National Cancer Registry Ireland

# Cancer Trends

## Skin cancers

Skin cancers are the most commonly diagnosed cancers among Caucasian populations with ultra violet radiation (UVR) the most well documented risk factor. For basal cell carcinoma (BCC) and melanoma intermittent/recreational UVR is the main risk factor while long-term chronic sun exposure is the greatest risk factor for squamous cell carcinoma (SCC).[1]

### *Cases and incidence*

Almost 11,000 invasive skin cancers were diagnosed per year in Ireland between 2011 and 2015 inclusive representing over one-third (35%) of all invasive cancers. The bulk of these (91%) were the generally less serious non-melanomatous tumours (non-melanoma skin cancer, NMSC), of which there were 4,373 new cases diagnosed in females and 5,546 in males each year (Table 1).

**Table 1**: *Annual average number of melanoma and non-melanoma skin cancers in Ireland, 2011-2015*

| | Female | Male | Total | % all skin cancers |
|---|---|---|---|---|
| **All skin cancer** | 4891 | 6015 | 10906 | |
| **Melanoma** | 518 | 469 | 987 | 9% |
| **NMSC** | 4373 | 5546 | 9919 | 91% |
| ***Melanoma*** | | | | |
| Superficial spreading | 231 | 166 | 398 | 3.6% |
| Nodular | 63 | 70 | 133 | 1.2% |
| Lentigo maligna | 53 | 61 | 115 | 1.1% |
| Acral lentiginous | 10 | 9 | 19 | 0.2% |
| other & unspecified | 160 | 162 | 322 | 3.0% |
| ***NMSC*** | | | | |
| BCC (Basal cell carcinoma) | 3185 | 3608 | 6793 | 62.3% |
| SCC (Squamous cell carcinoma) | 1139 | 1879 | 3019 | 27.7% |
| Merkel cell carcinoma | 8 | 14 | 22 | 0.2% |
| Adnexal carcinoma | 9 | 12 | 21 | 0.2% |
| Sarcoma | 6 | 7 | 13 | 0.1% |
| Other & unspecified | 25 | 26 | 51 | 0.5% |

**Data excludes multiple primary tumours*

Just under 1,000 invasive melanomas of skin were diagnosed per year (518 in females and 469 in males), making up 9% of all skin cancers and 3% of all invasive cancers. Superficial spreading melanoma were the most common subtype (40%), although one third of all cases were of unspecified type. NMSC was almost exclusively either basal cell carcinoma (approximately 6,800 cases per year, 69% of all NMSC) or squamous cell carcinoma (approximately 3,000 cases per year, 30% of all NMSC) with ≤60 cases in total per year of other specific subtypes such as Merkel cell and adnexal carcinomas. The remainder of this report focusses on malignant melanoma (MM), basal cell (BCC) and squamous cell (SCC) carcinomas only.

Melanoma incidence rates were similar between males and females (approximately 20 cases per 100,000 per year) but the NMSC rate was 46% higher in males, similar to what has been reported previously for Ireland[2] (Table 2). This varied by subtype - BCC incidence was 26% higher in males than females but SCC was over twice as common in men as in women. Reflecting this, the BCC/SCC rate ratio was lower in males (2.0) than in females (3.3).

**Table 2**: *Incidence rate (cases per 100,000 person years, European age standardised), 2011-2015*

| | Female | Male | Total |
|---|---|---|---|
| ***Melanoma*** | 20.6 | 20.4 | 20.3 |
| ***NMSC*** | 163.6 | 238.0 | 197.6 |
| BCC | 123.8 | 155.9 | 138.5 |
| SCC | 38.1 | 79.7 | 57.0 |
| BCC/SCC rate ratio | 3.3 | 2.0 | |

*Data excludes multiple primary tumours*

Overall more than 20% of patients diagnosed with either a BCC or SCC had more than one primary tumour (i.e. more than one cancer of each histological subtype per person, where tumours are counted as separate entities only when at least 5cm apart), the majority of these having between two and five tumours within five years of their first diagnosis (Table 3). An average of 1.2 BCC and 1.5 SCC were registered per patient between 2005 and 2014, and multiple NMSC tumours were more common in men than in women, similar to previously reported[2]. Melanoma patients however were more likely to have just one diagnosis with ≤5% of patients having more than one primary melanoma. All results in this report (including those in Table 1 and 2) are based on only one cancer of each histological subtype per person (i.e. multiple primary tumours are excluded in line with international reporting practice[3]).

### *Age profile*

Similar to many cancers, skin cancers are more common in older age. Almost half of all BCCs, and 69% of male and 74% of female SCC cases were diagnosed in patients aged 70 years or older (Figure 1A). Incidence rates for both BCC and SCC were considerably higher in these older patients (Figure 1B) and comparatively few patients were aged under 60 years, particularly for SCC.

