**INTRODUCTION**

There are two types of skin cancer: malignant melanoma of the skin and non-melanoma skin cancer (NMSC). Malignant melanoma is the less common but most serious type of skin cancer. In the UK in 2010, around 12,800 people were diagnosed with malignant melanoma, and in the UK in 2011 around 2,200 people died from the disease. NMSC is much more common, with more than 99,500 cases recorded in the UK in 2010; registration of the disease is known to be incomplete, however. The vast majority of NMSC cases are detected early and are not life-threatening. In the UK in 2011, there were around 590 deaths from NMSC.

Malignant melanoma is the fifth most common cancer in the UK, but only the 18th most common cause of cancer death, reflecting high survival from the disease. More than eight in ten malignant melanoma cases are estimated to be caused by UV radiation from the sun and sunbeds. Incidence rates have more than quadrupled since the mid-1970s in Great Britain. Most of the increase is considered to be real and linked to changes in sun-related behaviour, such as an increase in frequency of holidays abroad over time. The age distribution for malignant melanoma is unusual compared with other cancers, with a relatively high proportion of cases in younger people; but still 45% of cases are diagnosed in the over-65s. Whilst malignant melanoma is more common in females than males in the younger age groups, this pattern reverses in older people.

Survival from malignant melanoma has improved markedly in recent decades and is now amongst the highest for any cancer, largely thanks to increased awareness, earlier diagnosis and better treatments. Today eight in ten malignant melanoma patients are predicted to survive for at least ten years after their diagnosis. But there is still room for improvement, particularly among men. Skin cancer is an extremely preventable disease. With survival rates high, the main focus of research and practice continues to be on prevention and earlier diagnosis.

**INCIDENCE**

**By country in the UK**

Malignant melanoma is the fifth most common cancer in the UK (2010), accounting for 4% of all new cases. In males and females separately, malignant melanoma is the sixth most common cancer (4% each of the male and female total).\(^1,4\)

In 2010, there were 12,818 new cases of malignant melanoma in the UK (Table 1): 6,201 (48%) in men and 6,617 (52%) in women, giving a male: female ratio of around 10:1.\(^1,4\)

<table>
<thead>
<tr>
<th>Number of new cases</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td><strong>Number of new cases</strong></td>
</tr>
<tr>
<td>Males</td>
<td>5,151</td>
</tr>
<tr>
<td>Females</td>
<td>5,950</td>
</tr>
<tr>
<td><strong>Persons</strong></td>
<td>10,656</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Crude rate per 100,000</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td><strong>Crude rate per 100,000</strong></td>
</tr>
<tr>
<td>Males</td>
<td>20.0</td>
</tr>
<tr>
<td>Females</td>
<td>20.8</td>
</tr>
<tr>
<td><strong>Persons</strong></td>
<td>20.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>European age-standardised rate per 100,000</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td><strong>European age-standardised rate per 100,000</strong></td>
</tr>
<tr>
<td>Males</td>
<td>17.0</td>
</tr>
<tr>
<td>Females</td>
<td>17.3</td>
</tr>
<tr>
<td><strong>Persons</strong></td>
<td>17.0</td>
</tr>
</tbody>
</table>

\(^*\) Called malignant melanoma hereafter. Malignant melanoma (C43)
The crude incidence rate shows that there are 20 new malignant melanoma cases for every 100,000 males in the UK, and 41 for every 100,000 females.

The European age-standardised incidence rates (AS rates) are significantly higher in Wales compared with England, Scotland and Northern Ireland (males only). They are also significantly lower in Northern Ireland compared with Wales, England and Scotland (males only) (Table 1). The rates do not differ significantly between the constituent countries of the UK for females.

Similarly the latest analysis of malignant melanoma incidence rates across the former cancer networks throughout the UK reports significantly higher rates in the south and south west regions of England, whilst the incidence rates for areas of London are significantly lower than all other cancer networks.

2.2 By age

Malignant melanoma incidence is related to age, but it has an unusual pattern when compared with most other cancer sites. In the UK between 2008 and 2010, an average of 27% of cases were diagnosed in those aged under 50 years, and an average of 63% of cases were diagnosed in those aged 65 years and over. The rates do not differ significantly between the constituent countries of the UK for females.

Age-specific incidence rates increase steadily from around age 20-24 years, reaching a peak at age 85+ years for both sexes (with the increase being sharper for males from age 55-59 years onwards).

Some of the increase may be due to increased surveillance and early detection as well as changes in diagnostic criteria, but most is considered to be real and linked to changes in sun-related behaviour such as an increase in frequency of holidays abroad over time. A study published in December 2011 estimated that around 86% of malignant melanomas in the UK in 2010 were linked to exposure to UV radiation from the sun and sunbeds (Section 5).

In Europe, Malignant European Age-standardised incidence rates, Great Britain, 1975-2010.

2.3 Trends over time

Malignant melanoma incidence rates have increased overall in Great Britain since the mid-1970s (Figure 2). For males, European AS incidence rates were around seven times higher in 2008-2010 than in 1975-1977. For females, the increase is smaller but rates have still quadrupled between 1975-1977 and 2008-2010. Since the mid-1970s in Great Britain, malignant melanoma incidence rates have increased more rapidly than any of the current ten most common cancers in males and females.
Malignant melanoma incidence trends for the UK are shown in Figure 3. The last decade (between 1999-2001 and 2008-2010) the European age-standardised incidence rates have increased by 65% and 46% in males and females, respectively.

Figure 3: Malignant Melanoma Incidence Over Time, UK

Malignant melanoma incidence rates have increased overall for all of the broad age groups in Great Britain since the mid-1970s. The largest overall increase has been for males aged 60-79 years, with European AS incidence rates increasing around ten-fold between 1975-1977 and 2008-2010. The largest overall increase has been for people aged 60-79 years, with European AS incidence rates increasing around seven-fold between 1975-1977 and 2008-2010. Incidence rates for those aged 50-59 years have also more than tripled over the same time period.

Figure 4: Malignant Melanoma Incidence Over Time by Age, Males

Malignant melanoma incidence rates in males and females combined have also increased overall for all of the broad age groups in Great Britain since the mid-1970s. As indicated by the separate male and female rates, the largest overall increase has been for people aged 60-79 years, with European AS incidence rates increasing around seven-fold between 1975-1977 and 2008-2010. Incidence rates for those aged 50-59 years have also more than tripled over the same time period.

Figure 5: Malignant Melanoma Incidence Over Time by Age, Females

Malignant melanoma incidence rates are in males and females combined have also increased overall for all of the broad age groups in Great Britain since the mid-1970s. As indicated by the separate male and female rates, the largest overall increase has been for people aged 60-79 years, with European AS incidence rates increasing around seven-fold between 1975-1977 and 2008-2010. Incidence rates for those aged 50-59 years have also more than tripled over the same time period.

