Deprivation and blood cancer survival in England: analysis of cancer registration data 2000-2007

NCIN Data Briefing

KEY MESSAGES:

The incidence of blood cancers does not vary across socio-economic groups.

Despite this, significant differences are seen in the outcome for patients depending on the level of deprivation in the area in which they live.

Significantly lower survival was seen for patients living in more deprived areas with chronic lymphocytic leukaemia, chronic myeloid leukaemia, Non-Hodgkin lymphoma and myeloma.

Introduction

The blood cancers are diseases originating in the bone marrow and lymph nodes and include leukaemias, lymphomas and myeloma. They are a very diverse group of diseases affecting people across the whole life course, but with their greatest incidence amongst the elderly. The prognosis and responsiveness to treatment of these conditions also varies very widely, and over the period covered in this report the positive impact of several new forms of treatment was apparent.

Whilst the incidence of many forms of cancers varies significantly across different socio-economic groups, this is generally not the case for blood cancers. Previous analyses by the NCIN have not shown significant gradients in the incidence of these diseases by measure of deprivation "*Cancer Incidence by Deprivation England, 1995-2004*" (December 2008) http://www.ncin.org.uk/view?rid=73. However, outcomes for blood cancers have been shown to vary by deprivation. In this report we have presented survival outcomes for patients with blood cancers brought together into major disease groups, including subdivision of the leukaemias.

Methods

The data used in these analyses were taken from the National Cancer Data Repository (NCDR) covering cancer registrations in England for the period 2000-2008. This version of the NCDR was derived by merging datasets from each of eight English cancer registries in existence at the time . Data for the blood cancers were categorised into disease groups on the basis of the following ICD-10 (International Classification of Diseases) codes available in the NCDR: acute lymphoblastic leukaemia (ALL) - C91.0; acute myeloid leukaemia (AML) - C92.0, C92.4, C92.5, C93.0, C94.0, C94.2; chronic lymphocytic leukaemia (CLL) - C91.1; chronic myeloid leukaemia (CML) - C92.1; Hodgkin lymphoma (HL) - C81; Non-Hodgkin lymphoma (NHL) - C82-C85; myeloma - C90.

Relative survival figures were produced for persons diagnosed with haematological cancer between the calendar years 2000 and 2007, by individual disease group and deprivation quintile using the income domain of the Index of Multiple Deprivation 2004 assigned on the basis of postcode at registration. Relative survival is defined as the ratio of the observed (crude) probability of survival and the probability that would have been expected had the patients experienced the normal (background) mortality of the population in which they live, given the same distribution of factors such as age, sex and calendar year.

Results

Relative survival at one, three and five years for individuals living in the most affluent and most deprived quintiles of output areas in England are shown for all blood cancer disease groups in Figures 1 to 8. No variation in survival was seen between these socio-economic groups for acute lymphoblastic leukaemia (<15yrs or ≥15yrs) and acute myeloid leukaemia (Figures 1 to 3). For individuals with CLL (Figure 4), relative survival differed by deprivation quintile at one, three and five years, with poorer outcomes in more deprived areas, this difference becomes statistically significant at 5 years (5 year relative survival 2000-2003 quintile 1 vs. quintile 5 [95% CI]: 76.3% [73.6-78.8] vs. 66.5% [63.0-69.8]).

Figure 1: Acute Lymphoblastic Leukaemia (persons <15yrs)
Relative survival at 1, 3 and 5 years 2000-2007 by deprivation quintile

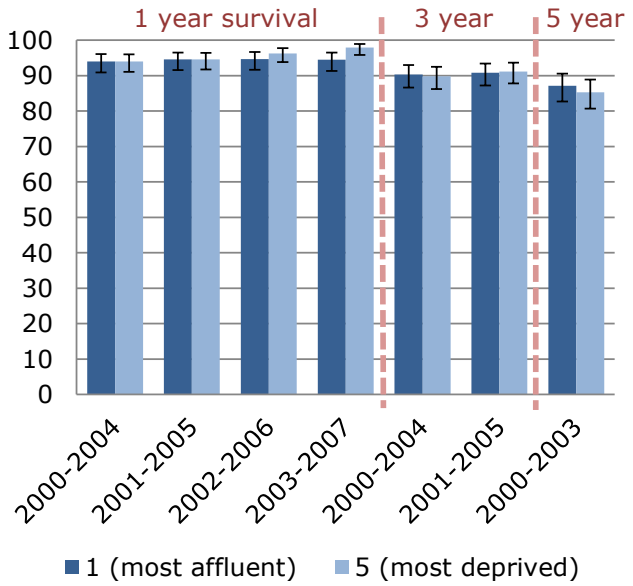


Figure 2: Acute Lymphoblastic Leukaemia (persons ≥15yrs)
Relative survival at 1, 3 and 5 years 2000-2007 by deprivation quintile

