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LIFE YEARS DIFFERENCE COMPARED TO THE GENERAL POPULATION

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ABSTRACT

For cohorts with long-term follow-up, the number of years lost due to a certain disease yields a measure with a simple and appealing interpretation. Recently, an overview of the methodology used for this goal has been published [1,2] and two measures have been proposed. In this work, we consider a third option, that may be useful in the settings in which the other two measures are inappropriate.

In all three measures, the survival of the given data set is compared to the expected survival in the general population which is calculated using external mortality tables. We thoroughly analyze the differences between the three measures, their assumptions, interpretation and the corresponding estimators. The first measure is defined in the competing risks setting and assumes an excess hazard compared to the general population, while the other two measures also allow estimation for groups that live better than the general population. In this case, the observed survival of the patients is compared to that in the general population, the starting point of this comparison depends on whether the entry into the study is a hazard changing event (e.g. disease diagnosis or simply the age at which the inclusion criteria were known to be met).

Focusing on the newly defined life years difference measure, we study the estimation of the variance and consider the possible challenges (e.g. extrapolation) that could occur in practice. We illustrate its use with a data set of French Olympic Athletes. Finally, an efficient R

implementation has been developed for all three measures which makes this work easily available to subsequent users.

References:

[1] P. K. Andersen. Decomposition of number of life years lost according to causes of death. *Statistics in Medicine*, 32:5278–5285, 2013.

[2] P. K. Andersen. Life years lost among patients with a given disease. *Statistics in Medicine*, 36(22):3573–3582, 2017.