A Comparison of Breast Cancer Case Attributes by Multiple Primary Rules

Larry F. Ellison (Statistics Canada)

Joellyn L. Hotes (NAACCR)

NAACCR Annual Meeting

June, 2003

Acknowledgements

- Co-authors:
  - Holly L. Howe (NAACCR)
  - Ingrid Friesen (Statistics Canada)
  - Betsy Kohler (New Jersey Cancer Registry)

- Others:
  - Rachel Weinstein (University of Pennsylvania)
  - Information Management Services

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

Background cont.

- 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 ≥ 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.

Age Group/Sex	SEER Rules	IARC Rules	Percent Change
80-84/Males	244	240	1.7%
80-84/Females	20,826	20,140	3.4%

*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.

Histology/Sex	SEER Rules	IARC Rules	Percent Change
Intraductal/Males	44	42	4.8%
Inflammatory /Females	2,951	2,822	4.6%

*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.

Stage/Sex	SEER Rules	IARC Rules	Percent Change
Distant/Males	170	165	3.0%
Regional/Males	967	960	0.7%
Distant/Females	14,743	14,305	3.1%
Regional/Females	85,563	84,042	1.8%

*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.

Grade/Sex	SEER Rules	IARC Rules	Percent Change
Well differentiated/ Males	283	278	1.8%
Well differentiated/Females	38,757	37,580	3.1%
Grade IV/Females	7,620	7,486	1.8%

*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