Figure 6: Malignant Melanoma Incidence Over Time by Age, Persons

Malignant melanoma incidence rates have also increased overall for all of the broad age groups for females in Great Britain since the mid-1970s. Following a similar pattern to males, the largest overall increase has also been for females aged 60-79 years, with European AS incidence rates increasing around five-fold between 1975-1977 and 2008-2010. For each of these age groups, the increase has been faster for males than for females.

2.4 Lifetime risk

Lifetime risk is an estimation of the risk that a newborn child will be diagnosed with cancer at some point during their lifetime. It is a summary of risk in the population but genetic and lifestyle factors affect the risk of cancer and so the risk for every individual is different.

In 2010, in the UK, the lifetime risk of developing malignant melanoma is 1 in 55 for men and 1 in 56 for women.
The lifetime risk for malignant melanoma has been calculated by the Statistical Information Team using the ‘Adjusted for Multiple Primaries’ (AMP) method; this accounts for the possibility that someone can have more than one diagnosis of malignant melanoma cancer over the course of their lifetime.14

The majority (66%) of men and women diagnosed with malignant melanoma present at stage I (Table 2),16 with the proportion being higher in women (71%) than in men (61%). Just 1% of men and women present with metastases (stage IV).

### Table 2: Malignant Melanoma Cases by Stage

<table>
<thead>
<tr>
<th>Stage at diagnosis</th>
<th>Men</th>
<th>Women</th>
<th>Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage I</td>
<td>61.4%</td>
<td>71.3%</td>
<td>66.4%</td>
</tr>
<tr>
<td>Stage II</td>
<td>21.0%</td>
<td>17.1%</td>
<td>19.1%</td>
</tr>
<tr>
<td>Stage III</td>
<td>13.7%</td>
<td>8.5%</td>
<td>11.1%</td>
</tr>
<tr>
<td>Stage IV</td>
<td>2.0%</td>
<td>0.7%</td>
<td>1.3%</td>
</tr>
<tr>
<td>Stage not known</td>
<td>1.9%</td>
<td>2.4%</td>
<td>2.1%</td>
</tr>
<tr>
<td>All stages</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

A study using data from three English cancer registries for 2007-2009 showed that around half of malignant melanoma cases (45% in males and 53% in females) are diagnosed when the tumour is less than 1mm thick.17 Only 14% of males and 10% of females are diagnosed when their tumour is more than 4mm thick.17

### 2.7 In Europe and worldwide

Although cancer registration has a long history in many countries of the world, particularly in the more affluent regions such as the UK, nearly 80% of the world’s populations live in regions that are not covered by such systems.38 Nonetheless, with a view to characterising the global burden of the disease, the International Agency for Research on Cancer (IARC) routinely uses the available data to estimate worldwide cancer incidence.19

Malignant melanoma is the 19th most common cancer worldwide, estimated to be responsible for almost 200,000 new cases of cancer in 2008 (more than 1% of the total). Malignant melanoma incidence rates are highest in Australia/New Zealand and lowest in South-Central Asia, with around a 200-fold variation in World AS incidence rates between the regions of the world for males, and around a 160-fold variation for females (Figure 8, see next page).

The majority of malignant melanomas are caused by heavy sun exposure in white-skinned populations.20,21 Incidence rates are highest by far in Australia/New Zealand, where it is the third most common cancer in both males and females, accounting for one in nine (around 11% in 2008) of the total cases.19 Incidence rates are increasing rapidly in many countries, including in the Nordic countries, where the increase has been attributed to excessive sun exposure during holidays at lower latitudes.20

### 2.5 Distribution of cases

Figure 7 shows the percentage distribution of malignant melanoma on parts of the body. These vary by sex, with more than four in ten cases in males arising on the trunk of the body, particularly on the back, while the most common site for females is on the legs.1,3

![Malignant Melanoma Cases by Body Site](image)

Figure 7: Malignant Melanoma Cases by Body Site

- **Head & neck:** 22% (Males: 14%, Females: 35%)
- **Trunk:** 41% (Males: 20%, Females: 59%)
- **Arm:** 13% (Males: 13%, Females: 19%)
- **Leg:** 39% (Males: 24%, Females: 57%)

Malignant melanoma (C43), percentage distribution of cases diagnosed on parts of the body, by sex, Great Britain, 2008-2010.11 Percentages may not add to 100 due to rounding.

### 2.6 By stage at diagnosis

Staging for malignant melanoma describes how deeply the tumour has grown into the skin, and whether it has spread. Data by stage are not yet routinely available for the UK due to inconsistencies in the collecting and recording of staging data in the past; this is improving, however, and plans for a nationally consistent dataset in England are underway.15 In the meantime, survival by stage is available for the former Anglia Cancer Network in the east of England for the period 2006-2010.16

Anglia covers around 5% of the population of England and may not be representative of the country as a whole due to differences in underlying demographic factors (such as age, deprivation or ethnicity), as well as variation in local healthcare provision standards and policies. Nonetheless, the Anglia data enable valuable comparisons between stage and malignant melanoma to be made.
2.8 Socio-economic variation

Malignant melanoma incidence is strongly inversely related to deprivation in the UK; it is one of the few cancers where incidence rates are lower for more deprived men and women and there is a clear trend of decreasing rates from the least to the most deprived.23–26 The most recent England-wide data for 2000–2004 show European AS incidence rates are 122% higher for men living in the least deprived areas compared with the most deprived, and 116% higher for women.23

It has been estimated that there would have been an additional 2,000 new malignant melanoma cancer cases each year in England during 2000–2004 if all men and women had experienced the same incidence rates as the most affluent.23
2.9 Prevalence

Prevalence refers to the number of people who have previously received a diagnosis of cancer and who are still alive at a given time point. Some patients will have been cured of their disease and others will not. The latest estimates for the UK (Table 3) show that nearly 60,000 men and women were still alive at the end of 2006, up to ten years after being diagnosed with malignant melanoma.27 Worldwide, it is estimated that there were around 756,000 cancer patients still alive in 2008, up to five years after their diagnosis.19

Table 3: Malignant Melanoma Prevalence

<table>
<thead>
<tr>
<th>Sex</th>
<th>One-year</th>
<th>Five-year</th>
<th>Ten-year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>4,278</td>
<td>16,118</td>
<td>24,617</td>
</tr>
<tr>
<td>Females</td>
<td>5,132</td>
<td>21,203</td>
<td>34,530</td>
</tr>
<tr>
<td>Persons</td>
<td>9,410</td>
<td>37,321</td>
<td>59,147</td>
</tr>
</tbody>
</table>

Malignant melanoma (C43), one-, five- and ten-year cancer prevalence, UK, 31 December 2006.

