,000; this was similar to the Washington state rate (306.7 per 100,000).
Figure 5 Annual age-adjusted breast cancer incidence rates, by race/ethnicity, females, 40-64 y.o., Pierce County, 2003-2012

<table>
<thead>
<tr>
<th>Race/ethnicity</th>
<th>Incidence Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian/Pacific Islander-NH</td>
<td>229.7</td>
</tr>
<tr>
<td>Hispanic as Race</td>
<td>237.0</td>
</tr>
<tr>
<td>Black-NH</td>
<td>289.8</td>
</tr>
<tr>
<td>White-NH</td>
<td>299.9</td>
</tr>
<tr>
<td>American Indian/Alaskan Native-NH</td>
<td>366.4</td>
</tr>
</tbody>
</table>

New cases, per year, per 100,000 female population


Race
Incidence in Pierce County varied significantly among subgroups defined by race. The highest incidence rate was among American Indian/Alaskan Native-NH women, although the small number of cases for this group means the estimated rate is imprecise (Figure 5). Among non-whites, Black-NH women had the highest rate of incidence. Hispanic women had fairly low incidence. Breast cancer incidence may have dropped among White-NH women around 2003, possibly attributable to discontinuation of hormone replacement therapy. Nonetheless, the overwhelming majority of breast cancer cases are White-NH women (Figure 6).

Figure 6 New breast cancer cases, females 40-64 y.o., Pierce County, 2003-2012

<table>
<thead>
<tr>
<th>Race/ethnicity</th>
<th>New Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Indian/Alaskan Native-NH</td>
<td>60</td>
</tr>
<tr>
<td>Hispanic as Race</td>
<td>123</td>
</tr>
<tr>
<td>Black-NH</td>
<td>223</td>
</tr>
<tr>
<td>Asian/Pacific Islander-NH</td>
<td>272</td>
</tr>
<tr>
<td>White-NH</td>
<td>3,259</td>
</tr>
</tbody>
</table>

Source: Population: Community Health Assessment Tool (CHAT): Center for Health Statistics, Washington State Department of Health
A comparison of incidence and comparison of mortality rates before and after 2009 are available for review (Figure 7 and Figure 8). The term crude describes the number of observed cases/number of population exposed. Upon initial review, it may appear that incidence is higher than in the past; however, it is possible that a higher rate of incidence (and cases) may be a result of refined screening technologies and/or an increase of women getting screened. There is variation in breast cancer incidence rates by race; however, the small number of these cases among American Indian/Alaskan Native-NH and Hispanic women limits confidence in the estimates for these groups, as noted by the wide error bars (Figure 7).

**Figure 7 Comparison of breast cancer incidence rates before and after 2009**

![Breast cancer crude incidence rates averaged for four-year periods: Pierce County females, all ages](image)


**Figure 8 Comparison of breast cancer mortality rates before and after 2009**

![Breast cancer crude mortality rates averaged for four-year periods: Pierce County females, all ages](image)

**Age**

Breast cancer incidence is strongly age dependent (Figure 9). Both Pierce County and Washington state incidence reached a peak in the 75-79 age groups; however Pierce county incidence remains higher than the state average. Although incidence is more common in older women, studies have shown that survival rates are higher among women diagnosed at ages 70 and older compared to women diagnosed before 50.iii

**Figure 9 Breast cancer incidence rate by age, females, Pierce County and Washington State, 2003-2012**

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Pierce County</th>
<th>Washington State</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-24</td>
<td>0.0</td>
<td>1.4</td>
</tr>
<tr>
<td>25-29</td>
<td>12.3</td>
<td>8.4</td>
</tr>
<tr>
<td>30-34</td>
<td>26.3</td>
<td>28.1</td>
</tr>
<tr>
<td>35-39</td>
<td>79.1</td>
<td>69.9</td>
</tr>
<tr>
<td>40-44</td>
<td>161.4</td>
<td>162.6</td>
</tr>
<tr>
<td>45-49</td>
<td>251</td>
<td>258.7</td>
</tr>
<tr>
<td>50-54</td>
<td>316.5</td>
<td>313.8</td>
</tr>
<tr>
<td>55-59</td>
<td>389.9</td>
<td>371.9</td>
</tr>
<tr>
<td>60-64</td>
<td>484.9</td>
<td>477</td>
</tr>
<tr>
<td>65-69</td>
<td>579.6</td>
<td>581.2</td>
</tr>
<tr>
<td>70-74</td>
<td>618.8</td>
<td>605.8</td>
</tr>
<tr>
<td>75-79</td>
<td>644.3</td>
<td>606.2</td>
</tr>
<tr>
<td>80-84</td>
<td>633.1</td>
<td>555.7</td>
</tr>
<tr>
<td>85+</td>
<td>479.2</td>
<td>427.6</td>
</tr>
</tbody>
</table>


