

## **ESTIMATING INCIDENCE AND SURVIVAL BY ETHNICITY FOR MYELOMA IN THE FACE OF MISSING DATA: AN APPLICATION OF MULTIPLE IMPUTATION METHODS WITHIN THE NATIONAL CANCER DATA REPOSITORY (NCDR).**

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Objectives: To establish estimates of incidence and survival for patients with myeloma by ethnicity.

Methods: The NCDR was used to identify registrations of myeloma (C90) in English cancer registries from 2002-2007. Ethnicity was categorised using records in linked Hospital Episode Statistics.

Missing ethnicity data were imputed deterministically using the 'ICE' command in Stata, for 10 and 50 imputations with the assumption that data were 'missing at random'. Age-standardised incidence rates (ASR) were calculated, relative survival estimated at 1, 3 and 5 years and excess mortality modelled using Poisson regression.

Results: Of the 19,484 cases recorded in the NCDR, ethnicity was missing in 5,279 (27%). Missingness decreased from 29% (2002-2004) to 25% (2005-2007). The distribution of recorded ethnicity was White 93.5%, Black 3.3%, South Asian 2.1%, Other (Mixed/Chinese/Other) 1.2%, these proportions were largely unchanged following 50 imputations (93.8%, 3.0%, 2.1%, 1.2%). Incidence (per 100,000) was highest in the Black ethnic category, ASR=15.1 (95% CI 13.8-16.4) and lowest in White ASR=5.0 (95% CI 4.9-5.0). Relative survival (RS) was significantly worse in the White group at 1, 3 and 5 years when compared to the other groups – Black: 1yr RS=80% (95%CI 76%-83%), 3yr RS=61% (95%CI 65%-66%), 5yr RS=49% (95%CI 40%-48%) compared with White: 1yr RS=66% (95%CI 65%-66%), 3yr RS=43% (95%CI 42%-44%), 5yr RS=29% (95%CI 27%-30%). Relative survival analysis found risk of death to be lower in the Black category for both 1 and 3 year survival HR=0.65 (95%CI 0.51-0.82) and 0.71 (95% CI 0.57-0.87) respectively, when compared to the reference White category.

Conclusions: This study confirms NCIN analyses indicating a higher incidence of myeloma in the Black ethnic group and persists after adjustment for confounders. Whilst a survival advantage has been seen amongst African American men with myeloma, our findings on survival patterning by ethnicity were unanticipated and merit further investigation.