Abstract citation ID: ckaf161.1776
A multi-analyst study on the influence of marital status on the incidence of cardiovascular disease

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Introduction: Multi-analyst studies, in which several analysts use the same data to independently investigate identical research questions, are rarely done in public health. The present analysis was based on the research question: "Does marital status influence the incidence of cardiovascular disease (CVD)?"
Methods: Sixteen analyst groups with backgrounds mainly in statistics, mathematics, and epidemiology independently performed an analysis. They used the Survey of Health, Ageing and Retirement in Europe (SHARE) data, a panel study of 140,000 persons aged $\geq$ 50 years from 28 European countries. The analysts provided an effect estimate, a comment on their results, and the full syntax of their analyses. In additional sensitivity analyses, an exemplary regression model was chosen to vary definitions of exposure and outcome and the confounder adjustment set.
Results: Sixteen different and unique analyses were done. The size of the datasets used for the analyses ranged from 15,592 to 336,914 observations. The effect estimates (odds ratios, hazard ratios, or relative risks) ranged from 0.72 to 1.02 (reference: cohabiting married) in strictly or partly cross-sectional analyses and from 0.95 to 1.31 in strictly longitudinal analyses. The choice of regression models, adjustment sets, as well as variations in the precise definition of exposure and outcome, had only minor effects on the effect estimates. Between adjustment sets (n = 14) applied, relative risks ranged from 1.10 to 1.16 in the exemplary regression model.
Conclusions: The choice of study design for the analysis and by this the decision for a more causal or more associative relationship between marital status and CVD explained most differences between analyses. Of particular interest is the underlying cause of the differences observed in the evaluation between cross-sectional and longitudinal designs, which may be attributed to divergent interpretations or the complexity of the data structure.
Key messages:
- Our analysis shows that effect estimates vary only slightly with researcher degrees of freedom, with larger differences mainly due to different study designs or the complex data structure.
- We highlight the importance of multi-analyst studies for advancing public health research.