**Stage at diagnosis**

Stage at diagnosis is categorized into four classes by the Washington State Cancer Registry: *in situ*, localized, regional and distant. Advanced stage diagnosis (regional or distant) can be an indication of inadequate breast cancer screening. Among Pierce County cases diagnosed in 2008-2012 in which the cancer could be staged, 29% were diagnosed at the regional or distant stages.
Race

Figure 10 Percent of breast cancer cases with regional or distant involvement at diagnosis, all ages, Pierce County, 2008-2012

<table>
<thead>
<tr>
<th>Race</th>
<th>Percent with regional or distant involvement at diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>White-NH</td>
<td>24.9%</td>
</tr>
<tr>
<td>Asian/Pacific Islander NH</td>
<td>25.6%</td>
</tr>
<tr>
<td>Hispanic as Race</td>
<td>26.1%</td>
</tr>
<tr>
<td>Black-NH</td>
<td>31.3%</td>
</tr>
<tr>
<td>American Indian/Alaska Native-NH</td>
<td>37.3%</td>
</tr>
</tbody>
</table>


While there were more White-NH women diagnosed with breast cancer than Black-NH women, Black-NH women were more often diagnosed at a later stage (regional or distant) than White-NH women (Figure 10). There was some variation in late-stage diagnosis by race; however, the small number of these cases among American Indian/Alaskan Native-NH and Hispanic women limits confidence in the estimates for these groups, as noted by the wide error bars (Figure 10).

Hospital burden of breast cancer

There were 787 hospitalizations due to breast cancer among Pierce County 40-64 y.o. females in the period 2004-2013. This corresponds to the rate of 60.1 hospitalizations per 100,000 females, per year in the age group 40-64. This rate for Washington state was 68.4 hospitalizations per 100,000 females per year.

Geography

Breast cancer-related hospitalization rates were fairly similar among women residing in different geographic Areas. The exceptions were Area 1: Bonney Lake to Mount Rainier, which had the highest rate of hospitalizations and Area 6: Lakewood/JBLM, which had a particularly low rate of hospitalizations. It is unclear as to why there are higher hospitalization rates in Area 1: Bonney Lake to Mount Rainier. One possible reason is potentially higher level of affluence, is leading to better access to screening and follow-up care. In contrast low hospitalization rates in Area 6: Lakewood/JBLM may be because women in this area received care at Madigan Army Medical Center which is excluded from this data source.
Figure 11 Breast cancer hospitalization rates by areas of interest, per 100,000 40-64 y.o. females: Pierce County, 2004-2013

![Breast cancer hospitalization rates by areas of interest](image)

Source: Community Health Assessment Tool (CHAT): Center for Health Statistics, Washington State Department of Health

Age

Pierce County and Washington state breast cancer hospitalization rates were age-dependent (Figure 12), as were Pierce County and Washington state breast cancer incidence rates described above (Figure 9), peaking at ages 75-79, while hospitalizations peaked at ages 80-84. However, when they reach the age of 85 and older, Pierce County women experienced lower hospitalization rates than the Washington state average.

Figure 12 Breast cancer hospitalization rates by age, per 100,000 females: Pierce County vs. Washington State females, 2004-2013

![Breast cancer hospitalization rates by age](image)

Source: Community Health Assessment Tool (CHAT): Center for Health Statistics, Washington State Department of Health
Breast cancer mortality

Breast cancer mortality rate is the number of women who died from breast cancer divided by the population then multiplied by 100,000.

\[ \text{Mortality rate} = \left( \frac{\text{deaths}}{\text{female population/ year}} \right) \times 100,000 \]

Figure 13 and Figure 14 compare two nine-year periods for breast cancer deaths in Pierce County, providing both the rate and total count of deaths from breast cancer. Attachment A’s glossary provides a definition of rate compared to case.