2.10 Non-melanoma skin cancer

Non-melanoma skin cancers (NMSC) are extremely common, but relatively few deaths (see Section 4.5) are caused by them. In 2010, there were 99,549 cases of NMSC registered in the UK: 56% in men and 44% in women, giving a male:female ratio of 1.31:1.4

The majority of NMSCs are BCCs (74%) or SCCs (23%).28 The remainder comprises a mixed group of rare skin cancers; almost three in ten of these are Merkel cell carcinoma, which has a very poor prognosis.29

Both BCC and SCC are more common in males than females, though the sex difference is wider for SCC than BCC.28 The recorded incidence of BCC increased by around a third (36% in males and 32% in females) between 2000-2002 and 2008-2010 in England, Scotland, Northern Ireland and Ireland combined.28 SCC incidence increased by a similar amount (34% in males and 39% in females) over the same time period.28 Whilst improved registration may partly explain these increases, some of the increase is probably genuine, reflecting increased UV exposure from the sun or sunbeds.28

NMSCs constitute a substantial burden to the national health services across the UK because of the large number of cases diagnosed each year, however NMSC incidence figures are under-estimates because the recording of NMSC is known to be incomplete.27 Many cancer registries record only the first NMSC of each histological type (e.g. BCC or SCC) per person, and information on small NMSCs treated in primary care or the private sector may never reach the registries.28 An estimated 30-50% of BCC and around 30% of SCC goes unrecorded, though this may vary by registry.28-33

Both BCC and SCC are highly treatable and survival rates for NMSCs are very high.34 However, if left untreated, these tumours can become destructive, invading local tissues and causing disfigurement.35

3 One-, five- and ten-year survival

Age-standardised relative survival26 for malignant melanoma in England during 2005-2009 shows that 96% of men survive their disease for at least one year, falling to 84% surviving for five years or more (Table 4).36,37 Survival for women is slightly higher, with 98% surviving for one year or more, and 92% surviving for at least five years. Broadly similar survival has been reported for Wales, Scotland and Northern Ireland.38-40

Survival continues to fall slightly beyond five years after diagnosis, with 80% of men and 90% of women predicted to survive for at least ten years (Table 4).

Five-year survival for malignant melanoma is amongst the highest of the 21 most common cancers in England.36 However, with an absolute survival difference of 8%, malignant melanoma shows one of the largest disparities in five-year survival between the sexes. Differences in the thickness of tumours between men and women may explain some of the variation, as well as diverse attitudes to health-related behaviour.41,42

Table 4: Malignant Melanoma One-, Five- and Ten-Year Survival

<table>
<thead>
<tr>
<th>Sex</th>
<th>One-year</th>
<th>Five-year</th>
<th>Ten-year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>95.7%</td>
<td>83.6%</td>
<td>79.7%</td>
</tr>
<tr>
<td>Women</td>
<td>97.7%</td>
<td>91.6%</td>
<td>90.1%</td>
</tr>
</tbody>
</table>

Malignant melanoma (C43), one-, five- and ten-year age-standardised relative survival, adults aged 15-99, England, 2005-2009.36 Ten-year survival has been predicted for patients diagnosed in 2009 (using the hybrid approach).27

Like with most cancers, treatment for malignant melanoma is much more effective when the disease is caught at an early stage (see Section 3.4).

Survival data for NMSC is not routinely available, and is therefore not shown. However, in the majority of cases, NMSC is detected early and is not life threatening.
### 3.2 By age

As with nearly all cancers, survival for malignant melanoma is higher in younger men and women, even after taking account of the higher background mortality in older people. The reasons for this are likely to include a combination of better general health, more effective response to treatment and earlier diagnosis in younger people overall.

In men, five-year relative survival for malignant melanoma in England during 2005-2009 ranges from 90% in 15-39 year-olds to 64% in 80-99 year-olds (Figure 10).56 Five-year survival is higher in women than men across all age groups, ranging from 96% in 15-39 year-olds to 85% in 80-99 year-olds.

**Figure 10** Malignant Melanoma Five-Year Survival by Age

Malignant melanoma (C43), five-year relative survival by age at diagnosis, adults aged 15-99, England, 2005-2009.56

### 3.3 Trends over time

As with the majority of cancers, survival for malignant melanoma is improving. This can generally be attributed to faster diagnosis and improvements in treatment. However, there is still scope for improvement and increasing cancer survival remains a major priority of Improving Outcomes: A Strategy for Cancer.43

One-year survival can be used as an indicator of early diagnosis, since death before one year is likely to be due to the disease being diagnosed at a late stage. In men, one-year age-standardised relative survival for malignant melanoma in England increased from 79% during 1971-1975 to 96% during 2005-2009 (Figure 11).36,37 In women, one-year survival increased from 89% to 98% over the same time periods, respectively.

**Figure 11** Malignant Melanoma One-, Five- and Ten-Year Survival Over Time

Ten-year age-standardised relative survival for men diagnosed with malignant melanoma in England increased from 39% during 1971-1975 to a predicted 80% in 2009 (Table 4 and Figure 11).36,37 In women, ten-year survival increased from 58% to a predicted 90% over the same time periods, respectively.

### 3.4 By stage at diagnosis

Survival by stage is not yet routinely available for the UK due to inconsistencies in the collecting and recording of staging data in the past; this is improving, however, and plans for a nationally consistent dataset in England are underway.43 In the meantime, survival by stage is available for the former Anglia Cancer Network in the east of England for the period 2006-2010.46 Anglia covers around 5% of the population of England and may not be representative of the country as a whole due to differences in underlying demographic factors (such as age, deprivation or ethnicity), as well as variation in local healthcare provision standards and policies. Nonetheless, the Anglia data enable valuable comparisons between stage and cancer to be made.

Survival for malignant melanoma is strongly related to stage of the disease at diagnosis.46 The majority (66%) of patients present at stage I (see Section 2.6). Just 1% of patients present with metastases (stage IV).
One-year relative survival is highest for patients presenting at stage I, with 101% of men and women surviving for at least one year (Figure 12). In comparison, one-year survival is considerably lower for those diagnosed with stage IV disease (10% for men and 35% for women). As very few patients are diagnosed at Stage IV, however, the one-year survival statistics have wide confidence intervals and should therefore be interpreted with caution. There are no significant sex differences at any of the stages.

### Figure 12: Malignant Melanoma One-Year Survival by Stage

<table>
<thead>
<tr>
<th>Stage</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>II</td>
<td>96%</td>
<td>91%</td>
</tr>
<tr>
<td>III</td>
<td>90%</td>
<td>86%</td>
</tr>
<tr>
<td>IV</td>
<td>61%</td>
<td>50%</td>
</tr>
<tr>
<td>Not known</td>
<td>36%</td>
<td>32%</td>
</tr>
</tbody>
</table>

Five-year survival for malignant melanoma is similarly strongly related to the stage of the disease at diagnosis, but there is a much more gradual decrease in survival between stages I and IV. Five-year relative survival ranges from 92% (for men) and 100% (for women) at Stage I to 8% (for men) and 25% (for women) at Stage IV (Figure 13). As expected, five-year survival is significantly lower than one-year survival across most known-stage groups within each sex. The exceptions are men and women presenting at Stage I, whose five-year survival remains at 100%, and men and women presenting at Stage IV, in whom survival does not differ significantly between one and five years (though, as before, low patient numbers preclude reliable analysis).