Melanoma patients had a younger profile with almost a third of all female patients and a fifth of males diagnosed before age 50 (Figure 1A). Similar to NMSC, incidence rates for melanoma were higher in older patients but differences were less pronounced (Figure 1B). Incidence rates in patients aged 60 or over were approximately five times those observed for under 60 year olds. For BCC the difference between these age groups was 10- fold and for SCC 35-fold. Median age at diagnosis was 64 for melanoma, 68 for BCC and 76 for SCC.

| | Melanoma | | BCC | | SCC | |
|---|---|---|---|---|---|---|
| | Female | Male | Female | Male | Female | Male |
| Total patients | 453 | 371 | 2745 | 3036 | 962 | 1548 |
| Total cancers | 485 | 398 | 3749 | 4526 | 1201 | 2135 |
| Average number of cancers per patient | 1.1 | 1.1 | 1.4 | 1.5 | 1.2 | 1.4 |
| **Number of cancers per patient*** | | | | | | |
| 1 tumour | 432 (95.4%) | 355(95.7%) | 2166 (78.9%) | 2280 (75.1%) | 814 (84.6%) | 1214 (78.4%) |
| 2 to 5 tumours | 21 (4.6%) | 16 (4.2%) | 554 (20.2%) | 707(23.3%) | 142 (14.7%) | 321(20.7%) |
| 6 to 9 tumours | 0 (0%) | <1 (0.1%) | 22 (0.8%) | 39 (1.3%) | 5(0.5%) | 11 (0.7%) |
| 10 + tumours | 0 (0%) | 0 (0%) | 3 (0.1%) | 9 (0.3%) | 1(0.1%) | 2(0.1%) |

**Table 3**: *Average number of BCC, SCC and melanoma skin cancers diagnosed per patient 2005-2014*

**tumours are counted as separate entities only if ≥5cm apart and so figures quoted here should be regarded as minimum counts only.*

**Figure 1A**: *Age distribution of MM, BCC and SCC, 2011-2015*

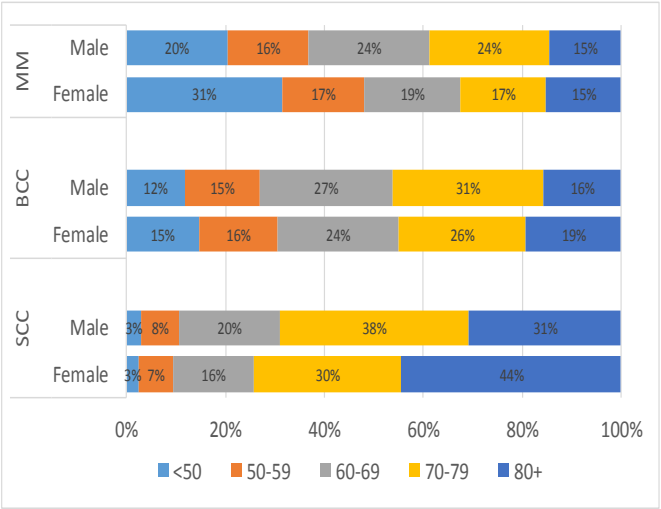
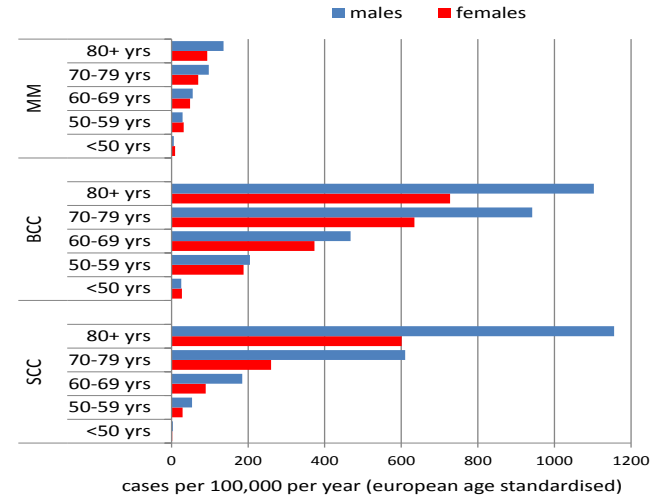


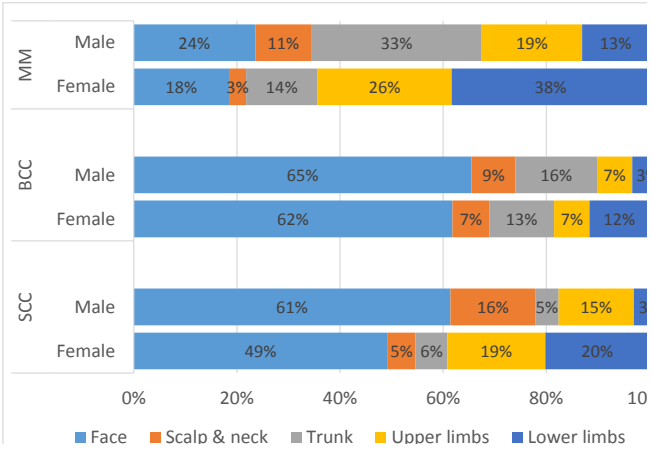

**Figure 1B**: *Age specific incidence rates for MM, BCC and SCC, 2011-2015*




*Body site*

Based on the first registered case per patient, melanoma in females was more commonly found in the lower limbs (38%) followed by upper limbs (26%), which is consistent with recreational UV exposure highly linked to melanoma causation. In males melanoma was most common on the trunk (33%) and face (24%). BCC and SCC for both males and females was most commonly found on the face, the area of the body experiencing most UV exposure (Figure 2).