In Pierce County 891 women died from breast cancer in the period 2003–2012, or 89.1 deaths per year (Figure 14). 364 of these were among women 40-64 years of age. The mortality rate for Pierce County was 26.8 per 100,000, per year; the rate for Washington state was 29.6 per 100,000 (Figure 15). Area 4: Central Tacoma to Ruston had the highest rate of breast cancer deaths for 40-64 year old women in Pierce County (Figure 13).

**Geography**

The highest rates of breast cancer deaths for 40-64 year old women were in Area 4: Central Tacoma to Ruston (40.7 deaths per 100,000 women) and Area 3: Ashford/Mt Rainier (30.3 deaths per 100,000 women) (Figure 13). The lowest rates of breast cancer deaths were in Area 2: N.E. Tacoma/Meridian East (22.0 deaths per 100,000 women) and Area 5: SE Tacoma to Spanaway (24.4 deaths per 100,000 women). The lowest number of deaths was Area 6: Lakewood/JBLM (38 deaths) yet with a fairly high rate of death.

Death rates and hospitalization rates sometimes presented a similar geographic picture of disease burden. Among 40-64 year old women in Area 1: Bonney Lake to Mt Rainier, however, hospitalizations and deaths were discordant with a high rate of hospitalizations and a low rate of deaths.

**Figure 13 Breast cancer death rates in 40-64 y.o. females, Pierce County Area, 2003–2012**

<table>
<thead>
<tr>
<th>Area</th>
<th>Mortality from breast cancer in 40-64 y.o. females</th>
</tr>
</thead>
<tbody>
<tr>
<td>4: Central Tacoma to Ruston</td>
<td>40.7</td>
</tr>
<tr>
<td>3: Ashford/Mt Rainier</td>
<td>30.3</td>
</tr>
<tr>
<td>7: UP/Key Peninsula</td>
<td>27.2</td>
</tr>
<tr>
<td>6: Lakewood/JBLM</td>
<td>27.6</td>
</tr>
<tr>
<td>1: Bonney Lake to Mt Rainier</td>
<td>26.8</td>
</tr>
<tr>
<td>5: SE Tacoma to Spanaway</td>
<td>24.4</td>
</tr>
<tr>
<td>2: NE Tacoma to Meridian E.</td>
<td>22.0</td>
</tr>
</tbody>
</table>

Source: Community Health Assessment Tool (CHAT): Center for Health Statistics, Washington State Department of Health
Sometimes, a high rate of hospitalizations and a low rate of deaths are a result of early screening and earlier treatment—especially possible in a more affluent geographical area.

**Figure 14 Breast cancer deaths in 40-64 y.o. females, Pierce County Areas, 2003-2012**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6: Lakewood/JBLM</td>
<td>38</td>
<td>33</td>
</tr>
<tr>
<td>2: NE Tacoma to Meridan E.</td>
<td>41</td>
<td>46</td>
</tr>
<tr>
<td>5: SE Tacoma to Spanaway</td>
<td>46</td>
<td>48</td>
</tr>
<tr>
<td>1: Bonney Lake to Mt Rainier</td>
<td>54</td>
<td>49</td>
</tr>
<tr>
<td>7: UP/Key Peninsula</td>
<td>59</td>
<td>59</td>
</tr>
<tr>
<td>3: Ashford/Mt Rainier</td>
<td>64</td>
<td>62</td>
</tr>
<tr>
<td>4: Central Tacoma to Ruston</td>
<td>61</td>
<td>63</td>
</tr>
</tbody>
</table>

Source: Community Health Assessment Tool (CHAT): Center for Health Statistics, Washington State Department of Health

**Age**

Breast cancer mortality increased with age (Figure 15). It is important to remember that a woman who died of breast cancer at age 80 could have first been diagnosed decades earlier.

**Figure 15 Breast cancer death rates, females by age, Pierce County vs. Washington State, 2003–2012**

Source: Community Health Assessment Tool (CHAT): Center for Health Statistics, Washington State Department of Health
Race
Black-NH women had the highest rates of death from breast cancer in Pierce County (Figure 16). The fact that Black-NH women have lower incidence but higher mortality from breast cancer compared with White-NH women means that additional factors make this population particularly vulnerable to poor outcomes. These factors might include: more aggressive tumors; diagnosis at a later stage; and/or inadequate care following diagnosis. Reasons for diagnosis at later stage and/or inadequate care following diagnosis can be due to health beliefs around cancer causes and cancer treatments; historical mistrust with predominantly white healthcare services; personal needs taking precedence over screening/treatment; or an inability to afford care.

