Multiple Primaries (MPs) in Survival Estimates: Should SEER include or exclude MPs?

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Introduction

- The Surveillance, Epidemiology, and End Results (SEER) Program of NCI collects data on multiple primary cancers, although second or higher tumors are typically excluded from survival estimates.
- Routine analysis of survival rates in SEER was restricted to create more homogeneous groups of patients since later cancers may affect patient prognosis.
- Rosso (2009) et al. evaluated the impact of including multiple primary tumors (second or higher) on relative survival estimates using data from 69 European cancer registries as part of the EUROCARE-4 study.
- Inclusion of multiple primaries reduced survival estimates.
- Advised that inclusion of multiple primaries reduces bias due to differences in registry running time, completeness, and quality.
- Ellison (2010) evaluated the impact of including multiple primaries in the Canadian Cancer Registry.
- Similar results to EUROCare-4.
- SEER registries have variable running times.
- Expect that longer running registries will contain more multiple primaries.
- In this poster we:
  - Evaluate the impact of excluding multiple primaries using SEER data.
  - Compare our results with EUROCare-4 and Canadian results.

Methods

- Data were from 17 areas of the SEER Program:
  - States of Connecticut, Hawaii, Iowa, New Mexico, Utah, Greater California, Kentucky, Louisiana, and New Jersey.
  - Metropolitan areas of Atlanta, Detroit, Seattle-Puget Sound, San Francisco-Oakland, Los Angeles, San Jose-Monterey, and Rural Georgia.
  - Alaska Native tumor registry.
- Excluded autopsy or death certificate only cases, patients alive but without follow-up, tumors diagnosed at age less than 14.
- Five-year relative survival was estimated using the actuarial method with monthly intervals.
- First only group included tumors with sequence number 00; multiple group included sequence number 02+.

Results

Figure 1: Proportion of multiple primaries by registry and sex. Reference lines are the percentage of MPs in EUROCare-4 and Canadian registries.

- Difference in relative survival increased as the proportion of MPs increased for all cancers combined (Table 1).
  - Alaska Natives and Rural Georgia had the smallest proportion of MPs and small change in relative survival estimates.
  - Detroit, Iowa, Seattle had largest proportion of MPs and largest change in relative survival estimates.

Table 1: 5-year relative survival estimates including only first tumors and MPs by registry and absolute difference between estimates.

- Figures 2 comparing other cause survival curves.
- Conclusions:
  - Even though empirical estimates changed very little, current evidence does not warrant SEER to change their policy of excluding second or higher multiples in relative survival analyses unless appropriate expected rate tables could be developed for second or higher primaries.
  - Expected rates for cancer patients with 2 or more tumors are likely to be too high using general life table because it does not account for fact that these patients had prior cancers (see figure 2 comparing other cause survival curves).
  - Same patient is included more than once when all tumors are used in the relative survival calculation.
  - While incidence and prevalence statistics are generated as "tumor-based", survival statistics are often thought of as "person-based" measures.
  - Patients diagnosed with two or more tumors (sequence 02+) are different than patients with only one tumor diagnosis (example: figure 2).
  - Survival outcomes of patients with MPs may be best if reported separately.

Future direction

- SEER has cause of death (COD) information. Could explore cause-specific survival for patients with more than one cancer.
- Since older patients have more MPs, perhaps useful to calculate age-standardized survival rates.

References