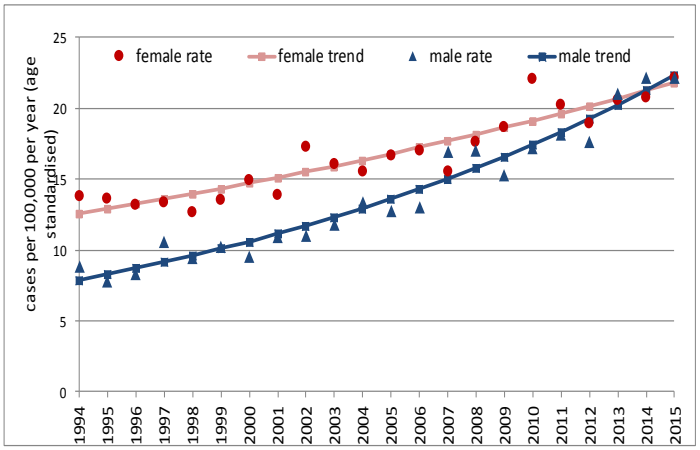
**Figure 2**: *distribution of MM, BCC and SCC by body site, 2011-2015*




***Trends in incidence***

Incidence rates of melanoma have increased significantly in both sexes since 1994, particularly for males. In the mid-1990s female rates were over 50% higher than in males but steeper increases in male incidence (annual percentage change (APC) 5.1% in males compared to 2.7% in females) have resulted in an equalisation of rates in recent years (Figure 3). Current (2011-2015) incidence rates in females are 54% higher than in the mid-1990s while male rates are 125% higher. Case numbers have increased from 237 to 518 per year for females and from 142 to 469 per year for males from the mid-1990s to 2011-2015.

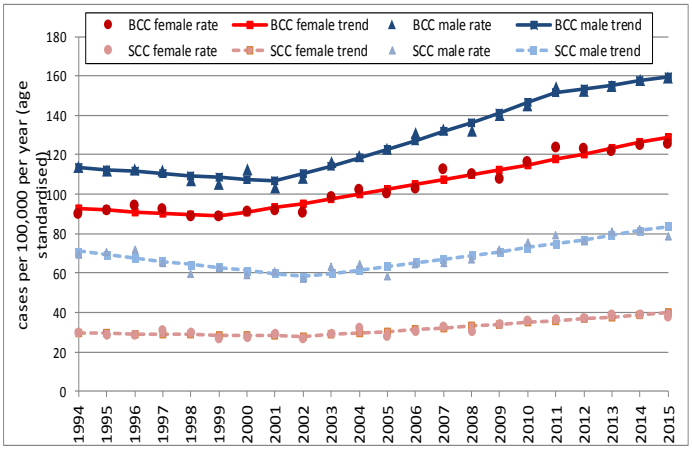
**Figure 3**: *Trend in incidence for melanoma 1994-2015*




| | FEMALES | | | | MALES | | | |
|---|---|---|---|---|---|---|---|---|
| | APC | 95%CI | trend | | APC | 95%CI | trend | |
| 1994 - 2015 | 2.7 | 2.2, 3.2 | ↑ | | 1994 - 2015 | 5.1 | 4.6, 5.6 | ↑ |

Incidence rates for NMSC remained largely unchanged (BCC & female SCC) or declined somewhat (male SCC) from 1994 to the early 2000s but thereafter rates for both NMSC subtypes increased significantly (Figure 4). Average annual percentage increases of 2.8% were observed in SCC for both sexes between 2002 and 2015. Incidence rates for male BCC increased most markedly from 2001 to 2011 (by 3.6% annually) after which rates continued to increase but more slowly (1.3% annually). Female BCC incidence increased more gradually from 1999 by 2.4% per year.

**Figure 4**: *Trend in incidence for BCC and SCC, 1994-2015*




| | FEMALES | | | | MALES | | | |
|---|---|---|---|---|---|---|---|---|
| | APC | 95%CI | trend | | APC | 95%CI | trend | |
| **BCC** | | | | | **BCC** | | | |
| 1994 - 1999 | -0.8 | -3.2, 1.6 | ↔ | | 1994 - 2001 | -0.9 | -1.8, 0.1 | ↔ |
| 1999 - 2015 | 2.4 | 2.0, 2.7 | ↑ | | 2001 - 2011 | 3.6 | 3.0, 4.2 | ↑ |
| | | | | | 2011 - 2015 | 1.3 | -0.3, 2.9 | ↔ |
| **SCC** | | | | | **SCC** | | | |
| 1994 - 2002 | -0.8 | -2.5, 1.0 | ↔ | | 1994 - 2002 | -2.5 | -4.1, -0.8 | ↓ |
| 2002 - 2015 | 2.8 | 2.1, 3.5 | ↑ | | 2002 - 2015 | 2.8 | 2.2, 3.5 | ↑ |

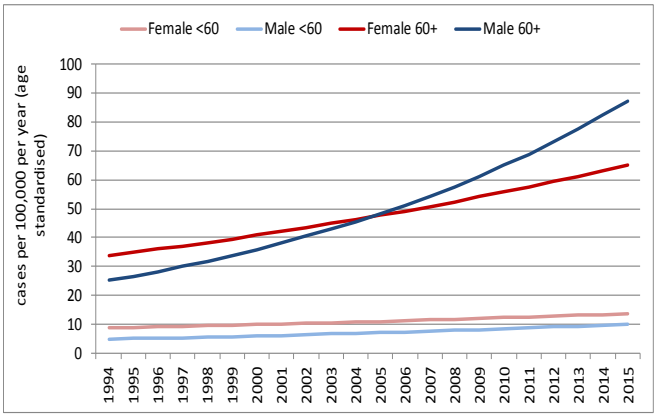


Current (2011-2015) incidence rates for BCC are 35% and 40% higher than in the mid-1990s for females and males respectively. Equivalent increases for SCC are slightly less marked (29% and 18% respectively).

