A Quick Hit Method of Evaluating Mortality Using Percent Survival at Five and Ten Years
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Abstract: A “Quick Hit” method is illustrated to translate percentage survival rates in a clinical article to meaningful mortality ratios for life insurance underwriting. The example used is from an article entitled, "Incidence and Outcomes of Asthma in the Elderly".

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Frequently, clinical articles present survival in terms of one, five, ten, etc. year survival percents. Translating these into meaningful mortality ratios for insurance underwriting is not difficult. Recently an article in On The Risk, entitled “How Many Tables is That Life Expectancy Worth?” discussed using survival percent tables.

In this article I will illustrate via a Quick Hit Method the application of these tables to evaluate a clinical article.

A paper in Chest, “Incidence and Outcomes of Asthma in the Elderly”, gave one, five and ten year survival percents for their study population. The authors concluded “asthma with onset after age 65 years was not associated with reduced survival”.

The study group consisted of 98 individuals followed from 1964 to 1984.

Study Group Characteristics
Age 65-74, 62% - female 49%
Age 75-84, 31% - female 57%
Age 85 and over, 7% - female 71%
Average age 73 - female 53%

Observed Study Group Survivals
5 year 72%
10 year 57%

I have assumed all are non smokers and the average age for each of the three groups is the midpoint of the age interval. Using the percent of each group in relation to the total, I calculated the average age for the group to be 73 years. Females comprised just over 50% of the group so for quick hit methodology I will assume an equal 50-50 gender mix.

The following table compares by sex the observed survival percents at 5 and 10 year intervals with the expected survival percents from sex distinct non smoker survival rates based on 70% of the 1975-80 table. The mor-
Mortality ratios are taken directly from these tables which are based on current experience mortality levels as reported in the Society of Actuaries' 1991-92 Reports. The reports cover normally underwritten business from large United States companies. Figures are based on the 1975-80 experience study and taken from Table 18 of the Society report.

<table>
<thead>
<tr>
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<th>Male 5 yr - 10 yr</th>
<th>Female 5 yr - 10 yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed survival</td>
<td>72% - 57%</td>
<td>72% - 57%</td>
</tr>
<tr>
<td>Expected survival</td>
<td>91% - 72%</td>
<td>95% - 82%</td>
</tr>
<tr>
<td>Mortality ratio</td>
<td>350% - 175%</td>
<td>600% - 275%</td>
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</tbody>
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For the entire group assuming a 50/50 male/female split, the mortality ratios would be:

- 5 yr: 475%
- 10 yr: 225%

We immediately notice elevated mortality ratios at both five and ten years despite the author's statement of no decreased survival. The difference is based on the tables used for expected mortality. The author's appropriately used tables based on United States North Central life expectancy for a white population. For insurance purposes I used 70% of the 1975-80 table. We must not forget insured population life expectancy exceeds general population life expectancy. Thus what is normal survival for a general population is invariably substandard for a select, insured population.

As a group, elderly individuals with asthma characteristics described for this cohort have a very excessive five year mortality and a moderately excessive ten year mortality. I assumed all to be non smokers. Were some smokers, expected mortality would have been greater and the mortality ratios less. However, considering the age of the participants and presence of a respiratory impairment, the assumption of a non smoking group is valid for this method.

By using the Quick Hit Method the medical director can easily and rapidly estimate the mortality of cohorts described in clinical articles when authors quote interval specific survival percents.

References