Hispanic women appear to remain at a fairly low risk of breast cancer mortality. The paradox of low socioeconomic status with better than expected health and mortality outcomes may explain the low mortality (see Hispanic Paradox in glossary). Nonetheless, more exploration is recommended, as forced racial categorization may limit recognition of Hispanic-related cases. Additionally, recent accounts of screening and treatment barriers may identify important screening and care disparities.

Upon first glance, the second highest rate of breast cancer deaths appear to be among American Indian/Alaskan Native-NH women, however the small number of cases for this group means the estimated rate is imprecise, and it is, in fact, White-NH women that have the next highest rate of breast cancer-related death.

Figure 16 Breast cancer death rates, by race, in 40-64 y.o. females, Pierce County vs. Washington State, 2003–2012

| Mortality from breast cancer in 40-64 females, per 100,000: Pierce County vs. Washington State |
|---------------------------------|-----------------|
|                    | WA          | PC          |
| Black-NH          | 49.3        | 16.1        |
| Am. Ind. / Alask. Nat.-NH | 42.1        | 30.7        |
| White-NH          | 29.8        | 27.8        |
| Asian/Pac. Isl.-NH | 19.8        | 20.1        |
| Hisp. as Race    | 12.5        | 16.1        |

Source: Community Health Assessment Tool (CHAT): Center for Health Statistics, Washington State Department of Health
Years of potential life lost due to breast cancer

Years of potential life lost (YPLL) is an estimate of the average years a woman would have lived if she had not died of breast cancer. It is, therefore, a measure of premature mortality. It is a measure that captures both the risk of death and the age of death in a population. In this section YPLL relative to age 65 per 100,000 individuals was calculated.

Geography
Breast cancer resulted in 132 years of potential life lost in Pierce County per 100,000 women in 2003-2012. This indicator of premature death largely followed the same geographical pattern as did the rate of death: YPLL was highest in Area 4: Central Tacoma to Ruston, and lowest in Area 6: Lakewood/JBLM (Figure 17).

Figure 17 Years of potential life lost, per 100,000, averaged for 2003-2012

<table>
<thead>
<tr>
<th>Council District</th>
<th>YPLL per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>6: Lakewood/JBLM</td>
<td>104.4</td>
</tr>
<tr>
<td>2: NE Tacoma to Meridian E.</td>
<td>111.1</td>
</tr>
<tr>
<td>5: SE Tacoma to Spanaway</td>
<td>120.1</td>
</tr>
<tr>
<td>3: Ashford/Mt Rainier</td>
<td>125.6</td>
</tr>
<tr>
<td>1: Bonney Lake to Mt Rainier</td>
<td>138.5</td>
</tr>
<tr>
<td>7: UP/Key Peninsula</td>
<td>149.0</td>
</tr>
<tr>
<td>4: Central Tacoma to Ruston</td>
<td>181.8</td>
</tr>
</tbody>
</table>

Source: Community Health Assessment Tool (CHAT): Center for Health Statistics, Washington State Department of Health

Race
YPLL followed the same racial pattern as seen for rate of death: high in Black-NH women and low in Hispanic women (Figure 18). The death rate from breast cancer for Black-NH women was three times higher (49.3/16.1 = 3) than that of Hispanic women 40-64 years old. On the other hand, YPLL for Black-NH women was 231.0/34.7= 6.7 times higher than that of Hispanic women. This means that Black-NH women are dying in greater numbers and dying at younger ages than Hispanic women.
Breast cancer screening in Pierce County

Breast cancer screening involves clinical breast examination or mammography. Studies have shown that regular screening of women with no symptoms has decreased the number of women who die from breast cancer by approximately 45 percent.

About 24.5% of women aged 40-64 in Pierce County and about 22.4% women in Washington state did not receive a mammogram in the past two years. Compared to Pierce County women who had a recent mammogram, those who had not were more likely to be:

- under age 50,
- nonwhite,
- uninsured,
- without a usual source of health care and
- unable to afford needed health care in the past year.