Incidence rates have increased across all age bands for melanoma, BCC and SCC since 1994. Figure 5 shows this trend for melanoma patients broadly grouped into those aged under and over 60 years. The greatest increase was observed for males aged 60+ (annual percentage change=6.1%) where rates have increased by 275% since the mid-1990s with case numbers increasing from 74 to 296 per year between 1994-98 and 2011-15. Although female rates in this age band have also increased significantly over time (from 117 to 269 cases per year), the greater rate of increase in males has resulted in current incidence rates being 27% higher than female rates; an exact reversal of the pattern seen in the mid-1990s when female incidence exceeded that in males by the same percentage.

**Figure 5**: *Trend in incidence by age for melanoma, 1994-2015*




| | FEMALES | | | | MALES | | | |
|---|---|---|---|---|---|---|---|---|
| | | APC | 95%CI | trend | period | APC | 95%CI | trend |
| <60 | 1994 - 2015 | 2.2 | 1.6, 2.8 | ↑ | 1994 - 2015 | 3.6 | 2.7, 4.4 | ↑ |
| 60+ | 1994 - 2015 | 3.2 | 2.4, 3.9 | ↑ | 1994 - 2015 | 6.1 | 5.3, 7.0 | ↑ |

The incidence trends for BCC and SCC patients aged 60+ was very similar to the overall incidence trends shown in Figure 4. Much lower incidence rates in the <60 age group compared to those aged 60+ (data not shown) reflected the generally older age profile of NMSC patients.

***Stage (and tumour thickness) for melanoma***

Stage is an important prognostic factor in melanoma. The majority of melanoma patients are diagnosed at an early stage, although approximately one fifth of males and 13-14% of females were stage III or IV at diagnosis (tumour depth is ≥4mm, or the cancer has spread to subcutaneous tissue or the lymph nodes or distant organs) (Figure 6A). The proportion of unknown stage has declined over time, accompanied by an increased proportion of early stage diagnoses for both sexes, but the proportion of late stage tumours has remained more or less unchanged.

Older patients tend to be diagnosed with more advanced melanomas, particularly the very elderly (80+ years) where during 2009-2013, 27% of women and 32% of men had T4 tumours (Figure 6B). In each age group, females had greater proportions of thinner lesions (T1) than males which may indicate a greater level of awareness of skin cancer risks in women.

**Figure 6A**: *Melanoma TNM stage distribution, early v late, 1994-2013*[4]

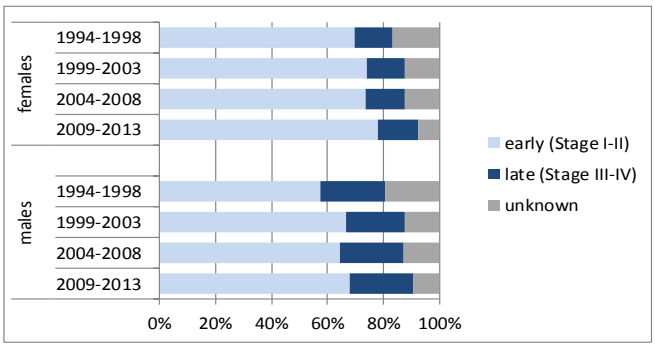
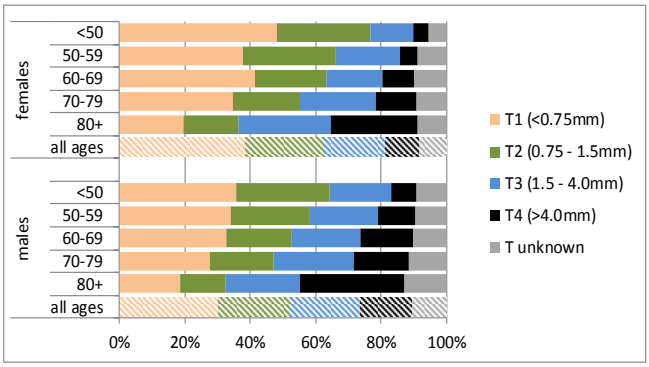



**Figure 6B**: *Melanoma tumour thickness distribution (TNM5 "T" category), 2009-2013*[4]




***Treatment***

Almost all skin cancers were pathologically diagnosed and an annual average of over 1,000 melanoma and 12,000 NMSC biopsies were taken during 2011-2014 inclusive (Table 4). A small proportion of cases (4% melanoma, 7% BCC and 9% SCC) had a biopsy taken outside of hospital (e.g. excised in a GP surgery) but of these a small number (<10%) went on to have another later biopsy in hospital. Approximately 95% of melanoma and almost 90% of both BCC and SCC patients had tumour-directed surgery. A small number of patients had just a biopsy only (35 melanomas and 1034 NMSC per year), mostly representing patients with early stage/small lesions where the tumour was likely to be fully removed at biopsy.

