REGIONAL VARIATION IN RELATIVE SURVIVAL – QUANTIFYING THE EFFECTS OF THE COMPETING RISKS OF DEATH USING CURE FRACTION MODEL WITH RANDOM EFFECTS

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In population-based cancer studies, relative survival, defined as the ratio between the observed and expected survival, is the preferred measure of survival from cancer itself, because it does not rely on the cause of death information. Monitoring the relative survival of cancer patients by region is a tool for assessing realisation of regional equity in cancer care. We extended a mixture cure fraction model with random effects to allow estimation of relative survival by region in a country with a parsimonious number of parameters. The heterogeneity in the expected survival was taken into account such that the expected mortality rate was considered as a random quantity varying across regions. Two sets of random effects were used to describe regional variation, both in the cure fraction and in the relative survival of the non-cured patients. This hierarchical model was fitted in a Bayesian framework to the follow-up data of Finnish colon cancer patients diagnosed in 1975–2004. The public health importance of the regional differences was described by the extra survival time and avoidable deaths that could be gained, if the regional variation were eliminated and all the hospital districts in Finland achieved the most favourable level of relative survival. The differences in the relative survival between the districts were rather small during the three decades. If all the districts had achieved the most favourable level of relative survival, the mean survival time of the patients diagnosed in 1995–2004 would have increased 4% in males and 2% in females.