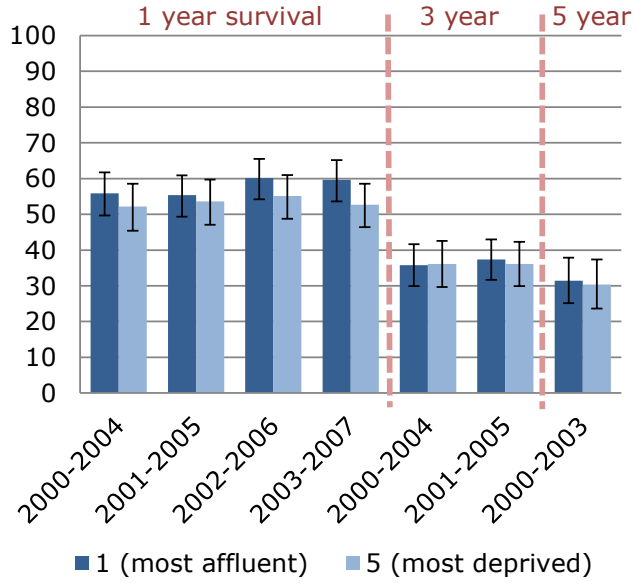


Figure 3: Acute Myeloid Leukaemia (persons)
Relative survival at 1, 3 and 5 years 2000-2007 by deprivation quintile

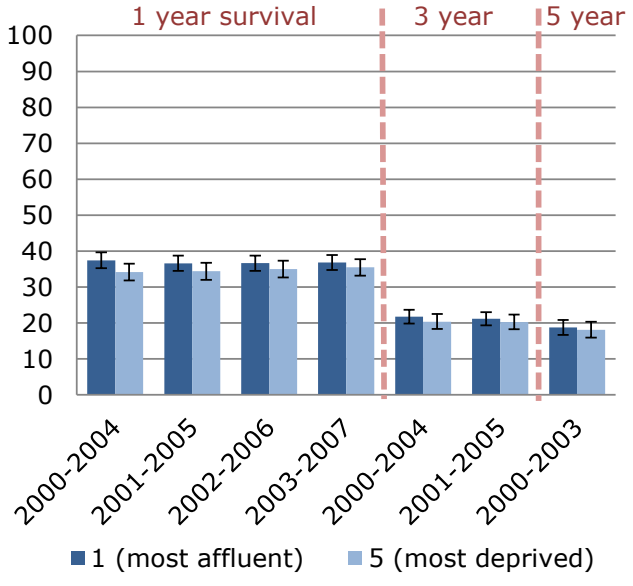


Figure 4: Chronic Lymphocytic Leukaemia (persons)
Relative survival at 1, 3 and 5 years 2000-2007 by deprivation quintile

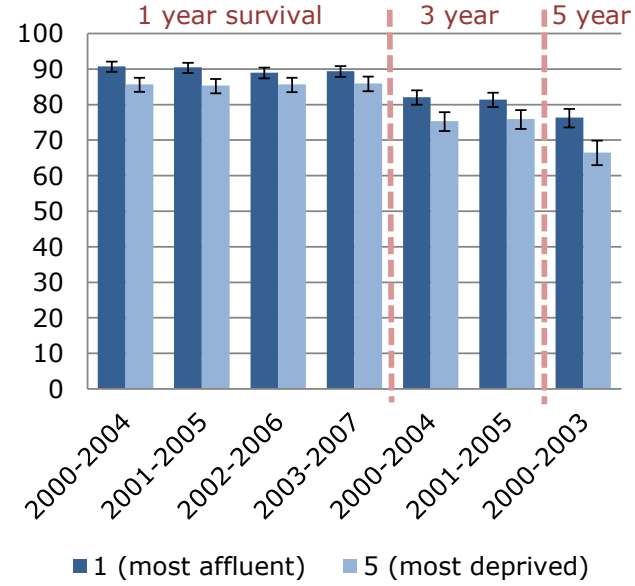


Figure 5: Chronic Myeloid Leukaemia (persons <65yrs)
Relative survival at 1, 3 and 5 years 2000-2007 by deprivation quintile