These characteristics have also been associated with mammography under-utilization in other studies. Among Pierce County women aged 40-64 who did not receive a mammogram in the past two years, about 62% of women reporting no usual source of health care (i.e., no primary care provider) reported having foregone a mammogram and 41% reported being unable to afford a doctor in the past year.

Geography

Screening mammography utilization was highest in Area 6: Lakewood/JBLM across all ages (Figure 19). Women 40-64 years of age were less likely to have received a mammogram than women over 65 years of age in all Areas with exception to Area 7: UP/Key Peninsula. Among women 40-64 years of age, women living in Area 5: SE Tacoma to Spanaway and Area 3: Ashford/Mt Rainier were less likely to have received a recent screening mammogram. Among women over 65 years of age, regional gaps in mammography utilization were observed in Area
1: Bonney Lake to Mt Rainier and Area 3: Ashford/Mt Rainier, (Figure 19), suggesting that geographic isolation may be a barrier to accessing mammography, particularly among women 40-64 years of age.

Figure 19 Percent of women who did not receive a mammogram within preceding two years, Pierce County, 2011-2013

Because mammography utilization information is self-reported during a telephone interview, it is subject to several biases. Please see Attachment F for a list of Behavioral Risk Factor Surveillance System (BRFSS) telephone survey questions utilized in this report.

**Economic status and access barriers in Pierce County**

Economic resources are very important for accessing health care. Pierce County women who reported not having a personal doctor also reported an inability to afford needed health care in the past year, lacked adequate insurance coverage, and experienced poverty. Because Medicare coverage begins at age 65 years we do not report insurance or poverty for that age group. Reports of access to doctors, the inability to afford needed health care, and insurance coverage are self-reported during a telephone interview, and are subject to several biases. Please see Attachment F for a list of Behavioral Risk Factor Surveillance System (BRFSS) telephone survey questions utilized in this report.
Figure 20 Women who did not have personal doctor, Pierce County, 2011-2013

<table>
<thead>
<tr>
<th>Area</th>
<th>Percent of Women who Don't Have Personal Doctor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Bonney Lake to Mt Rainier</td>
<td>7.4% 14.7%</td>
</tr>
<tr>
<td>7: UP/Key Peninsula</td>
<td>3.5% 14.8%</td>
</tr>
<tr>
<td>2: NE Tacoma to Meridian E.</td>
<td>7.7% 22.3%</td>
</tr>
<tr>
<td>3: Ashford/Mt Rainier</td>
<td>6.5% 22.4%</td>
</tr>
<tr>
<td>6: Lakewood/JBLM</td>
<td>4.9% 23.8%</td>
</tr>
<tr>
<td>4: Central Tacoma to Ruston</td>
<td>5.5% 29.5%</td>
</tr>
<tr>
<td>5: SE Tacoma to Spanaway</td>
<td>5.5% 33.8%</td>
</tr>
</tbody>
</table>

Source: Behavioral Risk Factor Surveillance System (BRFSS), 2011-2013

**Geography**

Having a physician referral is very strongly associated with mammography utilization and women without a primary care provider are less likely to receive a referral for a screening mammogram. Women with no usual source of care tended to reside in Areas with high levels of poverty: Area 4: Central Tacoma to Ruston, Area 5: SE Tacoma to Spanaway, and Area 6: Lakewood/JBLM (Figures 20-23). Area 4: Central Tacoma to Ruston and Area 5: SE Tacoma to Spanaway had the highest percentages of economic need among women 40-64 years of age, by all these measures (Figures 21-23).

Figure 21 Women who couldn’t afford health care in last year, Pierce County, 2011-2013

<table>
<thead>
<tr>
<th>Area</th>
<th>Percent of Women who couldn't Afford Health Care in Past Year, 2011-2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Bonney Lake to Mt Rainier</td>
<td>3.8% 16.1%</td>
</tr>
<tr>
<td>3: Ashford/Mt Rainier</td>
<td>2.9% 17.2%</td>
</tr>
<tr>
<td>7: UP/Key Peninsula</td>
<td>3.3% 22.1%</td>
</tr>
<tr>
<td>2: NE Tacoma to Meridian E.</td>
<td>4.7% 24.2%</td>
</tr>
<tr>
<td>5: SE Tacoma to Spanaway</td>
<td>5.5% 29.8%</td>
</tr>
<tr>
<td>4: Central Tacoma to Ruston</td>
<td>6.3% 38.6%</td>
</tr>
</tbody>
</table>

