A Comparison of Breast Cancer Case Attributes by Multiple Primary Rules

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Acknowledgements

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  – Rachel Weinstein (University of Pennsylvania)
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Introduction

• Different rules exist to determine whether a person has a new primary cancer or a recurrence or extension of previous one

• When different sets of rules are followed, comparison of cancer incidence rates is less straightforward; the impact of the procedural differences often being unknown
Purpose

• To compare breast cancer case counts determined using two different multiple primary coding rules:
  – Surveillance Epidemiology and End Results (SEER) coding rules
  – International Agency for Research on Cancer (IARC) coding rules
Background

- Differences between SEER and IARC multiple primary coding rules:
  - SEER:
    - consider medical information such as cancer site, date of diagnosis, histology, behavior, and laterality of paired organs per lifetime
Background cont.

– IARC Rules:

• consider only the cancer site and histology when determining whether to report a new primary cancer

• a person can only have one cancer per organ or pair of organs, or tissue, except when multiple tumors within an organ have different histologies
• Tumors that are part of a relapse, extension, recurrence or metastasis are excluded when using the SEER and IARC rules

• The use of the IARC rules generally results in fewer primary cancers
Data Sources

• Registry data (1994 to 1998) submitted to NAACCR
  – Data met NAACCR high quality data standards
  – Consent to use data was granted

• Original file was already coded using the SEER multiple primary rules
Methods

• Breast cancer tumor file was converted into a patient linked file
• File was restricted to people (322,717) with at least one invasive breast cancer tumor
• Only those (291,484) with a complete breast cancer tumor history were included
• IARC Rules were then applied to this file
Results

• The 1994-1998 SEER file of 291,484 men and women with complete breast tumor history and at least one invasive tumor contained 298,643 cases.

• The overall mean age was 62 and the median age was 63

• 99.1% of the cases occurred in females
Results

• Application of the IARC multiple primary rules to this file resulted in 6,924 fewer cases
  – 2.4% overall decrease in cases
  – 6,900 fewer females (2.4%) and 24 fewer males (0.9%)

• SEER counts always \( \geq \) IARC counts regardless of the subset of the data examined
Results by Age

• % difference between SEER and IARC coded cases generally increased with age among women
• Difficult to discern an age trend among men,
  – though the % difference was twice as large (1.2% to 0.6%) for those ≥ 65 years versus those < 65
• For both men and women the highest percentage differences were observed in the 80 to 84 year age group
Table 1. Summary: Age-specific Breast Cancer Incidence Counts, By Sex, Selected Areas in the U.S.

<table>
<thead>
<tr>
<th>Age Group/Sex</th>
<th>SEER Rules</th>
<th>IARC Rules</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>80-84/Males</td>
<td>244</td>
<td>240</td>
<td>1.7%</td>
</tr>
<tr>
<td>80-84/Females</td>
<td>20,826</td>
<td>20,140</td>
<td>3.4%</td>
</tr>
</tbody>
</table>

*Persons identified as having a tumor history before 1994 were excluded
**Percent change was calculated with IARC counts as the base
Source: NAACCR Call for Data Files, submitted December 2000
Results by Histology

• Among males, the highest percentage change was observed for intraductal and lobular breast carcinomas in combination.

• Among females, the highest percentage change was for inflammatory breast cancer.
Table 2. Summary: Histology-specific Breast Cancer Incidence Counts, By Sex, Selected Areas in the U.S.

<table>
<thead>
<tr>
<th>Histology/Sex</th>
<th>SEER Rules</th>
<th>IARC Rules</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intraductal/Males</td>
<td>44</td>
<td>42</td>
<td>4.8%</td>
</tr>
<tr>
<td>Inflammatory/Females</td>
<td>2,951</td>
<td>2,822</td>
<td>4.6%</td>
</tr>
</tbody>
</table>

*Persons identified as having a tumor history before 1994 were excluded

**Percent change was calculated with IARC counts as the base

Source: NAACCR Call for Data Files, submitted December 2000
Results by Stage

• % differences in observed case counts were greatest for tumors staged as distant, and smallest for those staged as regional

• True for both males and females
Table 3. Summary:
Stage-specific Breast Cancer Incidence Counts, By Sex, Selected Areas in the U.S.

<table>
<thead>
<tr>
<th>Stage/Sex</th>
<th>SEER Rules</th>
<th>IARC Rules</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distant/Males</td>
<td>170</td>
<td>165</td>
<td>3.0%</td>
</tr>
<tr>
<td>Regional/Males</td>
<td>967</td>
<td>960</td>
<td>0.7%</td>
</tr>
<tr>
<td>Distant/Females</td>
<td>14,743</td>
<td>14,305</td>
<td>3.1%</td>
</tr>
<tr>
<td>Regional/Females</td>
<td>85,563</td>
<td>84,042</td>
<td>1.8%</td>
</tr>
</tbody>
</table>

*Persons identified as having a tumor history before 1994 were excluded
**Percent change was calculated with IARC counts as the base
Source: NAACCR Call for Data Files, submitted December 2000
Results by Laterality

- Overall differences between SEER and IARC case counts were negligible when examined by laterality

- True for both males and females
Results by Grade

• % difference in case counts decreased with increasing grade of tumor among females
  – well differentiated (Grade I) tumors accounted for the largest difference and Grade IV tumors the smallest

• No such trend by grade was evident among males though the % change was highest for well differentiated tumors
Table 4. Summary:
Grade-specific Breast Cancer Incidence Counts, By Sex, Selected Areas in the U.S.

<table>
<thead>
<tr>
<th>Grade/Sex</th>
<th>SEER Rules</th>
<th>IARC Rules</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well differentiated/ Males</td>
<td>283</td>
<td>278</td>
<td>1.8%</td>
</tr>
<tr>
<td>Well differentiated/ Females</td>
<td>38,757</td>
<td>37,580</td>
<td>3.1%</td>
</tr>
<tr>
<td>Grade IV/ Females</td>
<td>7,620</td>
<td>7,486</td>
<td>1.8%</td>
</tr>
</tbody>
</table>

*Persons identified as having a tumor history before 1994 were excluded

**Percent change was calculated with IARC counts as the base

Source: NAACCR Call for Data Files, submitted December 2000
Concluding Remarks

• A common set of rules would facilitate international comparisons but may not be forthcoming in the near future

• Important to separate coding differences from the biological and etiological contributors that increase risk for subsequent primary cancers
Concluding Remarks cont.

• We observed 2.4% fewer invasive breast cancer cases using IARC rather than SEER multiple primary coding rules

• This difference should be kept in mind when comparing counts from registries using these different multiple primary coding rules

• % may or may not apply to other cancer sites