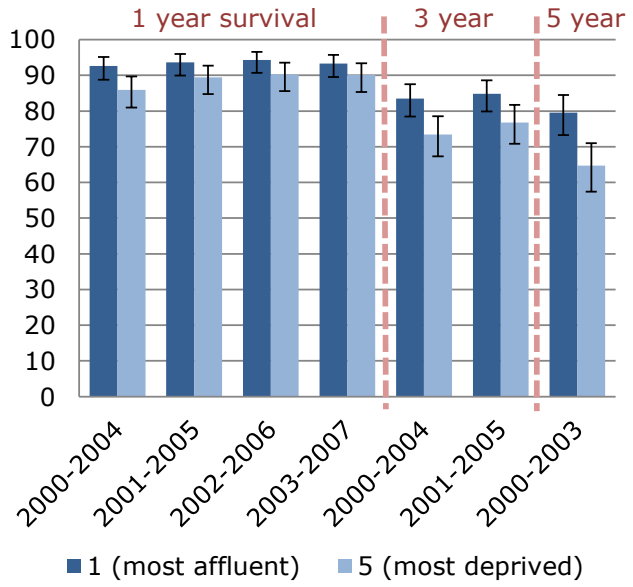


Figure 6: Hodgkin Lymphoma (persons)
Relative survival at 1, 3 and 5 years 2000-2007 by deprivation quintile

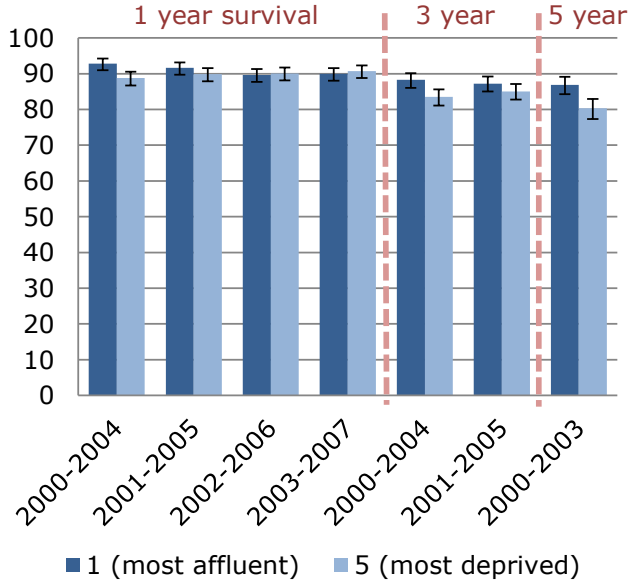


Figure 7: Non-Hodgkin Lymphoma (persons)
Relative survival at 1, 3 and 5 years 2000-2007 by deprivation quintile

