Webappendix

Details of method

1. Net survival compensates for mortality from other causes (background mortality); it is the recommended method for population-based survival analyses because death registration does not capture cancer as the underlying cause of death comparably between countries and over time[1;2]. Excess mortality enables visualisation of how the instantaneous excess risk of dying from cancer changes with time since diagnosis.

2. We used log-likelihood ratio tests for interactions between age and country. Age at diagnosis was a continuous variable; its effects were allowed to be non-linear and the effects of age and country could be time-dependent. Sensitivity analyses were conducted to determine the optimal number of degrees of freedom in the baseline hazard. Final models were selected using the Akaike Information Criterion, log-likelihood ratio tests, and examination of the Martingale residuals to ascertain goodness of fit. Where possible, we compared the results of our selected model with those from a slightly more flexible model (e.g. by introducing an interaction term or an extra degree of freedom in the baseline hazard). The selected models were robust to this increased flexibility.

3. Multiple imputation by chained equations with the ice command in Stata: we specified an ordered logistic model which included vital status, the non-linear effect of the log cumulative excess hazard, morphology and the non-linear effect of age at diagnosis. Variables such as anatomic sub-site, year of diagnosis and any interactions with the log of the cumulative excess hazard were included if they significantly predicted the pattern of stage or the likelihood that stage was missing.

Reference List

(1) Lambert PC, Royston P. Further development of flexible parametric models for survival analysis. Stata J 2009;9:265-90.

(2) Remontet L, Bossard N, Belot A, et al. An overall strategy based on regression models to estimate relative survival and model the effects of prognostic factors in cancer survival studies. Stat Med 2007;26:2214-28.