The Effect of Follow-Up Time On Lifetime Risk

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1. Lifetime Risk

Lifetime Risk (LTR) can be defined, as the probability of an individual will have an attribute during his/her life span. The calculation of LTR is useful for the estimation of cumulative risk of developing a disease during an individual's remaining lifespan. Estimates of LTR assist clinicians, researchers, and policy-makers in the assessment of the burden of disease in a population. The risks of two or more diseases can be compared and clinical and public health measures can be taken commensurate with the burden of disease. Estimates of the LTR of developing a disease or an attribute are frequently preferred over age-specific or age-standardized incidence rates. These estimates are better able to convey the importance of the disease over the entire life span.

2.Lifetime Risk Calculation

Weinberg's and Actuarial methods are techniques that can be used to compute the age-adjusted estimates of LTR, taking into account the competing causes of disorder. The standard actuarial estimator is adapted to data from a point prevalence survey by constructing a chart resembling the "current life table", in which onset of death is the event of interest and the data are divided into age intervals. The method requires the knowledge of the age of onset of all recorded cases as well as the age at withdrawal or death from a competing cause. LTR estimate is defined by firstly, calculating a survival probability estimate, for each interval, $\hat{p}$ =(a-1/2b-c)/(a-1/2b), where a is the number of persons alive andunaffected at start of the interval, b is the number of withdrawals, deaths from competing causes during this interval, c is the number of incident cases involving persons with ages of onset in this. To express the chance, adjusted for withdrawn cases that a person would live through the interval without onset of the disorder. The Weinberg morbidity table is based on the same principle as the actuarial estimator but uses an incorrect formula for the interval-specific survival probability. The error comes from the inclusion of new cases into the correction for withdrawals; since the outcome of an incident case is known for the whole risk interval. The Weinberg estimator can be given as; $\hat{p}$ =((a-1/2(b+c)-c)/(a-1/2(b+c). In order to form an estimate of LTR from these interval-specific probability estimates, the $\hat{p}$ values from successive intervals, ends with the interval, which includes the last case. This product is an estimate of the cumulative probability of survival. Subtraction of this quantity from unity results in an estimate of LTR. Both techniques rest on the assumption that age-specific incidence rates do not vary with secular time.

3. Application

To study the differences between various methods of estimating LTR for motor vehicle accident

deaths and all hearths caused deaths, National Institute Statistics Report of Turkey, 1997 is used. LTR was calculated using the Life Table method, taking competing causes of death into account and using Actuarial and Weinberg Life Table methods. LTR was calculated by constructing four different age intervals (A, B, C, D) to see the effect of follow up time on LTR.

A: 0, 1-4, 5-14,. ……75+ **B:** 0, 1-14, 15-34, . ……75+

C: 0,1 -24, 25-54, 55+ **D:** 0, 1-34, 35-74, 75+

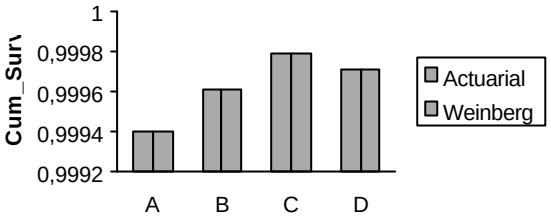

Figure 1.Cumulative Survival Rates Age Categories

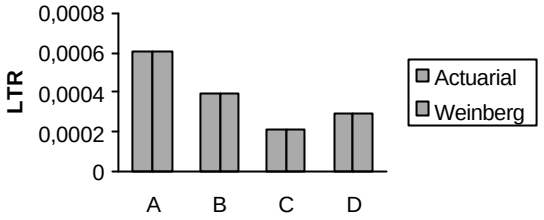

Figure 2.LTR Values Different Age According to Different Categories

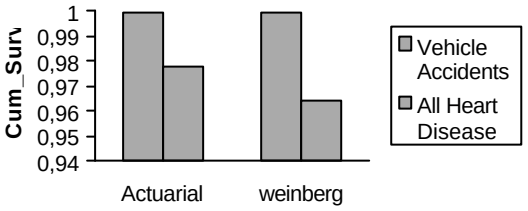

Figure 3.Cumulative Survival Rates for Different Age-Specific Event Rate

4. Conclusion

When we compare the motor vehicle accident deaths and all hearths caused deaths according to different four age categories, the difference between Actuarial and Weinberg Cumulative survival rates appears (Fig.1). If the range of the interval is increased or the numbers of intervals are reduced, LTR is underestimated (Fig.1, Fig.2). The Weinberg estimator is especially vulnerable to differences in the mortality rates of causes and non-cases, both before and after appearance of the trait. If the cut-off age is taken as a small age, LTR becomes larger. As a suggestion a simulation study can be done to see the relations on LTR estimate.

REFERENCE

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RESUME

Dans ce travaille, en emploient le méthode de Weinberg et Actuellement on a donne les c' aculs de le temps de vies.