Person-time analysis of hospital activity among cancer survivors

Jacob Maddams[1], Martin Utley[2], Henrik Møller[1]

[1]THAMES CANCER REGISTRY

[2]CLINICAL OPERATIONAL RESEARCH UNIT, UNIVERSITY COLLEGE LONDON

Objectives

There are around 2 million cancer survivors in the UK[1], but little is known about this subset of the general population beyond demographics such as age and time since diagnosis. We developed a 'person-time of survivorship' approach to examine the intensity of health service utilization among survivors, using a linked cancer registry-Hospital Episode Statistics (HES) dataset.

Methods

We used the national cancer registry dataset for England (1990-2006) which is linked at a person level to a HES extract featuring all in-patient hospital episodes for cancer survivors. Firstly, we defined the prevalent population as those people recorded in the cancer registry data with a diagnosis of female breast (ICD-10 C50), colorectal (ICD-10 C18-C21), lung (ICD-10 C33-C34) or prostate (ICD-10 C61) cancer prior to 2007, who were alive for some portion of 2006.

Typically, prevalence statistics are calculated as a static enumeration of survivors at a given point in time. However, in order to evaluate the intensity of HES activity among survivors, a different approach was used. We calculated the person-days of prevalence in 2006 for each cancer type, according to age and time since diagnosis. We then captured all HES episodes in 2006 for this cohort of survivors and calculated the person-days of HES activity for the cohort, again according to age and time since diagnosis.

We then defined the intensity of HES activity as the proportion of prevalence time that was spent in HES activity, and calculated this according to 5-year age groups and 1-year time since diagnosis intervals.

Hospital activity among cancer survivors in England, 2006: proportion of survivor person-time spent in HES activity (with 95% confidence intervals)

A) Males, by age group
B) Females, by age group
C) Males, by time since diagnosis
D) Females, by time since diagnosis
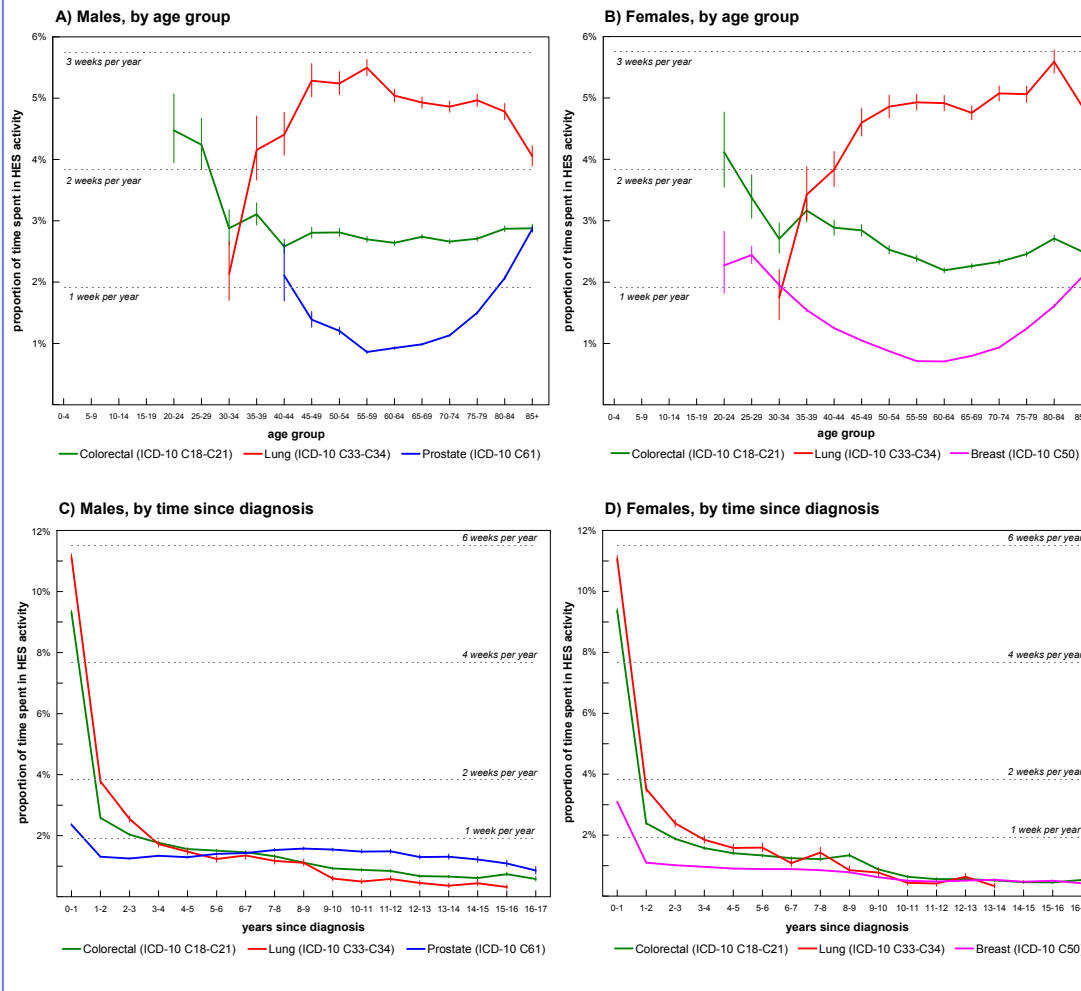
Results

Of the four cancers studied, we found lung cancer to have the highest intensity of HES activity – between 4% and 6% of total survivor time was spent in HES activity for all ages above 35 years (figures A & B). This is equivalent to around 2-3 weeks spent in hospital per year, on average. Breast and prostate cancers had peaks of activity in the relatively young and relatively old age groups. For all the cancer types studied, HES activity was highest in the first year since diagnosis (11% for lung, 9.4% for colorectal, 3.1% for breast and 2.4% for prostate cancer; figures C & D).

Conclusions

We found the person-time approach to analyzing HES activity among survivors to be flexible and more revealing than a simple enumeration of hospitalisation events and survivors.

It is clear that the majority of hospital activity among cancer survivors occurs in the short term after diagnosis. We did not have access to HES activity rates in the general population, and so it is not possible to say whether or not cancer survivors experience an excess of HES activity in the long term. Of the cancer types studied, the one with the worst prognosis, lung cancer, had the highest hospital activity. Survivors of prostate and female breast cancer had increased levels of HES activity in the relatively young and relatively old age groups. This may be because cancers in these age groups are more likely to be symptomatic, late stage cancers, compared with those diagnosed through routine screening or PSA tests in the age groups 50-70 years. We may also see a generally higher level of HES activity in the older age groups, most likely due to age-related co-morbidities.

References

1. Maddams, J., D. Brewster, et al. (2009). "*Cancer prevalence in the United Kingdom: estimates for 2008.*" British Journal of Cancer.