



Non-melanoma skin cancer

Case numbers and histological types

Between 1994 and 2011, an average of 6,899 cases of invasive skin cancer was diagnosed per year in Ireland. Malignant melanoma accounted for just over 8% of this number; the vast bulk of all invasive skin cancers being non-melanomatous subtypes, of which over 6,300 were diagnosed each year (Table 1). Over 95% of these “non-melanoma” skin cancers were histologically diagnosed and almost all were either basal (68% approximately) or squamous (30%) cell carcinomas (BCC and SCC respectively). The remaining non-melanoma subtypes were all very rare by comparison and included Kaposi sarcoma and cutaneous lymphomas, principally mycosis fungoides and T-cell lymphomas. The remainder of this report deals with BCC and SCC only.

Table 1. Annual average number and histological subtypes of all non melanoma skin cancers diagnosed in Ireland, 1994-2011

	females	males	total	% all NMSC
All invasive skin cancers	3233	3666	6899	
<i>melanoma</i>	334	325	568	
non-melanoma (NMSC)	2900	3431	6331	100%
basal cell carcinoma (BCC)	2095	2185	4280	67.6%
squamous cell carcinoma (SCC)	741	1175	1917	30.3%
Merkel cell carcinoma	8	6	14	0.2%
adnexal & skin appendage tumours	6	7	13	0.2%
dermatofibrosarcoma	6	6	12	0.2%
other & unspecified NMSC	29	29	58	0.9%
Kaposi sarcoma	1	5	5	0.1%
*mycosis fungoides	6	10	16	0.3%
* T-cell lymphoma	3	4	7	0.1%
*other/unspecified	5	4	9	0.1%

* lymphoma

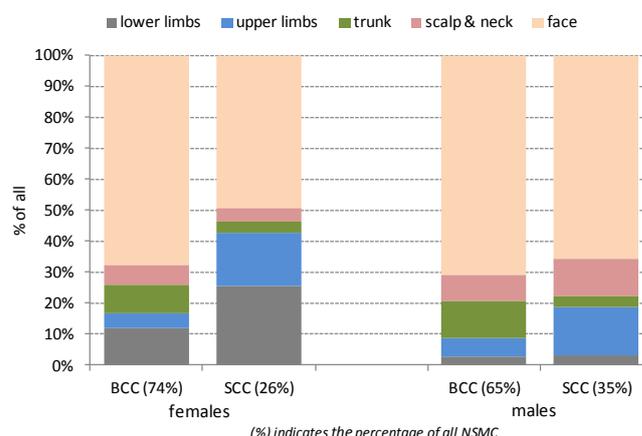
Sun exposure is well documented as the primary risk factor for all skin cancers and it has been reported that BCC may be more strongly related to acute sun-burn events in childhood and intermittent adult exposure while SCC is mostly a result of chronic long term occupational sun-exposure¹. The number of BCC diagnosed in all Irish patients overall was over twice that of SCC. However incidence patterns in males and females were very different. Males had a higher incidence rate for both BCC and SCC than females, but more importantly, males were more likely than females to have SCC and the BCC/SCC rate ratio in males (1.86) was much lower than in females (3.28) (Table 2). This may relate to the greater proportion of males having outdoor occupations and therefore more long term chronic sun exposure than females.

Table 2. Incidence rate (cases per 100,000 per year, age standardised) of BCC and SCC, 1994-2011

	females	males	total
all non-melanoma (BCC+SCC)	131.02	188.69	156.35
basal cell carcinoma (BCC)	100.38	122.60	110.07
squamous cell carcinoma (SCC)	30.64	66.09	46.28
BCC/SCC rate ratio	3.28	1.86	2.38

The location of BCC and SCC tumours on the body provides some evidence that the type of sun exposure may be an important risk factor. The majority of all tumours (BCC & SCC) in both sexes were located on the face, the area which experiences most sun exposure overall (Figure 1). However males were more likely to have SCC tumours in the scalp and neck and upper limbs, consistent with parts of the body most exposed during normal outdoor and work-related activities. NMSC in the trunk area for both sexes were more likely to be BCC, which would indicate exposure from more leisure based/sun bathing activity.

