MEN ARE MORE LIKELY TO DEVELOP CANCER AND TO DIE FROM IT – DO WE KNOW WHY?

An exploration of the burden of cancer among males in the UK

Catherine S Thomson[a], Tori Howard[a], Matthew Wickenden[a], Jon Shelton[b] and Professor Alan K White[c]

[a]Cancer Research UK Statistical Information Team, [b]National Cancer Intelligence Network, [c]Centre for Men's Health Leeds Metropolitan University

INTRODUCTION

In general, men are at significantly greater risk of both developing and dying from nearly all of the common cancers that occur in both sexes (with the exception of breast cancer). This analysis updates previous findings from 2010,[1] and presents trends over time in these ratios and new analyses of lifetime risk and survival data.[2] The cancer burden in those of working age (20-64) was examined in detail.

METHODS

Male-to-female age-standardised rate ratios for UK incidence (1975-2010) and mortality (1971-2010) data were calculated for all cancers, for combinations of all excluding lung, breast and the sex-specific cancers, and for individual cancer sites. UK lifetime risk was calculated using data for 2010. One- and five-year relative survival (2005-2009) and ten-year relative survival (2007), were examined for inequalities between the sexes. Non-melanoma skin cancer (NMSC) was excluded from all analyses.

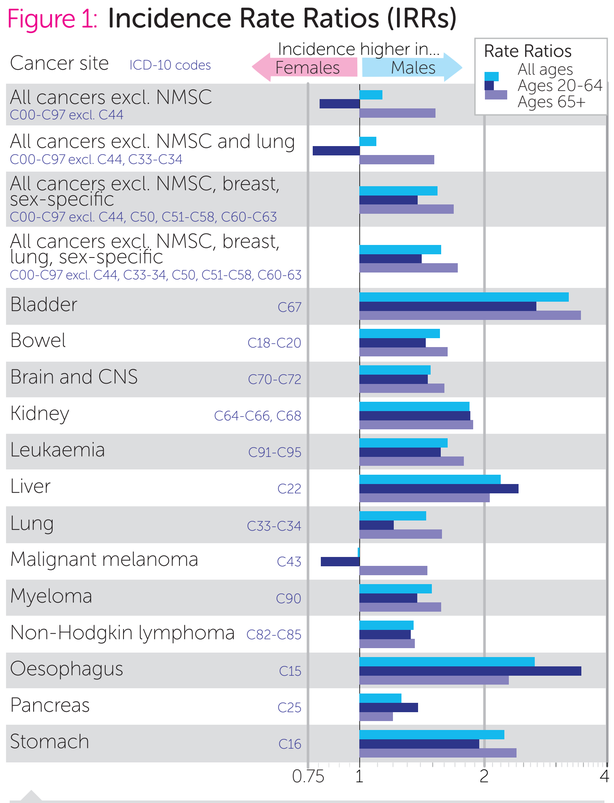
RESULTS

INCIDENCE AND MORTALITY RATE RATIOS

In 2010, UK males continued to have a higher risk of both developing and dying from cancer than females, with a male-to-female incidence rate ratio (IRR) of 1.14 (Figure 1) and a mortality rate ratio (MRR) of 1.37 (data shown in full report).[2]

When only those cancers which both sexes can get (excluding breast cancer) were examined, the rate ratios were even larger: IRR 1.56 and MRR 1.67. However, for all cancers excluding lung cancer, the IRR was not significantly higher (1.10; 95% CI 0.77-1.53) and the MRR was only just significant (1.33, 95% CI 1.01-1.52); thus showing the influence of smoking on lung cancer rates (Figure 2).

Figure 1: **Incidence Rate Ratios (IRRs)**



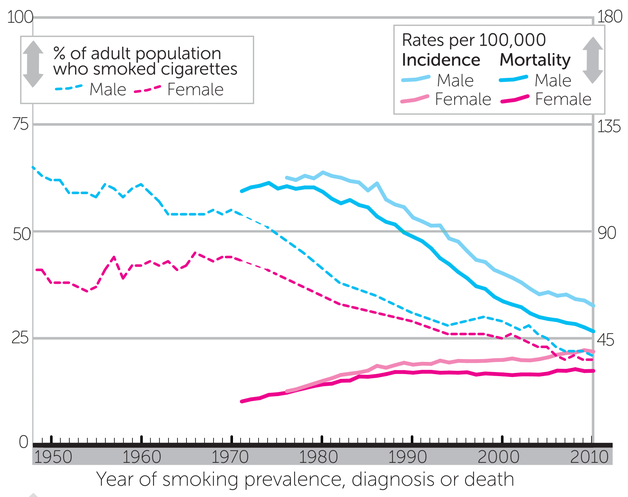
European age-standardised incidence rate ratios, of male-to-female cancer incidence (excluding NMSC), UK, 2010, base-2 logarithmic scale.

All of the above incidence rate ratios were statistically significant at the 95% confidence level (95% CI) except malignant melanoma at all ages.

Brain and CNS includes all malignant tumours of the brain and other parts of the central nervous system only.

Men of working age (20-64) had a lower risk of developing all cancers (IRR 0.80) and all excluding lung cancer (IRR 0.77), but men had an increased risk of developing those cancers which affect both sexes excluding breast cancer (IRR 1.39), reflecting the predominance of breast and sex-specific cancers in younger women (Figure 1).

Figure 2: **Smoking and Lung Cancer Trends**



Smoking prevalence, Great Britain, 1948-2010 (weighted after 1998).

European age-standardised lung cancer incidence rates, Great Britain, 1975-2010.

European age-standardised lung cancer mortality rates, Great Britain, 1971-2010.

