Summary Stage 2000: Directly Coded vs. Derived

NAACCR Data Use and Research Committee – Summary Stage Work Group

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Acknowledgement: Zhenzhen Zhang

Background
- Historically, there were two major coding systems for staging cancer cases: AJCC TNM and SEER Summary Stage
- To eliminate the duplicate efforts in staging cancer cases, the CS system was developed. With the CS codes, both AJCC TNM and SEER SS can be derived automatically.

Methods
- CINA Deluxe 1995-2005 dataset (Dec 2007 submission)
- Data from 40 cancer registries that met the standards for high quality incidence data
- Cancer sites defined according to the SEER site recodes. Only invasive cases included
- Likelihood ratio test used

Diagram:
- Sig differences in stage from 2003 to 2004?
  - No
  - Yes
  - Explained by decreases in % of unknown stage alone or in combination with linear trends?
  - No
  - Yes
- Changes in coding instruction?
  - No
  - Yes
- Related to use of the CS
  - Yes
  - No
1. Four cancer sites without significant differences in stage distribution between 2003 and 2004:
   - bone and joints
   - intraportal bile duct
   - NHL
   - penis

2. Four cancer sites with significant differences in stage distribution between 2003 and 2004:
   - cases, attributable to 2001-2004 linear trends in stage distribution:
     - other non-epithelial skin
     - stomach
     - pancreas
     - thyroid

3. Eight cancer sites with significant differences in stage distribution between 2003 and 2004:
   - attributable to decreases in % of unknown stage from 2003 to 2004 alone or in combination with 2001-2004 linear trends:
     - breast
     - brain
     - corpus & uterus, NOS
     - esophagus
     - liver
     - prostate
     - soft tissue including heart
     - testis

4. Eighteen cancer sites with significant differences in stage distribution between 2003 and 2004:
   - decreases in % of unknown stage from 2003 to 2004 alone or in combination with 2001-2004 linear trends do not explain the differences:
     - bladder
     - cervix
     - colon
     - rectum
     - kidney
     - larynx
     - lung
     - melanoma
     - oral
     - ovary
     - vulva
     - anus
     - HL
     - eye
     - gallbladder
     - small intestine
     - vagina
     - cranial & other nervous system

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**Stage Distributions by Year of Diagnosis**

**Stomach**

Year of Diagnosis

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<th>Year</th>
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<th>Regional</th>
<th>Distant</th>
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<tr>
<td>2004</td>
<td>20%</td>
<td>14%</td>
<td>5%</td>
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**Brain**

Year of Diagnosis

<table>
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<tr>
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<th>Localized</th>
<th>Regional</th>
<th>Distant</th>
<th>Unknown</th>
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<tr>
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<td>30%</td>
</tr>
<tr>
<td>2004</td>
<td>34%</td>
<td>15%</td>
<td>10%</td>
<td>21%</td>
</tr>
</tbody>
</table>
Comparisons of Coding Instructions

- Differences in coding instructions between SS2000 and CSDSS2000 were identified for all cancer sites except for breast, cervix, and cranial nerves & other nervous system.
- CS instructions are more detailed; additional anatomic structures used to define direct extension and/or lymph nodes involvement.
- Switched from one stage in SS2000 to another in CSDSS2000 for some cancer sites.

Changes in Extension (SS2000 vs. CS)

- Colon Cancer
  - Direct extension to SS2000
  - CSDSS2000
  - Non-peritonealized pericolonic tissues
  - Lamina propria, including lamina propria in the stalk of a polyp
  - Localized

- Tonsil, Oropharynx
  - Retropharyngeal
  - Regional Distant

- Nasopharynx
  - Posterior cervical (spinal accessory)
  - Regional Distant

Discussion

The observed differences in stage distribution between 2003 and 2004 may be attributable to:

- 2001-2004 linear trends in stage distribution
- decreases in unknown stage cases from 2003 to 2004 alone or in combination with 2001-2004 linear trends in stage distribution
- major changes in coding instruction (stage switch)
- additional anatomic structures used to define extensions in the CS manual
- human errors
Discussion

• Similar patterns were observed in a study that examined the stage comparability using double-coded cancer cases (colon & rectum, breast, prostate, and oral cavity only) diagnosed in 2004-2006 (Kahn et al. 2009).

• It supports our speculations that changes in coding instructions may affect stage distributions for some cancer sites.

Limitations

• Kappa statistic method could not be used to assess the agreement of the two coding systems because of the absence of double-coded stage data.

• Impact of changes in coding instructions on stage distributions could not be quantified.

• Not all changes in stage distribution from 2003 to 2004 have explanations. Some could be attributable to human errors.

Limitation

• Linear trends in stage distribution based on short-term data may not reflect true patterns of the trends

• Scales in stage shift are very small for some cancer sites and may not have a significant meaning in practice.

Recommendation

• Future changes in coding schemes should include provisions to double-code stage data during the transition years to evaluate the impact of the revisions.

• Because changes in coding instructions may confound the real changes in stage distribution, their impacts should be assessed when analyzing combined pre-CS and post-CS stage data.

• Stage incomparability needs to be included in limitation section.

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