Using NAACCR Survival Tables to Look at Deaths

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Introduction

Absolute death surveillance, even with linkage to the National Death Index, is hindered by practical issues including missing social security number and other identifiers that may lead to errors in ascertaining deaths. Death information could be investigated for selected patients whose survival seems unusually good. The NAACCR Survival Table database offers one such opportunity. For instance, we found that in 2011, unusually good survival, or flaws in death ascertainment. If we can use statistical methods to identify survivor patients (we expect to find death but have no death certificate) we might learn more about methods that death certificate linkup.

In this study, we investigated survivor outcomes in New Hampshire's cancer registry data.

Results

In those aged 65+ (6,142 of 28,217 patients in the database) whose death was marked as 9.5 with a mean of 55. In the multivariable model, 65% of those whose death was associated with private insurance, being married, and having been married any age, lower stage-specific RSR and stage-specific RSR increases, age, and the number of years since diagnosis. 

In those aged 65+, 12,846 (56.9%) of 22,754 patients in the database were 75.2 with a mean of 75.7, regional, lower stage-specific RSR and stage-specific RSR was associated with private insurance, being married, and being married any age, while odds of death increased with increasing years since diagnosis.

Discussion

It is unclear how often errors in vital status ascertainment affect registry data. Two subsets of patients were identified, whose vital status was least consistent with the multivariable model. This may indicate errors in the statistical model where the registry data may be flawed. To understand the “Should Be Alive/Should Not be Dead” group, we need to better understand if the cancer has not been treated but has something unrelated or unreported related. The underlying cause of death can often be thought of as the condition that led to person to seek treatment. The multivariable model (Table 2) presented standard methods of our data were examined to identify the characteristics of patients whose survival was unusually short and who have died.

We examined 25 (1.6%) of 1,527 cases, 257 (1.6%) of 1,527 cases were examined to identify the characteristics of patients whose survival was unusually short and who have died.

Methods

We used the R² in its low, 2005–2011, for the New Hampshire State Cancer Registry and incorporated them into a logistic regression model. We identified malignant cancer cases in adults from the New Hampshire State Cancer Registry, diagnosed 2005–2011, and excluded cases where the stage at diagnosis was 0 or the data were not available for the stage category. We linked the patients to the 21 sites for which R² was reported by the NAACCR Survival Analysis Task Force.”

Models were created to describe vital status, one each for younger and older patients with a cut-off of 65 years to account for differences in mortality. In each case we tested a full model with the pre-specified explanatory variables listed in Table 1, and sequentially removed variables with p>0.105 until a final model was obtained. Pros Logics in SAS 8.4 was used to do this analysis.

Each patient was assigned a predictive value for death according to the model. Extreme values were examined to identify the characteristics of patients whose survival was unusually short and who have died.

Multivariable models of factors associated with death

Table 1: Explanatory variables tested in the model

Table 2: Multivariate models of factors associated with death (or ratio, OR, 95% confidence interval)

Results

Table 3: Under 65.

Table 4: Age 65 and older

Discussion

Next steps

We will keep track down those who seem to have unusually good survival to see whether it was an error in cancer registry lead to diagnosis.

Acknowledgments

This project was supported in part by the Centers for Disease Control and Prevention’s National Program of Cancer Registries, cooperative agreement #5U58DP001930-00 awarded to the New Hampshire Department of Health and Human Services, Division of Cancer. The next highest categories were bone 3.1%, lymph nodes 2.6%, lung 2.3%, liver 2.3%, skin 2.1%, soft tissue 1.9%, breast 1.3%, kidney 1.2%, bone 1.1%, skin 1.0%, melanoma 0.9%, brain 0.8%.

Under G5 Model: Should be Dead

This subset included 146 cases of 1,527 cases, 146 cases were examined to identify the characteristics of patients whose survival was unusually short and who have died.

Table 5: Under 65.

Under G5 Model: Should be Alive

We examined 1025 (37.3%) cases of 2,614 death, who had the poorest survival. The mean age was 55 and a median of 60. There were on average 25 cases per year. 2005-2011, with a total number of 670 cases, which was split into male and female. In this subset 550 (81.5%) were married, and the subset 517 (74.6%) had disease and 40% (61) had private insurance. Looking at primary site, 42.10% (664) were prostate, 8.95% (136) were bone, 8.22% (128) were liver, and 6.74% (106) were lung. After the most frequent sites were kidney (5.74%), 44.5%, 44.5%, 13%, 3.7% (19), and atherosclerotic heart disease 3.7% (19).

Brezet 32.0%, Liver 6.7%, Kidney 5.0%, Upper 0.3%, Esophagus 3.9%, Skin 3.9%, Liver 4.4%, Upper 0.3%, Esophagus 3.9%, Skin 3.9%, Liver 4.4%, Upper 0.3%, Esophagus 3.9%, Skin 3.9%, Liver 4.4%, Upper 0.3%, Esophagus 3.9%, Skin 3.9%, Liver 4.4%, Upper 0.3%, Esophagus 3.9%, Skin 3.9%, Liver 4.4%, Upper 0.3%, Esophagus 3.9%, Skin 3.9%, Liver 4.4%, Upper 0.3%, Esophagus 3.9%, Skin 3.9%, Liver 4.4%, Upper 0.3%, Esophagus 3.9%, Skin 3.9%, Liver 4.4%, Upper 0.3%, Esophagus 3.9%, Skin 3.9%, Liver 4.4%, Upper 0.3%, Esophagus 3.9%, Skin 3.9%, Liver 4.4%, Upper 0.3%, Esophagus 3.9%, Skin 3.9%, Liver 4.4%, Upper 0.3%, Esophagus 3.9%, Skin 3.9%, Liver 4.4%, Upper 0.3%, Esophagus 3.9%, Skin 3.9%, Liver 4.4%, Upper 0.3%, Esophagus 3.9%, Skin 3.9%, Liver 4.4%, Upper 0.3%, Esophagus 3.9%, Skin 3.9%, Liver 4.4%, Upper 0.3%, Esophagus 3.9%, Skin 3.9%, Liver 4.4%, Upper 0.3%, Esophagus 3.9%, Skin 3.9%, Liver 4.4%, Upper 0.3%, Esophagus 3.9%, Skin 3.9%, Liver 4.4%, Upper 0.3%, Esophagus 3.9%, Skin 3.9%.

This group of cases had a cause of death relationship to the primary site at the 1.0 level. For those 43 (70.0%) of these cases were cancer deaths. Of the next highest categories were liver (5.74%), 44.5%, 44.5%, 13%, 3.7% (19), and atherosclerotic heart disease 3.7% (19).

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