Since the 1970s, IRRs between males and females of working age have been mostly decreasing for Hodgkin Lymphoma, kidney and lung cancers (Figure 3a), and mostly increasing for malignant melanoma and oesophageal cancer (Figure 3b). There were not consistent trends for most of the other cancers examined (data not shown). The drop in lung cancer IRRs (Figure 3a), again reflects the pattern seen in smoking prevalence (Figure 2).

Figure 3a: **Decreasing Male-to-Female IRRs**

Figure 3b: **Increasing Male-to-Female IRRs**

European age-standardised male-to-female cancer incidence rate ratios, 20-64 year olds, Great Britain, 1975-1977 to 2008-2010, base-2 logarithmic scale.

LIFETIME RISK

The risk of a baby born in 2010 being diagnosed with cancer during their lifetime is 44% for baby boys and 40% for baby girls, or more than 1 in 3 for both sexes (Table 1). When breast and sex-specific cancers are excluded from the calculation, the gap between the sexes is wider (lifetime risk: 35% for baby boys and 26% for baby girls). Lifetime risk data for the individual cancer sites are given in the full report.[2]

Table 1: **Lifetime Risk**

Cancer site (ICD-10 codes)	Lifetime risk % Male	% Female	1 in X Male	1 in X Female
All cancers excl. NMSC (C00-97 excl. C44)	43.9	40.1	3	3
All cancers excl. NMSC and lung cancer (C00-97 excl. C44, C33-C34)	37.8	35.5	3	3
All cancers excl. NMSC, breast and sex-specific (C00-97 excl. C44, C50, C51-58, C60-63)	34.5	25.8	3	4
All cancers excl. NMSC, breast, lung & sex-specific (C00-97 excl. C44, C33-34, C50, C51-58, C60-63)	27.8	20.6	4	5

Risk for babies born in 2010 being diagnosed with selected cancers over a lifetime, UK, 2010.

10-YEAR SURVIVAL

Overall, ten-year relative survival for males was 39% compared with 51% for females. This is likely to be driven by the fact that there are around 9,000 more females getting breast cancer each year (with a good prognosis) than there are males getting prostate cancer. Individual cancers showed differences between the sexes but the pattern was less clear. For many cancers males had poorer survival than females, but for several cancers there was no difference, and for a few cancers males had better survival (Table 2).

Ten-year age-standardised relative survival for adults (aged 15-99 years) predicted for patients diagnosed in 2007 (using the hybrid approach): England and Wales.

Survival is not age-standardised for cancers of the brain, lung, oesophagus or stomach.

Brain includes malignant tumours of the brain only.

Table 2: **Ten-Year Relative Survival (%) By Sex**

Cancer site	ICD-10 codes	Male	Female
All cancers combined	C00-C97 excl C44	39.3	51.0
Bladder	C67	51.5	42.4
Brain	C71	9.3	9.6
Colon	C18	50.1	50.8
Kidney	C64-66, C68	43.0	44.3
Leukaemia	C91-95	32.9	33.6
Lung	C33-34	4.9	5.9
Malignant melanoma	C43	76.7	88.0
Myeloma	C90	19.0	14.9
Non-Hodgkin lymphoma	C82-85	50.3	51.3
Oesophagus	C15	10.2	9.7
Pancreas	C25	2.9	2.7
Prostate	C61	68.5	N/A
Rectum	C19-20, C21.8	47.3	52.1
Stomach	C16	13.7	13.1

CONCLUSIONS

Large inequalities exist between the sexes in cancer burden and fatality, for which there are various reasons, although why males are so much more likely to develop cancer than females is complex and still only partially understood.[3] A biological component is likely as female sex-hormones and sex differences in the immune system are implicated in some of the differences seen.[4] However, it is possible that the incidence of those cancers caused by smoking, and those influenced by diet, alcohol consumption, and being overweight reflect sex differences in such behaviours.[5] Examination of the trends in rate ratios over time may help us understand the links with lifestyle factors, in particular smoking. Indeed we have shown the strong effect of smoking on lung cancer incidence rate ratios between the sexes. In addition to these lifestyle factors, a number of other factors are likely to contribute to the inequality between the sexes. More research is required to unravel these relationships in the hope that avoidable inequalities can be reduced or even eliminated in the future.

ACKNOWLEDGEMENTS

Many thanks to Ella Ohuma[a], Katrina Brown[a], Lucy Ironmonger[a] and Sarah Beardon[a] for data preparation, Alan Slater[a] for graphic design and layout, the CRUK Cancer Survival group at London School of Hygiene and Tropical Medicine, and for the essential work of the National Cancer Registration Service (part of Public Health England), the Office for National Statistics in England, and the cancer registries in Wales, Scotland and Northern Ireland.

cruk.org/cancerstats

REFERENCES

1. White AK, et al. Men's Health and the Excess Burden of Cancer in Men. Eur Urol Suppl 2010;9(3):467-470.

2. Cancer Research UK, Men's Health Forum and NCIN. Cancer Statistics Report – The Excess Burden of Cancer in Men in the UK. London: Cancer Research UK, 2013.

3. Edgren G, Liang L, Adami H-O, et al. Enigmatic sex disparities in cancer incidence. Eur J Epidemiol 2012; 27(3):187-96.

4. Dorak M, Karpuzoglu E. Gender differences in cancer susceptibility: an inadequately addressed issue. Front Genet 2012; 3:268.

5. Parkin DM. 16. The fraction of cancer attributable to lifestyle and environmental factors in the UK in 2010, summary and conclusions. Br J Cancer 2011; 105(S2):577-581.