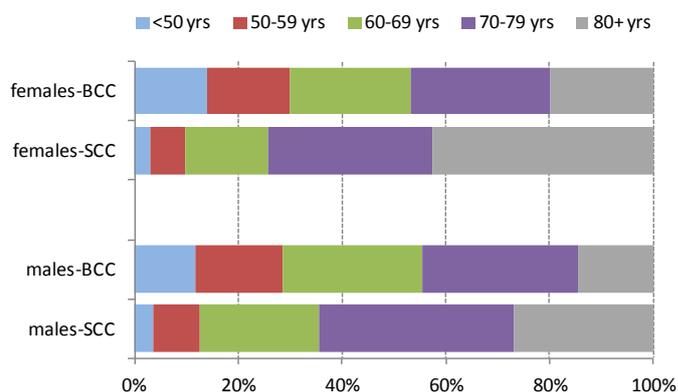
Figure 1. Distribution of BCC and SCC by location on the body, females and males, 1994-2011



Age profile

Similar to many other cancers, non melanoma skin cancer is more common in older people and the majority of all patients were aged 60 or older when first diagnosed (Figure 2). SCC had an older age profile than BCC in both sexes; 74% of females and 64% of males were aged 70 or older when diagnosed with SCC. The majority of BCC patients were aged between 60 and 80 years at diagnosis with males and females having fairly similar age distributions.

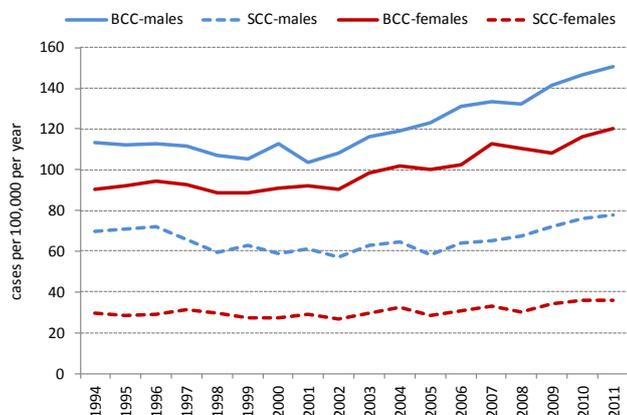
Figure 2. Age distribution of BCC and SCC 1994-2011



Time trends in incidence and mortality

From the mid 1990's to early 2000's there was little overall change in incidence rate for NMSC, with rates in females remaining fairly level and a slight decline in males (Figure 3). However rates of both subtypes have subsequently increased, and for both sexes current rates (2011) are between 33% and 39% higher than those in 2002. An annual percentage change of between 3% and 4% has been recorded during the last 10 years.

Figure 3. Trends in incidence of BCC and SCC, 1994–2011



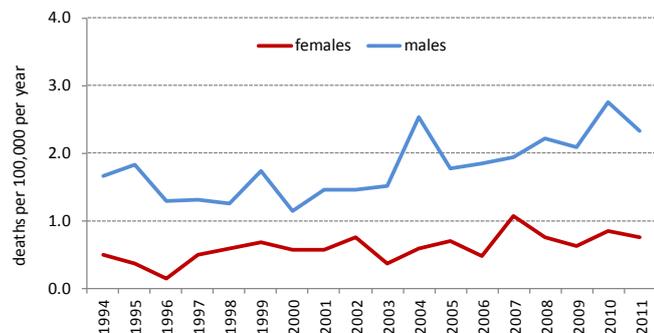
Despite the large number of cases diagnosed every year, there are very few deaths from non-melanoma skin cancer and an average of less than 50 deaths per year was registered between 1994 and 2011, equivalent to just 0.6% of all cancer deaths (Table 3).

Table 3. Annual average number of deaths and mortality rate from non-melanoma skin cancer in Ireland, 1994-2011

	females	males	total	% all cancer deaths
number of deaths	16	32	48	0.6%
mortality rate	0.61	1.84	1.10	

Mortality rates have remained below 3 deaths for every 100,000 men or women per year and like incidence, were higher in men than in women, with some slight increase over time (Figure 4).