### Figure 13: Malignant Melanoma Five-Year Survival by Stage

<table>
<thead>
<tr>
<th>Stage</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>II</td>
<td>84%</td>
<td>80%</td>
</tr>
<tr>
<td>III</td>
<td>71%</td>
<td>64%</td>
</tr>
<tr>
<td>IV</td>
<td>39%</td>
<td>25%</td>
</tr>
<tr>
<td>Not known</td>
<td>23%</td>
<td>22%</td>
</tr>
</tbody>
</table>

### 3.5 In Europe

EUROCARE (European Cancer Registry-based study on survival and care of cancer patients) is a series of cancer registry-based comparisons of cancer survival by country in Europe. Whilst the studies have some unavoidable limitations and the survival statistics should be viewed with some caution, EUROCare is the largest co-ordinated effort at providing comparative survival statistics across Europe.

The most recent study in the series, EUROCARE-4, used data collected from 82 cancer registries in 23 European countries for the analysis of 2.7 million adult cancer patients diagnosed in the period 1995–1999.

Malignant melanoma is one of the few cancers in which five-year relative survival in England is significantly higher than the European average. The study showed there is considerable variation within the UK, however, with significantly lower five-year survival in Wales (74%) compared with England, Scotland and Northern Ireland (85%, 89% and 93%, respectively). Such comparatively low survival in Wales may be explained by differences in stage at diagnosis, particularly among the more deprived men and women who seem to fare worse compared with their UK counterparts. Differences in public awareness and early diagnosis initiatives may also play a role. It has been estimated that around 930 deaths could be avoided within five years of diagnosis if malignant melanoma survival in Britain equalled the best in Europe.

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1. Relative survival can be greater than 100% because it accounts for background mortality. A relative survival figure greater than 100 indicates that people diagnosed have a better chance of surviving one or five years after diagnosis than the general population.
### Table 5: Malignant Melanoma Mortality by Country

<table>
<thead>
<tr>
<th>Sex</th>
<th>England</th>
<th>Wales</th>
<th>Scotland</th>
<th>Northern Ireland</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of deaths</strong></td>
<td>2011</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>1,088</td>
<td>75</td>
<td>105</td>
<td>27</td>
<td>1,295</td>
</tr>
<tr>
<td>Females</td>
<td>783</td>
<td>43</td>
<td>71</td>
<td>17</td>
<td>914</td>
</tr>
<tr>
<td>Persons</td>
<td>1,871</td>
<td>118</td>
<td>176</td>
<td>44</td>
<td>2,209</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Crude rate per 100,000</strong></th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>4.2</td>
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<tr>
<td>Females</td>
<td>2.9</td>
</tr>
<tr>
<td>Persons</td>
<td>3.5</td>
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</table>

<table>
<thead>
<tr>
<th><strong>European age-standardised rate per 100,000</strong></th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>3.4</td>
</tr>
<tr>
<td>Females</td>
<td>2.0</td>
</tr>
<tr>
<td>Persons</td>
<td>2.6</td>
</tr>
</tbody>
</table>

### 4.3 Trends over time

Malignant melanoma mortality rates have increased overall in the UK since the early 1970s (Figure 15). For males, European AS mortality rates increased by 185% between 1971-1973 and 2009-2011. The rise is smaller for women, with rates increasing by 55% between 1971-1973 and 2009-2011. From the late 1980s onwards, mortality rates have increased much more quickly in males than in females, causing a divergence of the rates between the sexes. This is in contrast to malignant melanoma incidence rates in males and females, which have converged in the last decades (see Section 2.3). Over the last decade (between 2000-2002 and 2009-2011), the European AS mortality rates have increased by 22% in males and remained stable in females. The increase in malignant melanoma mortality rates is likely to be a reflection of the increase in incidence rates. The increase in mortality rates is much less pronounced, however, due to improvements in survival (as a result of earlier diagnosis and better treatment). The lower mortality rates in females since the mid-1980s mirror the better survival rates seen in women (see Section 3).

### 4.2 By age

Malignant melanoma mortality is strongly related to age, with the highest mortality rates being in older men and women. In the UK between 2009 and 2011, an average of 5% of malignant melanoma deaths were in the 15-39 age group, whilst an average of 38% of deaths were in people aged 75 years and over (Figure 14). Age-specific mortality rates increase sharply from around age 50-54 years and over in both sexes. Mortality rates are generally similar between males and females until age 50-54 onwards, when rates are higher for males than for females. This is in contrast to incidence rates which are higher for females until the mid-50s. The widest gap between the ages is for those aged 70-74 years, when the male:female mortality ratio of age-specific rates (to account for the different proportions of males to females in each age group) is 20:10.

### Figure 15: Malignant Melanoma Mortality Over Time

Malignant melanoma mortality rates have increased overall for most of the broad age groups in the UK since the early 1970s, except those aged 15-39 and 40-49 years (Figure 16). The largest increases have been in people aged 75 years and over, with European AS mortality rates more than quadrupling between 1971-1973 and 2009-2011.
4.4 In Europe and worldwide

Worldwide cancer mortality data are collated and distributed by the World Health Organisation. As with the collation of incidence data, there is wide variation in the coverage of death registration systems across the world, with two-thirds of the world’s populations living in regions that are not covered by mortality statistics, as well as variation in the quality of the cause of death information itself. IARC routinely uses the available data to estimate worldwide cancer mortality.

Malignant melanoma is the 23rd most common cause of cancer death worldwide, estimated to be responsible for more than 46,000 deaths in 2008 (around 0.6% of the total). Malignant melanoma mortality rates are highest in Australia and New Zealand and lowest in South Central Asia, with a 49-fold variation in World AS mortality rates between the regions of the world for males, and a 23-fold variation for females (Figure 17).