**Table 4**: *Treatment received for melanoma, BCC and SCC (2011-2014)*[5]

| | Melanoma | BCC | SCC |
|---|---|---|---|
| **Annual average number of registered cancers** | 983 | 6751 | 3003 |
| % pathologically diagnosed | 99.9% | 99.5% | 99.5% |
| % tumour-directed surgery (excision) | 94.7% | 88.1% | 89.2% |
| % no other treatment (biopsy/surgery only) | 93.7% | 98.6% | 96.3% |
| % biopsy alone | 3.5% | 11.0% | 9.7% |
| % radiotherapy | 3.4% | 1.3% | 3.4% |
| % medical oncology | 4.2% | 0% | 0.2% |
| **annual average number of registered biopsies#** | 1003 | 8580 | 3641 |

**some patients had multiple biopsies registered*

Very few patients had any other first-line treatment (Table 4). During 2011-2014, an average of 33 melanoma (3.4% of all), 86 BCC (1.3%) and 103 SCC (3.4%) patients had radiotherapy per year, and 41 melanoma (4.2%) and 6 SCC (<1%) patients had chemotherapy or immunotherapy (excluding treatments for recurrent or progressed cancer).

While there were no differences between the sexes in the proportion of patients having surgery, male melanoma patients were twice as likely as females to have radiotherapy (4.8% compared to 2.1%) and chemotherapy (5.9% compared to 2.6%),



reflecting the higher proportion of late stage tumours seen in males (Figure 6). The most common drugs administered to melanoma patients were Interferon and Ipilimumab.

***Trends in mortality***

Between 2011 and 2014 inclusive there were 159 deaths from melanoma and 70 deaths attributed to NMSC per year (Table 5). Mortality rates in men were 1.5 times higher for melanoma and 2.5 times higher for NMSC compared to women.

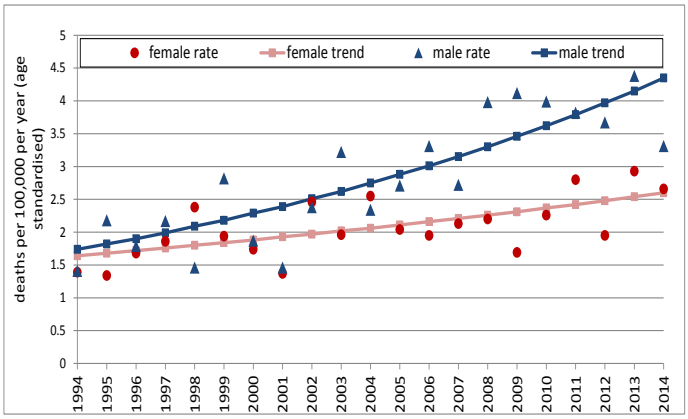
Comparing the period 1994-1997 with 2011-2015, deaths from melanoma have increased from 30 to 72 per year in females (an increase of 143%) and from 29 to 87 per year in men (an increase of almost 200%). Age standardised mortality rates (per unit of population) increased by 65% in women and 101% in men between these periods, or by on average 2.3% per year in women and 4.7% per year in men between 1994 and 2013 (Figure 7). The greater increase in male mortality rates have resulted in a sharp divergence in mortality trends between the sexes over time.

**Table 5**: *Annual average number of deaths 2011-2014*

| | Female | Male | Total |
|---|---|---|---|
| **Melanoma** | | | |
| **No of deaths** | 72 | 87 | 159 |
| **Mortality rate*** | 2.6 | 3.8 | 3.1 |
| **NMSC** | | | |
| **No of deaths** | 25 | 45 | 70 |
| **Mortality rate** | 0.8 | 2.0 | 1.3 |

**Mortality rate per 100,000 person years age standardised (2011-2014)*

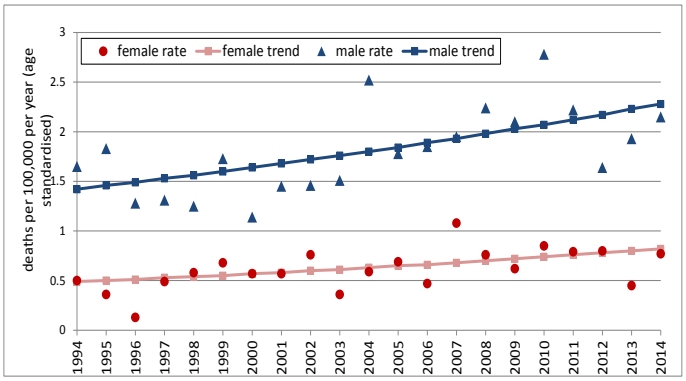
**Figure 7**: *Trend in mortality for melanoma, 1994-2014*




| | FEMALES | | | | MALES | | | |
|---|---|---|---|---|---|---|---|---|
| | APC | 95%CI | trend | | APC | 95%CI | trend | |
| 1994 - 2014 | 2.3 | 1.0, 3.7 | ↑ | 1994 - 2014 | 4.7 | 3.2, 6.2 | ↑ | |

For NMSC the annual number of deaths has also more than doubled from the mid-1990s to recent years (from 8 to 25 female deaths and 22 to 45 male deaths per year). Unlike melanoma, the annual percentage increase in mortality rates for NMSC between 1994 and 2014 was fairly similar between the sexes (2.6% for women and 2.4% for men) resulting in a much less marked divergence in trends (Figure 8).