Figure 4. Trends in mortality of non-melanoma skin cancer, 1994–2011



Geographical distribution

Incidence rates for BCC were significantly higher than the national average for both males and females in the HSE areas around Dublin (Table 4). Rates were highest in the Dublin-Mid Leinster area and lowest in HSE West for both sexes. Incidence rates in

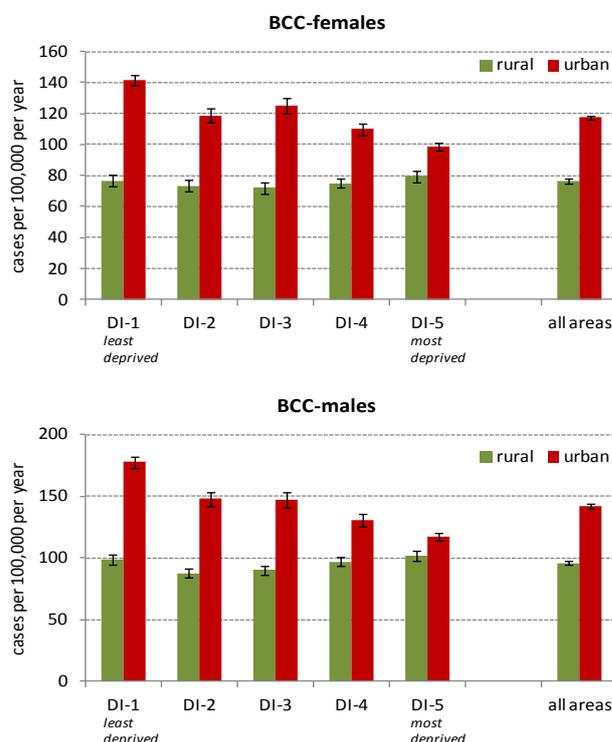
HSE South were closest to the national average. Incidence rates for SCC in both sexes were highest in HSE Dublin-North East with similar rates in HSE South. As observed for BCC, incidence rates for SCC were significantly low in HSE West compared to overall national rates.

Table 4. Incidence rates (cases per 100,000 per year) by HSE region, BCC & SCC, 1994–2011

	females		males	
	rate	95%CI	rate	95%CI
BCC				
Dublin-Mid Leinster	112.0	2.1	135.3	2.5
Dublin-North East	109.2	2.4	128.1	2.8
South	98.2	2.0	121.1	2.3
West	81.6	1.9	107.0	1.2
Ireland overall	100.4	1.0	122.6	1.2
SCC				
Dublin-Mid Leinster	30.7	1.0	65.9	1.8
Dublin-North East	34.3	1.3	69.1	2.1
South	32.5	1.1	68.8	1.8
West	25.6	1.0	61.4	1.6
Ireland overall	30.6	0.5	66.0	0.9

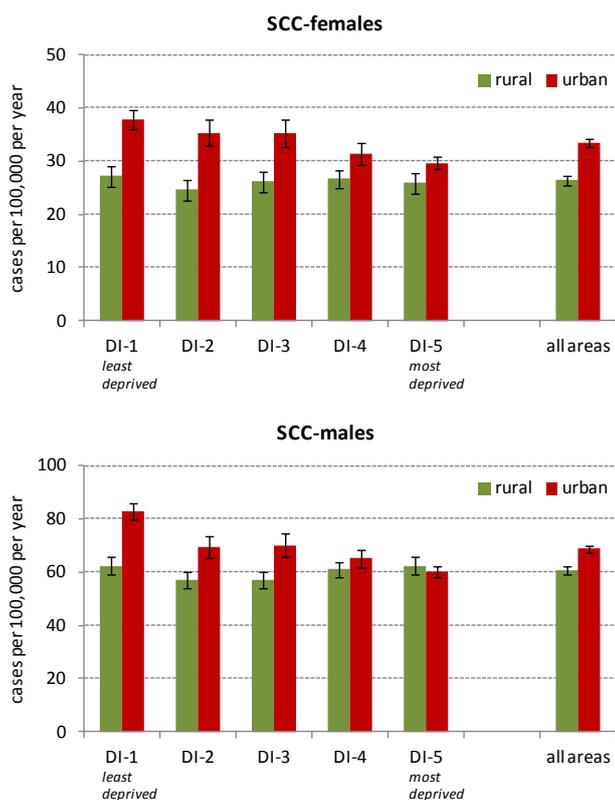
Non-melanoma skin cancer, particularly BCC, is known to have a positive association with socio-economic status.⁴ This relationship was evident in Ireland when incidence was examined by deprivation index and by urban or rural area of residence (Figures 5a & b). Incidence of both subtypes was significantly higher in urban than in rural populations overall, particularly for BCC (Figure 5a). In urban areas, there was a clear inverse relationship between incidence of BCC and increasing deprivation index, with both males and females in the most affluent (least deprived) areas having statistically significantly higher incidence than those in the most deprived areas. In contrast, incidence of BCC in rural areas appeared to be less influenced by deprivation index and rates here varied comparatively little.