Figure 18: Malignant Melanoma Mortality in Europe

<table>
<thead>
<tr>
<th>Country</th>
<th>Rate per 100,000 (Males)</th>
<th>Rate per 100,000 (Females)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweden</td>
<td>4.0</td>
<td>2.8</td>
</tr>
<tr>
<td>Estonia</td>
<td>3.2</td>
<td>2.0</td>
</tr>
<tr>
<td>Denmark</td>
<td>2.9</td>
<td>2.1</td>
</tr>
<tr>
<td>Slovakia</td>
<td>2.8</td>
<td>1.9</td>
</tr>
<tr>
<td>Slovenia</td>
<td>2.1</td>
<td>1.5</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>2.0</td>
<td>1.4</td>
</tr>
<tr>
<td>Ireland</td>
<td>1.9</td>
<td>1.3</td>
</tr>
<tr>
<td>Austria</td>
<td>1.8</td>
<td>1.2</td>
</tr>
<tr>
<td>Hungary</td>
<td>1.4</td>
<td>1.0</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>1.3</td>
<td>0.9</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>1.2</td>
<td>0.8</td>
</tr>
<tr>
<td>Finland</td>
<td>1.1</td>
<td>0.7</td>
</tr>
<tr>
<td>Poland</td>
<td>1.0</td>
<td>0.6</td>
</tr>
<tr>
<td>UK</td>
<td>0.9</td>
<td>0.5</td>
</tr>
<tr>
<td>Latvia</td>
<td>0.8</td>
<td>0.4</td>
</tr>
<tr>
<td>EU-27</td>
<td>0.7</td>
<td>0.4</td>
</tr>
<tr>
<td>Germany</td>
<td>0.6</td>
<td>0.3</td>
</tr>
<tr>
<td>Malta</td>
<td>0.5</td>
<td>0.2</td>
</tr>
<tr>
<td>Lithuania</td>
<td>0.4</td>
<td>0.2</td>
</tr>
<tr>
<td>Italy</td>
<td>0.3</td>
<td>0.1</td>
</tr>
<tr>
<td>France (Metropolitan)</td>
<td>0.3</td>
<td>0.2</td>
</tr>
<tr>
<td>Belgium</td>
<td>0.3</td>
<td>0.2</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>0.2</td>
<td>0.1</td>
</tr>
<tr>
<td>Spain</td>
<td>0.2</td>
<td>0.1</td>
</tr>
<tr>
<td>Portugal</td>
<td>0.1</td>
<td>0.0</td>
</tr>
<tr>
<td>Romania</td>
<td>0.1</td>
<td>0.0</td>
</tr>
<tr>
<td>Greece</td>
<td>0.1</td>
<td>0.0</td>
</tr>
<tr>
<td>Cyprus</td>
<td>0.1</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Malignant melanoma (C43), European age-standardised mortality rates, EU-27 countries, 2008 estimates.
5 Non-melanoma skin cancer

NMSC is an extremely common cancer (see Section 2.10), but relatively few deaths are caused by it. In 2011, there were 585 deaths from NMSC in the UK, of which 62% were in males.66-68 BCCs rarely metastasise (spread) and are unlikely to be fatal, though they can cause disfigurement,35 in contrast SCCs sometimes spread and can therefore lead to death.61

Within the 27 countries of the European Union (EU-27), the highest malignant melanoma European AS mortality rates are estimated to be in Sweden for both males (around 5 deaths per 100,000) and females (around 3 deaths per 100,000), and the lowest rates are estimated to be in Cyprus for males (1 male death per 100,000), and Greece for females (around 1 female death per 100,000) (Figure 18, see previous page).25

UK malignant melanoma mortality rates are estimated to be the 14th (males) and 13th (females) highest in Europe (EU-27).

3.1 Ultraviolet radiation from sun exposure

Excess exposure to UV radiation is the main preventable risk factor for skin cancer.62,63 The sun is the principal source of natural UV radiation, whilst sunbeds produce artificial UV radiation.

UVA and UVB are the two types of solar radiation which reach us on Earth. Both types are linked to skin cancer. UVB is predominantly responsible for burning, whilst UVA penetrates deeper into the skin and is linked with premature ageing.

It is also expected that climate change will cause more skin cancer cases in the future, as more UV radiation reaches us on Earth, and warmer temperatures encourage people to spend more time in direct sunlight.64

There is sufficient evidence that too much exposure to solar UV radiation is the main cause of both malignant melanoma and NMSC, according to IARC.65,66 It is estimated that around 11,100 (86%) malignant melanoma cases in the UK in 2010 were linked to UV radiation exposure.62 Among NMSCs, an estimated 50-70% of SCCs and 50-90% of BCCs in fair-skinned people are caused by UV radiation.67

5.1.1 Intermittent sun exposure and sunburn

Risk of malignant melanoma is most strongly linked to intermittent exposure to high-intensity sunlight (for example from sunbathing, doing watersports or holidaying in a place where the sun is strong), a meta-analysis has shown.68 Intermittent sun exposure was associated with a 60% increased risk of malignant melanoma, though this effect was smaller and not significant in studies of UK, US, Canadian or Australian populations.68

Intermittent exposure to high-intensity sunlight often results in sunburn,68 and a history of sunburn doubles the risk of malignant melanoma.68-71 Having had 26 or more episodes of ‘painful’ or ‘severe’ sunburn during your lifetime increases the risk of malignant melanoma by two to three times in women, a pooled analysis showed.60 Malignant melanoma risk is increased regardless of whether sunburn occurred in childhood or adulthood.68,71

Sunburn, especially in childhood, or intermittent exposure to sunlight, also increases the risk of SCC.72,73 Sunburn and intermittent sunlight exposure is believed to have less of an effect on SCC risk.74-76

Exposure to UV radiation has increased in recent decades in the UK population, as people have increasingly sought a suntan by holidaying abroad.

5.1.2 Chronic sun exposure

Chronic or more continuous sunlight exposure, for example that received by people with outdoor occupations, did not appear to increase malignant melanoma risk in a recent meta-analysis, though the review authors commented that occupational sun exposure still probably increases risk over no sun exposure at all.68

There is evidence that chronic sun exposure increases the risk of NMSC. People who work outdoors are at 43% higher risk of BCC,77 and 77% higher risk of SCC,78 and these effects are stronger in countries nearer the equator, two meta-analyses have found.77,78
5.2 Ultraviolet radiation from sunbeds

There is sufficient evidence that use of sunbeds causes malignant melanoma. IARC states and ICNIRP also states that sunbed use causes SCC. There is currently no IARC statement on sunbeds and BCC.

Use of a sunbed for the first time before age 35 increases the risk of malignant melanoma by 59%, and use at any age increases malignant melanoma risk by 20-25%, the most recent meta-analysis showed. Women using a sunbed once a month or more in their 30s increase their malignant melanoma risk by 49%, and those doing so in their 40s face a 61% increased risk, one large study included in that analysis showed. Another cohort study showed women aged 25-39 who use a sunbed more than 10 times a year have two-and-a-half times the malignant melanoma risk compared with women who do not use sunbeds. Sunbed use is estimated to cause around one hundred deaths a year from malignant melanoma in the UK.

Sunbed use at any age increases the risk of SCC by 67%, and increases BCC risk by 29%, according to the most recent meta-analysis. Risk increases for both types of NMSC in relation to sunbed use were also shown in an earlier meta-analysis. Exposure before age 25 appears to confer even greater risk increases, though in meta-analysis the effect was significant only for BCC (40% risk increase). Women who used a sunbed more than six times a year during high school increased their BCC risk by 73% in comparison with those who didn’t use a sunbed, a US cohort study showed. And both SCC and BCC risk were increased by 15% for every four sunbed sessions a year during high school or at age 25-35. Using a sunbed without ever burning appears to be no safer – it can increase the risk of malignant melanoma by 20-25%, the most recent case-control studies have shown. It is limited evidence that sunbed use causes SCC.

Categories of people who should not use sunbeds, as recommended by ICNIRP and WHO.