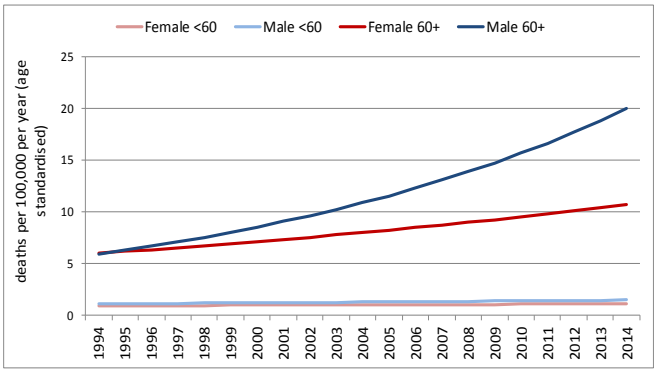
**Figure 8**: *Trend in mortality for NMSC, 1994-2014*




| | FEMALES | | | | MALES | | | |
|---|---|---|---|---|---|---|---|---|
| | APC | 95%CI | trend | | APC | 95%CI | trend | |
| 1994 - 2014 | 2.6 | 0.4, 4.9 | ↑ | 1994 - 2014 | 2.4 | 0.9, 3.9 | ↑ | |

The age-specific mortality rate for melanoma showed little change for both males and females under 60 but a clear increase for those over 60, most particularly for males (APC of 3.0% for women and 6.3% for men, Figure 9). For NMSC, the APC in mortality rates for deaths in over 60 year olds were very similar to that calculated for all deaths (APC of 2.9% for women and 2.4% for men, age specific trend not shown).

**Figure 9**: *Age specific trend in mortality for melanoma, 1994-2013*



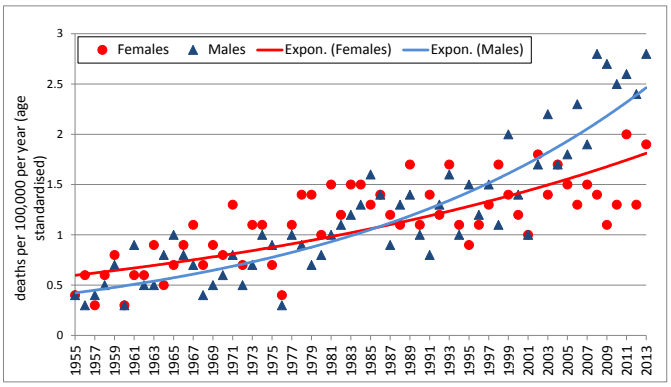

| | FEMALES | | | | MALES | | | |
|---|---|---|---|---|---|---|---|---|
| | | APC | 95%CI | trend | | APC | 95%CI | |
| <60 years | 1994 - 2014 | 1.0 | -1.5, 3.5 | ↔ | 1994 - 2014 | 1.5 | -0.5, 3.6 | ↔ |
| 60+ years | 1994 - 2014 | 3.0 | 1.7, 4.2 | ↑ | 1994 - 2014 | 6.3 | 4.3, 8.3 | ↑ |

In the longer term, numbers of deaths and age-standardised mortality rates for melanoma have increased greatly since the late 1950s when an average of just 9 female and 8 male deaths were recorded per year (Figure 10)[6]. A greater rate of increase in male mortality rates (+3.1% per year 1955-2013 compared with +1.9% for females) have resulted in the male-female rate ratio increasing from 0.9 (1955-1959) to 1.6 (2000-2014).



**Figure 10**: *Long term mortality rates for melanoma, 1955-2013 (WHO)*[6]




| | FEMALES | | | MALES | | |
|---|---|---|---|---|---|---|
| | APC | 95%CI | trend | APC | 95%CI | trend |
| 1955- 2013 | 1.9 | 1.5, 2.3 | ↑ | 3.1 | 2.7, 3.6 | ↑ |

***Survival***

Five year net survival for NMSC has always been very high, but survival for melanoma has improved quite substantially since the mid-1990s. NMSC has almost 100% 5-year survival (slightly lower for SCC) and melanoma now has almost 90% 5-year survival (Table 6). Women have slightly higher melanoma survival than men (Figure 11 & 12). Melanomas diagnosed at stage I had a much higher survival than those diagnosed at stage IV (Figure 13).

**Table 6**: *5-year net survival (NS) for Melanoma, BCC & SCC, 1994-2014*

| | Melanoma | | BCC | | SCC | |
|---|---|---|---|---|---|---|
| | NS (%) | 95% CI (range) | NS (%) | 95% CI (range) | NS (%) | 95% CI (range) |
| 1994-1998 | 82.7 | 80.4 - 85.1 | 99.8 | 98.9 - 100 | 95.2 | 93.6 - 96.7 |
| 1999-2003 | 85.5 | 83.5 - 87.4 | 100 | 99.2 - 100 | 97.4 | 95.9 - 98.8 |
| 2004-2008 | 85.3 | 83.7 - 86.9 | 100 | 99.3 - 100 | 99.0 | 97.8 - 100 |
| 2009-2013 | 89.3 | 87.5 - 91.0 | 100 | 99.2 - 100 | 99.3 | 98.0 - 100 |
| 2010-2014 | 88.7 | 87.3 - 90.2 | 100 | 99.4 - 100 | 99.3 | 98.3 - 100 |