Figure 5a. Incidence of BCC and variation with deprivation index (DI)² and urban/rural area of residence, 1994–2010³ (rural areas defined by population density <1 person per hectare)



Urban-rural differences in incidence of SCC were lower than those seen for BCC, and although there was a large and significant difference between urban and rural dwellers in the least deprived regions, this disparity declined with increasing deprivation level (Figure 5b). Similar to BCC, for urban dwellers (both males and females) the incidence of SCC was highest in the most affluent areas and significantly lower in the most deprived regions. Like the pattern seen for BCC, incidence of SCC in rural areas was less closely linked to deprivation, and there was little urban-rural difference in poorer areas, particularly for males where incidence was slightly higher in rural compared to urban residents in the most deprived parts of the country.

Figure 5b. Incidence of SCC and variation with deprivation index (DI)² and urban/rural area of residence, 1994–2010³ (rural areas defined by population density <1 person per hectare)



These geographic patterns are broadly similar to other published reports^{4,5}. It has been suggested that city dwellers have a higher risk of BCC, where sun exposure is likely to be more intermittent and urban populations have greater risk of sun-burn events⁴. More leisure time and financial ability to travel to sunny climates with the associated higher risk of sunburn could contribute to the very clear relationship between BCC and deprivation index seen in urban areas in Ireland. Although a similar pattern of incidence of SCC and deprivation was observed for urban areas, the lack of a clear association between incidence and deprivation in rural areas makes it difficult to draw any firm conclusions. The similarity in urban-rural SCC incidence for males in the most deprived areas may support the view that risk for SCC is less influenced by intermittent sun exposure than BCC.

Treatment

Non-melanoma skin cancer is highly treatable and almost all patients in Ireland between 1994 and 2010 were treated by simple surgical removal of the tumour with little other intervention (Table 5). For some patients, the entire tumour was removed at biopsy, frequently at outpatient level with no other treatment required. Radiotherapy was administered to less than 10% of patients. Radiotherapy was slightly more common for SCC, which has a slightly higher risk of metastasising. More than 99% of all patients diagnosed received some form of tumour directed treatment.

Table 5. Treatment received by BCC and SCC patients, 1994-2010⁶

	females		males	
	BCC	SCC	BCC	SCC
surgery	87%	88%	88%	91%
biopsy only	8%	7%	9%	6%
radiotherapy	6%	7%	6%	9%
no treatment	1%	1%	1%	1%

International variation in incidence

Reliable and comparable international incidence data on non-melanoma skin cancer is very difficult to obtain, chiefly because of the lack of data or poor registration practices in the majority of countries. Many countries only register the 1st case of NMSC and do not register or appropriately differentiate subsequent or multiple primary tumours. A review published last year by Lomas *et al*⁷ highlighted the difficulties in examining international trends in NMSC incidence.

A trend of increasing incidence has been reported in almost all countries that register NMSC⁷. Incidence rates of 884 and 387 cases per 100,000 per year for BCC and SCC respectively in Australia⁸ are considerably higher than rates recorded in Europe. Programmes targeted at educating the population on the risks of sun exposure have been undertaken in Australia for many years and are now becoming more prevalent in Ireland and in other European countries.

References and notes

- Gallagher RP, Hill GB, Bajdik CD *et al* 1995. Sunlight exposure, pigmentation factors, and risk of non-melanocytic skin cancer: I Basal cell carcinoma and II Squamous cell carcinoma. *Arch Dermatol* 131:157-163 and 164-169.
- Deprivation Index as per 2002 census. SAHRU (www.sahru.tcd.ie)
- Data to deprivation level (ie geo-coded data) available up to 2010 only.
- Steding-Jessen *et al*, 2010. Socioeconomic status and non-melanoma skin cancer: a nationwide cohort study of incidence and survival in Denmark. *Cancer Epidemiol* 34: 689-695
- Hannuksela-Svahn A *et al* 1999. Basal skin carcinoma and other non-melanoma skin cancers in Finland from 1956 through 1995. *Arch Dermatol* 135: 781-786.
- Data on treatment is available up to 2010 only.
- Lomas, A *et al* 2012. A systematic review of worldwide incidence of nonmelanoma skin cancer. *Br J Dermatol*. 166: 1069-1080.
- Staples MP *et al* 2006. Non-melanoma skin cancer in Australia: the 2002 national survey and trends since 1985. *Med. J. Aust* 184: 6-10