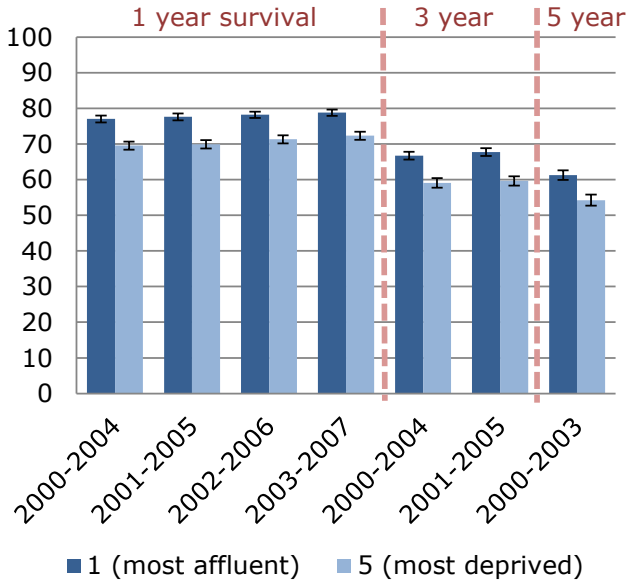
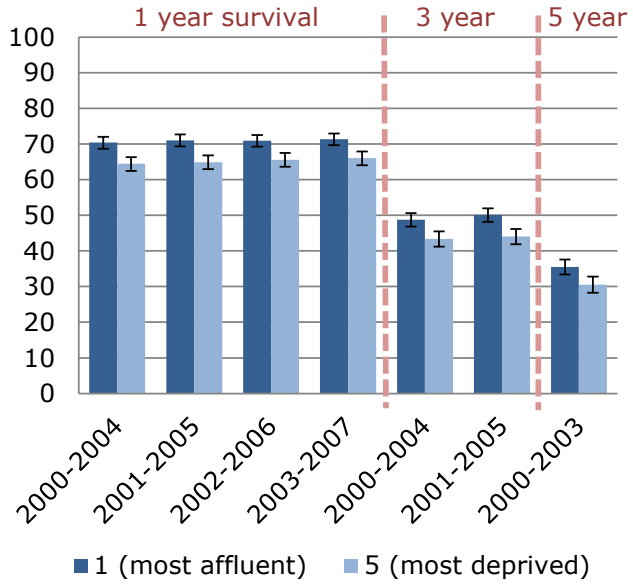


Figure 8: Myeloma (persons)
Relative survival at 1, 3 and 5 years 2000-2007 by deprivation quintile



A difference in relative survival at five years by deprivation was seen for individuals with CML (<65 yrs) diagnosed in 2000-2003 (Figure 5), (5 year relative survival 2000-2003 quintile 1 vs. quintile 5 [95% CI]: 79.6% [73.3-84.5] vs. 64.7% [57.4-71.0]); it is possible to see the gap in shorter term survival narrowing for patients diagnosed in more recent years.

Whilst a significant difference was seen in relative survival at five years for individuals with Hodgkin lymphoma (Figure. 6) there was no clear gradient across all the individual deprivation quintiles (data not presented) (5 year relative survival 2000-2003 quintile 1 vs. quintile 5 [95% CI]: 86.9% [84.2-89.1] vs. 80.3 [77.3-82.9]).

For individuals with Non-Hodgkin lymphoma (Figure 7), relative survival was lower in the most deprived quintile at one, three and five years with a significant difference of seven percent in relative survival at five years (5 year relative survival 2000-2003 quintile 1 vs. quintile 5 [95% CI]: 61.3% [60.0-62.7] vs. 54.3% [52.7-55.8]). A similar pattern was seen for individuals with myeloma (Figure 8) with relative survival at five years being significantly lower by five percent in the most deprived quintile (5 year relative survival 2000-2003 quintile 1 vs. quintile 5 [95% CI]: 35.5% [33.4-37.6] vs. 30.5% [28.3-32.8]).

Commentary

Despite socio-economic groups within the population in England having a similar risk of developing blood cancers, individuals living in more deprived areas of the country have poorer survival outcomes for several forms of blood cancer.

Possible explanations for this pattern include differences in the stage of disease at presentation, the impact of comorbidities and access or compliance with effective treatments.

Analyses by the NCIN on the route to diagnosis (2006-2008) have shown that for AML, myeloma and NHL emergency presentation was more common amongst deprived populations. Currently staging information is not available for most blood cancers so it is unclear what contribution this may make. Similarly there is currently little information on access to or compliance with effective therapies by socio-economic groups at a national population level. It is possible that the variation in outcome for patients with CML was a consequence of differences in access to the family of drugs called Tyrosine Kinase Inhibitors (TKIs), the first of which, Imatinib (Glivec), was licenced in 2001. It is noticeable that the initial difference in outcome has diminished as these have become the standard treatment in all patients.

New high quality data sets being implemented by the NCIN on disease staging, patterns of presentation and treatment will play an important role in achieving a better understanding of the causes of these inequalities in outcome for blood cancers.

Find out more:

Public Health England

The Knowledge and Intelligence Team (Northern and Yorkshire) provide the lead within Public Health England for haematological malignancies. http://www.nycris.nhs.uk

Haematological Malignancy Research Network (HMRN)

This site is intended for anyone interested in haematological malignancy; and contains information and statistics for clinicians and researchers. http://www.hmrn.org