5.3 Skin type, hair and eye colour

People with light eyes, skin or hair, or with skin that sunburns easily or does not tan, have an increased risk of skin cancer. These factors in combination are used to define the skin phototype (Table 7). This classification is used in most studies exploring pigmentary characteristics and skin cancer risk.

Table 7: Skin Phototypes

<table>
<thead>
<tr>
<th>Phototype</th>
<th>Typical Features</th>
<th>Tanning Ability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I</td>
<td>Tends to have freckles, red or fair hair, and blue or green eyes.</td>
<td>Often burns, rarely tans.</td>
</tr>
<tr>
<td>Type II</td>
<td>Tends to have light hair, and blue or brown eyes.</td>
<td>Usually burns, sometimes tans.</td>
</tr>
<tr>
<td>Type III</td>
<td>Tends to have brown hair and eyes.</td>
<td>Sometimes burns, usually tans.</td>
</tr>
<tr>
<td>Type IV</td>
<td>Tends to have dark brown eyes and hair.</td>
<td>Rarely burns, often tans.</td>
</tr>
<tr>
<td>Type V</td>
<td>Naturally black-brown skin. Often has dark brown eyes and hair.</td>
<td>Naturally black-brown skin. Usually has black-brown eyes and hair.</td>
</tr>
</tbody>
</table>


In comparison with people with skin phototype IV, those with skin phototype I are at more than double (2.27 times) the malignant melanoma risk, phototype II at double (1.99 times) the risk, and phototype III at 35% increased risk, a recent meta-analysis reported.

In comparison with dark-eyed people, those with blue/gray eyes have a 57% higher malignant melanoma risk, and those with green/grey/hazel eyes have a 51% increased risk.

Cancer Research UK recommends that people do not use sunbeds.
In comparison with dark-haired people, those with red/red-blonde hair were shown to be at up to triple the malignant melanoma risk.93-95 Blondes are at double the risk, and people with light brown hair are at 46% increased risk.93

People with freckles were found to have around double (1.99 times) the risk of malignant melanoma; versus people without freckles.93 People with freckles have increased malignant melanoma risk, regardless of the number of moles they have.96

People with blue/green-blue/green-grey eyes are at increased risk of BCC.97 People with red and light-coloured hair are at increased risk of BCC and SCC.98-100

### 5.4 Moles (naevi)

Meta-analyses show people with any unusually shaped or large moles (also called atypical naevi; these are usually larger than common naevi, with a more variegated appearance, poorly-defined border, and some areas slightly raised) have around four to ten times increased risk of malignant melanoma.96-99,101 and the risk increases with the number of atypical moles.100 People with very high numbers (100+) of common moles on their bodies have nearly seven times the risk compared to people with very few (0-15 moles),101 and every additional common mole increases the risk of malignant melanoma by around 2%.102

People with dysplastic mole syndrome (also known as Familial Atypical Multiple Mole-Melanoma Syndrome or FAMMM; characterised by multiple atypical moles that continue to appear in adulthood) and a family history of malignant melanoma have a 500-fold increased risk of developing malignant melanoma,103 however this is very rare and accounts for less than 5% of malignant melanoma cases.101

Most moles are genetically determined (inherited), though sun exposure can increase the number of moles. Most moles appear during childhood.96,104 The emergence of moles in adolescents is under strong genetic control, a UK study of moles in twins concluded.105 Chronic sun exposure rather than number of sunburn episodes is the most important environmental factor determining mole development.106

### 5.5 Sunscreen use

The impact of sunscreen use on skin cancer risk remains unclear, due largely to methodological limitations.106,107

Sunscreen should be used together with clothing and shade to protect the skin from sun damage, and should never be used to spend longer in the sun.

Research shows sunscreen users may counteract the protective effect of sunscreens by: spending longer in the sun than non-users; applying their sunscreen incorrectly; or failing to use protective clothing.108-111

### 5.6 Vitamin D

The only established benefit of exposure to solar UV radiation is the synthesis of vitamin D, which is vital for bone health. Higher circulating levels of vitamin D in the blood are associated with lower risk of bowel cancer, although it is unclear whether this is a causal relationship.112-116

However, sunbathing, tanning or burning should not be necessary to make sufficient vitamin D to obtain health benefits. In fair-skinned people, the time taken to make enough vitamin D is short, and less than the time taken for skin to redden or burn.117 Once sufficient vitamin D is made, any extra is turned into inactive substances.118 So more sun exposure does not equate to greater health benefits, and excessive exposure to solar UV radiation is not a means of reducing the incidence or mortality of cancer.

### 5.7 Family history

People with a family history of malignant melanoma have roughly double the risk of developing the disease, compared to people without a family history.119-122 A small percentage of malignant melanoma cases (around 10%) are attributable to inherited risk.121,122

FAMMM is one of several rare hereditary syndromes associated with an increased risk of malignant melanoma.133 FAMMM is associated with the hereditary susceptibility genes CDKN2A and CDK4. CDKN2A mutation carriers often have three or more family members with malignant melanoma, or have multiple primary malignant melanomas with no family history. CDKN2A mutation carriers living in Europe have a 58% risk of developing malignant melanoma by age 80.124 Malignant melanoma and NMSC have been linked to Li Fraumeni syndrome in some studies, although they are not among the ‘core’ cancers occurring in Li Fraumeni families.125 People with a family history of SCC have an increased risk of SCC.126 People with a family history of malignant melanoma have an increased risk of BCC.127

### 5.8 Previous cancer

Previous malignant melanoma is associated with eight- to twelve-fold increased risk of a second malignant melanoma.128-130 The effect is stronger for women.129,130 People with a previous malignant melanoma and a parent with malignant melanoma are at more than 30-fold risk of a second malignant melanoma.131 Malignant melanoma risk is higher among people with a previous diagnosis of various other cancers, including female breast cancer,132,133 non-Hodgkin lymphoma,134,135 renal cell carcinoma,136 certain childhood cancers,137 prostate cancer,138,139 thyroid cancer,132 and leukaemia.132 Generally the increase in risk was less than double. Often these associations are bi-directional,128 supporting shared genetic or environmental factors.