Source: Behavioral Risk Factor Surveillance System (BRFSS), 2011-2013
Conclusions and recommendations

Geography

Our analysis shows geographical variation in breast cancer incidence and mortality, mammography utilization, and socioeconomic barriers to care across Pierce County. Breast cancer death rates and years of potential life lost to breast cancer were highest in Area 4: Central Tacoma to Ruston. Among Pierce County women 40-64 years of age, women living in Area 5: SE Tacoma to Spanaway were least likely to have received a recent screening mammogram. Likewise, by multiple measures, economic need was high in Area 4: Central Tacoma to Ruston and in Area 5: SE Tacoma to Spanaway. If strategic outreach planning decisions are to be based
on breast cancer burden or economic need, we recommend the breast center focus outreach efforts on these Tacoma areas.

Area 3: Ashford/Mt Rainier could also benefit from targeted outreach, as geographical isolation may be a barrier to screening mammography for women aged 40-64 in this area; however, we also recommend conducting focus groups or key informant interviews to better understand the barriers of these women living in rural areas.

Race

White-NH women appear to be most likely to develop breast cancer among women in Pierce County; however, Black-NH women were the most likely to develop breast cancer among non-whites. Black-NH women remain more likely to be diagnosed at a later stage, to die of breast cancer, and to die at a younger age. National studies have shown that Black women were more likely to have large, advanced-stage, high-grade and lymph-node positive tumors-even among well-screened women. Because inadequate screening is a primary contributory factor for higher mortality from breast cancer among Black-NH women, there remains a need to address mediating factors that make these women particularly vulnerable to poor outcomes. These mediating factors include but are not limited to diagnosis at a later stage; inadequate care following diagnosis, and inability to afford care.

Hispanic women appear to remain at a fairly low risk of breast cancer mortality. The paradox of low socioeconomic status with better than expected health and mortality outcomes may explain the low mortality (see Hispanic Paradox in glossary). Nonetheless, more exploration is recommended, as forced racial categorization may limit recognition of Hispanic-related cases. Recent anecdotal accounts identify barriers to screening and treatment such as cultural health beliefs around breast cancer causes and prognosis; fear of pain during screening; limited skills in navigating care systems; limited skills in health literacy/health communication; and/or limited self-advocacy in clinical settings. We recommend conducting focus groups or key informant interviews to better understand the barriers of these women.

Age

Breast cancer incidence, hospitalization and death were very strongly related to age; each of these measures of burden increased consistently with age and peaked sometime after age 75. There have been few studies that explore breast cancer burden and care barriers for women ages 70 and older. While there is low certainty about the net benefits of screening mammography for women 75 years or older, the greatest benefits of screening mammography are seen in women aged 60 to 69 years. While breast cancer burden increases with age, access to care also tends to improve with age. This is particularly true after age 65 when almost all women become eligible for Medicare. In Area 5: SE Tacoma to Spanaway, there has been a decrease in the amount of women 65 or older that could not afford health care sometime in the
previous year; however, Area 5: SE Tacoma to Spanaway holds the highest amount of women in the county (6.3%) 65 or older who could not afford health care sometime in the previous year.

**Recommendations**

- If strategic outreach planning decisions are to be based on breast cancer burden and economic need, then we recommend Area 4: Central Tacoma to Ruston and Area 5: SE Tacoma to Spanaway as places to focus outreach efforts.
- If strategic outreach planning decisions are to be based on breast cancer burden, economic need, and potential geographic isolation, Area 3: Ashford/Mt Rainier could also benefit from targeted outreach, coupled with conducting focus groups or key informant interviews to better understand the barriers of these women, living in rural areas.
- Black women were more likely to be diagnosed at a regional or distant stage, to die of breast cancer and to die at a younger age than other women. We recommend that they continue to be targeted for outreach and intervention.
- Hispanic women appear to remain at a fairly low risk of breast cancer mortality; however, there may be factors that limit the ability to fully recognize breast cancer diagnosis and death rates. Barriers to screening and treatment have anecdotally been identified. We recommend conducting focus groups or key informant interviews to explore the barriers of these women in order to determine appropriate outreach efforts.
References

i Washington State Department of Health – Office of Hospital and Patient Data Systems Procedure Manual For Submitting Discharge Data For UB-04, Revised April 2, 2010