**Figure 11**: *5- & 10 year net survival for melanoma in females, 1994-2014*

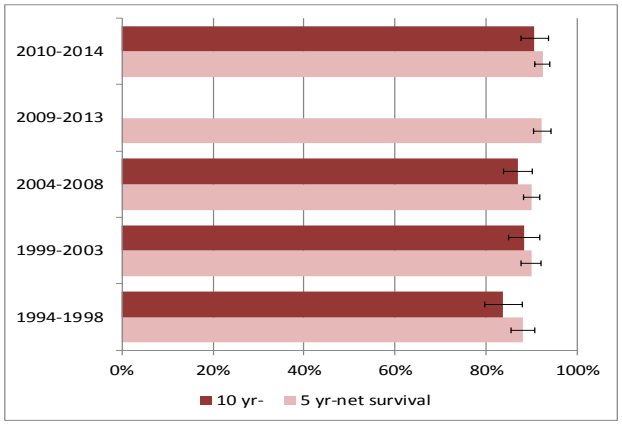



**Figure 12**: *5- & 10 year net survival for melanoma in males, 1994-2014*

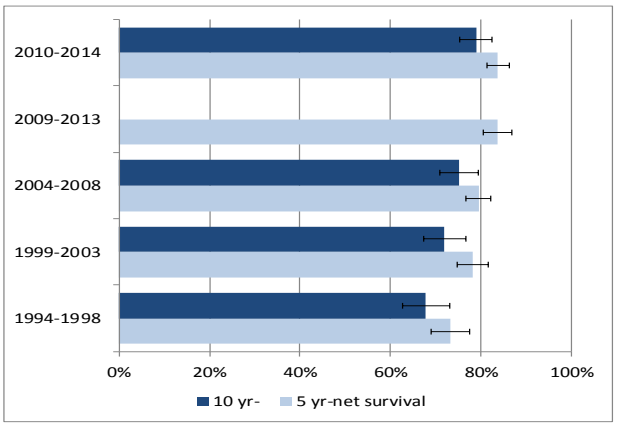
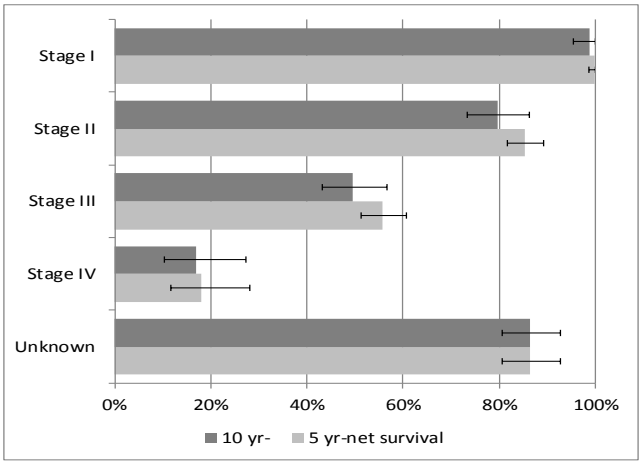



**Figure 13**: *5 & 10 year net survival for melanoma by stage*




***International comparisons for melanoma incidence, mortality and survival***[7,8]

Comparisons with European data are only possible for melanoma as many countries do not collect data on NMSC. Within Europe-Switzerland, Norway, Sweden and the Netherlands had the highest estimated incidence rates of melanoma in 2012, followed by the UK and Ireland.

Ireland had the highest estimated mortality rate in Europe and the rates in males were much higher than in females across all European countries (Figures 14 & 15).

Despite the comparatively high mortality rate for melanoma in Ireland, available survival data indicate that melanoma survival in this country is very close to the European average (Figure 16). Possibly this indicates that despite increases in the proportion of early stage melanomas over time (Figure 6A) with high survival rates (Figure 13), the numbers of advanced melanomas with poor outcomes may not have not fallen correspondingly. Females ranked 9th and males ranked 16th out of 29 countries during 2000-2007, both just above the European average. Within Europe the Nordic countries have the highest survival and the Eastern countries the poorest.