Previous SCC is associated with ten times higher risk of a second BCC or SCC, whilst previous BCC is associated with ten times higher risk of second BCC but a lower increase in second SCC risk.139-141 PreVIOUS malignant melanoma is associated with three-fold increased risk of NMSC.142 People who have had NMSC are also at increased risk of other second primary cancers.143

### 5.9 Other medical conditions, treatments and procedures

Organ transplant recipients are at 29-fold increased NMSC risk, and two-fold increased malignant melanoma risk, a meta-analysis shows.144-146
Risk factors

4.5 4.4 4.3 4.2 4.1 3.5 3.4 3.2 3.1 2.7 2.3 2.2

the UK is recorded in skin cancer information on
treatment cancer melanoma skin worldwide
time the UK diagnosis time survival and ten-year variation
economic the UK

How Acknowledge The future

Mortality

4.1 One-, five- and ten-year survival
32 By age
31 Trends over time
30 By country in the UK
29 By age
28 Trends over time
27 In Europe and worldwide
26 Socio-economic variation
25 Prevalence
24 Lifetime risk
23 Trends over time
22 By age in the UK
21 Risks for people with a family history of NMSC
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19 By age
18 Trends over time
17 Incidence
16 By country in the UK
15 Risks for people with a family history of NMSC
14 Other risk factors
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12 Trends over time
11 Introduction
10 Skin cancer

This may be related to the use of immunosuppressant drugs called azathioprine and cyclosporine, which IARC states are causes of NMSC.56

People with Crohn’s disease have an 80% increased risk of malignant melanoma, and people with ulcerative colitis have a 23% increased risk, a meta-analysis shows.147 Treatment for these bowel conditions may include immunosuppressant drugs, but the increase in malignant melanoma risk appears to be independent of treatment.147

People with atopic dermatitis (the most common form of eczema) appear to have an increased risk of NMSC, but the association between atopic dermatitis and malignant melanoma remains unclear.148,149 Contact allergy may reduce the risk of NMSC very slightly.150 A drug called methoxsalen is used in conjunction with exposure to UVA to treat eczema, and IARC classifies this as a cause of NMSC.66 Patients with severe psoriasis may have seven times the NMSC risk of the general population, and eleven times the malignant melanoma risk, a cohort study showed.151

Malignant melanoma risk is apparently doubled in men with Parkinson’s disease, but there is no significant association for women, a meta-analysis showed.152 A Danish cohort study found a smaller effect (41% increase in men and women combined) with similar magnitude in both sexes.153 NMSC risk was 29% higher in Parkinson’s disease patients in that cohort study, but the meta-analysis found no significant association.152,153

Rheumatoid arthritis patients taking tumour necrosis factor inhibitors (anti-TNF-α) may have increased NMSC risk, but the evidence remains unclear: a meta-analysis of randomised controlled trials found the effect was not significant,154 but a meta-analysis of observational studies found a 45% higher risk of NMSC.155 Rheumatoid arthritis patients taking anti-TNF-α do not have a higher NMSC risk than patients taking other disease-modifying anti-rheumatic drugs,156 nor does their malignant melanoma risk appear to be significantly altered.155

People with HIV or AIDS have been shown to have increased malignant melanoma and NMSC risks;144 presently IARC states that there is limited evidence that HIV type 1 infection causes NMSC.66

Case-control studies show that women with higher BMI or body surface area have an increased malignant melanoma risk, when results are adjusted for the amount of sun exposure, suggesting mutual confounding between body size and sun exposure (e.g. larger women self-limit their public sun exposure).159 However, most studies have not adjusted for amount of sun exposure and have not found an association between overweight and malignant melanoma risk in women.159-161 Obesity is associated with decreased NMSC risk, perhaps due to less UV exposure in larger people.162,163 Women with BMI lower than 25kg/m2 were at 26-43% higher BCC risk and 20-41% higher SCC risk than women with a higher BMI, US cohort studies have shown.97,162 For men in these analyses, the difference in BCC risk was only significant for people with BMI 30-3499 versus BMI under 25, and there was no significant effect of BMI on SCC risk.97,162 Babies with a higher birthweight have a higher risk of early-onset malignant melanoma, a Northern Ireland cohort study showed; those weighing 4.5-6kg at birth had more than twice the malignant melanoma risk compared with those weighing 3.3-5kg at birth.164

There is sufficient evidence that X-radiation and gamma radiation (both types of ionising radiation) cause NMSC, according to IARC.95 Radiotherapy for a previous cancer is estimated to have caused 17.9% of second primary malignant melanoma cases in women and 2.8% of second primary malignant melanoma cases in men in 2010.165 Exposure to cosmic radiation has been posited as an explanation for the higher rates of malignant melanoma in airline staff, but recent evidence suggests that excessive UV exposure and sun-sensitive skin phenotypes are more likely causes.166,167 People who receive at least one computed tomography (CT) scan of the brain before age 20 have a 14% higher risk of malignant melanoma or NMSC, with no significant effect of CT scans to other anatomical sites, a large Australian cohort study showed.166

Some chemical exposures that can take place in certain occupations cause NMSC, IARC states.66 These include coal tar pitch, soot, mineral oils and shale oils. It has been estimated that around 7% of NMSCs in men and around 1% in women in Britain are due to occupational exposures (including solar radiation).169

People diagnosed with genital warts (associated with infection with HPV types 6 and 11) have a 30% increased risk of BCC.170

5.10 Other risk factors

Taller women appear to be at increased risk of malignant melanoma and BCC. One study showed women taller than 5 feet 3 inches were at 28-64% higher BCC risk than shorter women; there was no effect of height for men.97 Malignant melanoma risk increased by 32%-51% for every 10cm increase in height, according to recent large studies.157,158

Malignant melanoma risk is 31% higher in overweight (body mass index – BMI – 25-29.9) and obese (BMI 30+) men, compared with men whose BMI is lower than 25, a meta-analysis reported.155 This analysis showed the risk appears to plateau in overweight men rather than continuing to increase with higher BMI,155 however a previous meta-analysis found a 17% risk increase per 5-unit BMI increment.160

Use of oral contraceptives (OCs) or hormone replacement therapy (HRT) does not significantly impact on malignant melanoma risk in women, a meta-analysis shows.171 Other reproductive factors (age at birth of first child, number of children) show small effects on malignant melanoma risk, though these effects are largely explained by socio-economic factors.171 SCC risk increased by 35% for every five years of HRT use in a cohort study, and BCC risk was 15% higher in women who had ever used HRT compared to those who had never used it.172 OC use did not impact on BCC or SCC risk in this cohort study.172
55 Unlike for many other cancers, smoking does not appear to increase malignant melanoma risk. The relationship between smoking and NM risk remains unclear, with effects apparently varying by NM type, and patient sex. Non-steroidal anti-inflammatory drugs (NSAIDs) appear not to affect malignant melanoma risk, meta-analyses show. Case-control studies indicate aspirin may slightly reduce malignant melanoma risk, but no effect is seen in cohort studies – and because of the potential adverse consequences of high intake of aspirin, such as gastrointestinal haemorrhage, it would not be recommended as a prophylactic measure.

6 How skin cancer is diagnosed

In 2006-2008 in England, 68% of malignant melanoma patients were diagnosed having been seen by a specialist as a result of a GP referral (Figure 19). These were either ‘two week wait’ referrals (41%), or routine or urgent referrals where the patient was not referred under the ‘two-week wait’ route (27%). Just 3% of malignant melanoma patients were diagnosed after presenting as an emergency: either via the Accident & Emergency department; other emergency hospital admission, attendance or transfer; or emergency GP/consultant referral.