**Figure 14**: *European incidence rates of melanoma skin cancer, 2012*[7]

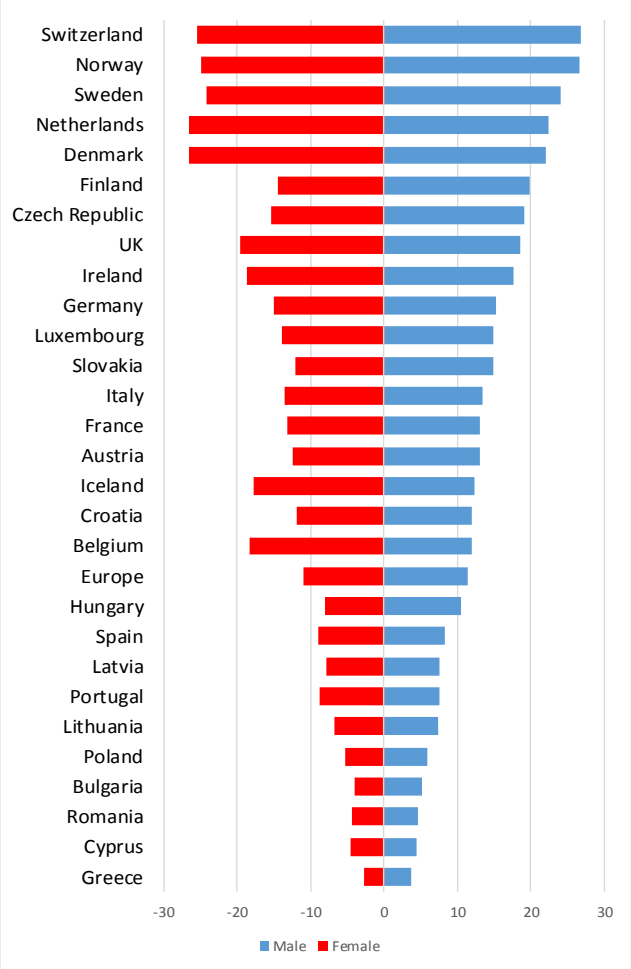
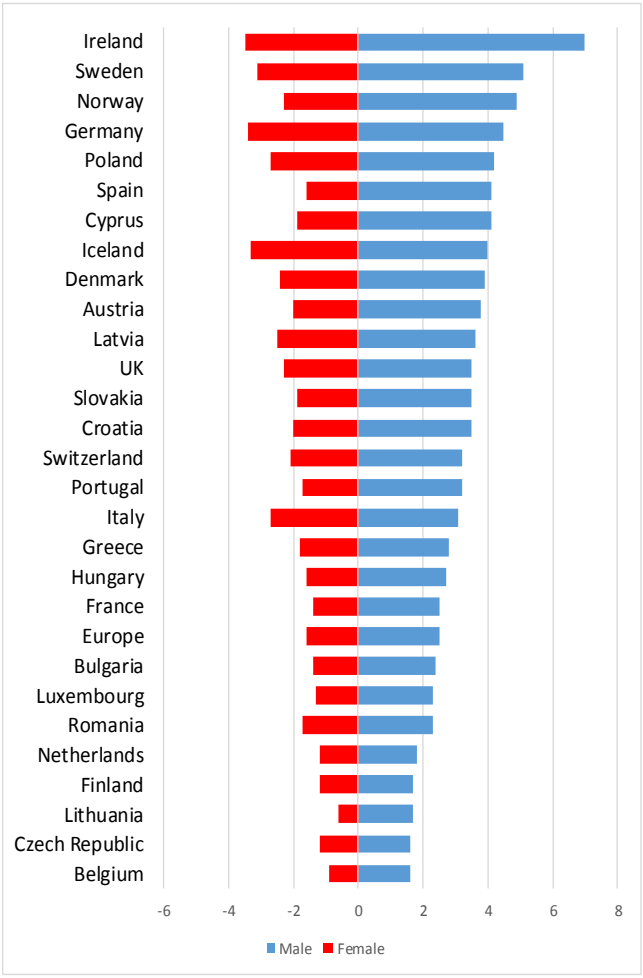



**Figure 15**: *European mortality rates of melanoma skin cancer, 2012*[7]







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2. Deady S, Sharp L & Comber H. 2014. Increasing skin cancer incidence in young, affluent, urban populations: a challenge for prevention. Br J Dermatol. 171, pp324–331

3. Tyczynski J et al 2003. Standards and guidelines for cancer registration in Europe. IARC Technical Publication No. 40. https://www.iarc.fr/en/publications/pdfs-online/treport-pub/treport-pub40/IARC_Technical_Report_No40.pdf.

4. Data on stage (TNM 5th edition) is available for melanoma up to 2013 only (7th edition for cases diagnosed 2014-2015 is not reported here).

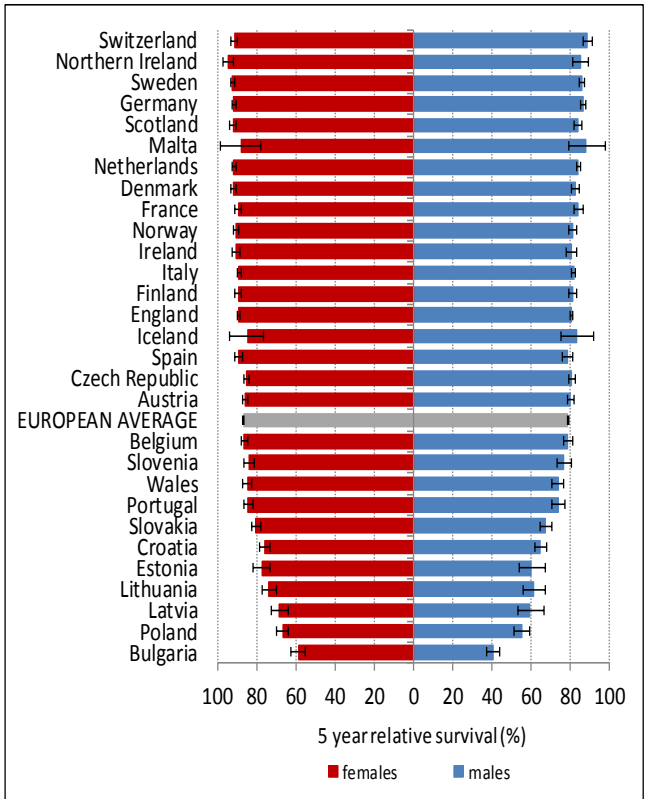
5. Complete data on treatment is available for up to 2014 only.

6. Data (1955-2013) extracted from the WHO database (http://www-dep.iarc.fr/WHOdb/WHOdb.htm). Note rates are standardised to the world standard population.

7. Source: European Cancer Observatory (ECO), EUCAN database. Rates standardised to the European (1976) standard population. http://eco.iarc.fr/EUCAN/Cancer.aspx?Cancer=20

8. Survival of cancer patients in Europe - the EUROCARE-5 study, figures extracted from the online database https://w3.iss.it/site/EU5Results


**Figure 16**: *5-year relative survival in Europe, melanoma skin cancer 2000-07*[8]




*If you have any concerns about skin cancer or need any other information, please see* www.cancer.ie/information-support *or* www.irishskinfoundation.ie