Figure 19: Malignant Melanoma Routes to Diagnosis

6.1 How skin cancer is diagnosed

6.2 Key treatments

6.2.1 Malignant melanoma

The first-line treatment for malignant melanoma is surgery (wide local excision), the NICE IOG states. Radiotherapy can be used with curative intent for melanoma in situ or palliatively (often alongside chemotherapy) for metastatic malignant melanoma. Some patients may receive supportive care and observation only.

In the 2011/12 Cancer Patient Experience Survey, 86% of malignant melanoma patients said they were given a choice of different types of treatment, and 76% felt their views were definitely taken into account by the team discussing their treatment.

6.2.2 Non-melanoma skin cancer

Surgical removal is also the first-line treatment for NMSC, though other surgical and non-surgical techniques may be used instead of, or alongside, including: cautery or electrodesiccation (electrical or chemical burning of the tumour), cryotherapy/cryosurgery (freezing of the tumour using liquid nitrogen), topical treatment (applying a cream such as Imiquimod or Fluorouracil), photodynamic therapy ( PDT, using light therapy in combination with a photosensitising cream to destroy cancer cells), and radiotherapy (often using superficial X-ray machines, though linear accelerator treatments are becoming more common).
6.3 Clinical trials

In 2011/12, 19 skin cancer trials in the National Institute for Health Research portfolio were open and recruiting in the UK. 13 for melanoma (all types), 5 for NMSC, and 1 for all skin cancers. There were also 9 funded trials in the process of being set up: 7 for melanoma, 1 for NMSC, and 1 for all skin cancers. Most of these trials focused on first- or second-line treatments, and include a trial looking at nilotinib to treat acral and mucosal melanoma skin cancer that has spread (NICAM), and a study looking at high blood pressure and pazopanib treatment (HYPAZ).

It is difficult to calculate the exact proportion of skin cancer patients participating in trials, because under-registration of NMSC means the total number of eligible patients is unclear; however it is likely that recruitment of patients to skin cancer trials is lower than in trials for cancer in general. In 2010/11 up to 4% of eligible skin cancer patients were entered into an NIHR randomised controlled trial (RCT), and up to 6% were entered into a non-RCT trial. In contrast, in 2011/12, an estimated 23.1% of UK cancer patients across all tumour sites participated in an NCRI portfolio clinical trial.

The 2011/12 Cancer Patient Experience Survey found that taking part in clinical trials was discussed with 27% of skin cancer patients.

Sunbed use, particularly in young people, is a completely avoidable skin cancer risk factor. In 2008-2009 in England, 6% of 11-17 year olds said they had used a sunbed, and in 2008 in Northern Ireland, 5% of under-25s in Northern Ireland reported currently using sunbeds. Cancer Research UK has campaigned for tougher legislation on sunbed use by children and adolescents, and since 2008 in Scotland, and 2011 in England, Wales and Northern Ireland, it has been illegal for under-18s to use sunbeds. There is now some evidence to suggest teenagers’ sunbed use is decreasing. It is too early to see the effects of the legislation on the incidence of skin cancer in the UK, but this should be seen in the coming years.

As well as concentrating efforts on early diagnosis and prevention of skin cancer, better treatments and improved quality of care are also urgently needed. Survival from malignant melanoma is consistently lower in men than women across all age groups, and is especially low in elderly men. Improving the diagnosis and treatment of older patients, and men in particular, is an ongoing challenge. Late stage disease also remains very difficult to treat, and this will be a major focus of research in the future.

7. THE FUTURE

Skin cancer patients today generally have a much better prognosis compared with those diagnosed in previous decades, thanks to increased awareness, earlier diagnosis, and advances in treatment. But much more can be done.

Skin cancer is essentially an avoidable disease. Prevention is either primary (through reducing exposure to UV radiation) or secondary (by earlier diagnosis). At the forefront of prevention efforts in the UK is SunSmart, a national skin cancer prevention campaign. Launched by Cancer Research UK in 2003, SunSmart is a public health campaign made up of four key elements: research, public communication, professional support and policy development. It aims to improve knowledge, attitudes, and behaviour around preventing overexposure to UV and/or sunburn, as well as promoting the benefits of early diagnosis. Children, teenagers and young adults, and men are particularly important audiences for the campaign. Other public health organisations and charities promoting sun safety include the British Association of Dermatologists, Skin and the Teenage Cancer Trust. There are also numerous local initiatives in the UK, though one survey in England showed these are often a low priority work area with ad-hoc (usually seasonal) activity rather than sustained intervention.

This issue needs to be addressed, since evidence from Australia suggests long-term commitment and adequate resources for prevention programmes are required to improve skin cancer outcomes.

8. ACKNOWLEDGEMENTS

We would like to acknowledge the essential work of the National Cancer Registration Service (part of Public Health England) and the Office for National Statistics in England, and the cancer registries in Wales, Scotland and Northern Ireland. Population-based cancer data has been collected in most regions of the UK since the early 1960s, and without this cancer registration system there would be no incidence or survival statistics.
The UK is widely acknowledged as having one of the most comprehensive cancer registration systems in the world, with population-based cancer data being collected in most regions of the UK since the early 1960s. From April 2013, the recording of cancer incidence and survival data in England has been co-ordinated by the National Cancer Registration Service, which is part of Public Health England (an executive agency of the Department of Health). There are eight regional cancer registration offices, with the statistics for England as a whole being collated by the Office for National Statistics. Wales, Scotland and Northern Ireland each have one national cancer registry. Cancer registration data are collected according to a common minimum dataset, which includes hospital details, personal details (such as name, sex, date of birth, NHS number and postcode), diagnostic and tumour details (such as location of the tumour in the body, and for some sites the tumour’s stage of advancement at diagnosis), and death details (where relevant). Information is obtained on a voluntary basis from a wide variety of sources including hospitals, pathology laboratories, cancer centres, treatment centres, hospices, private hospitals, cancer screening programmes, other cancer registers, general practices, nursing homes, death certificates, Hospital Episode Statistics (HES) and Cancer Waiting Time (CWT) data.

Most cancer registration systems currently record tumours using the International Classification of Diseases tenth revision (ICD-10), which assigns codes largely based on topography (location in the body) and behaviour (malignant, in situ, benign, or unknown/uncertain). The ICD-10 codes for malignant melanoma and NMSC are C43 and C44, respectively. Melanomas can also occur in other body organs, such as the eye, but these data are not shown here. In this report the term ‘malignant melanoma’ refers to malignant melanoma of the skin only.

The recording of NMSC at cancer registries is known to be incomplete. Many cancer registries record only the first NMSC of each histological type (e.g. BCC or SCC) per person, and information on small NMSCs treated in primary care or the private sector may never reach the cancer registries. An estimated 30–50% of BCC and around 30% of SCC goes unrecorded, though this may vary by registry. Efforts to improve the recording of NMSC are ongoing.

Cancer mortality statistics are derived from statutory death registrations in England and Wales, Scotland, and Northern Ireland. Data are reported in ICD-10 according to the underlying cause of death, which is determined using information collected on the death certificate.

Death certificates are set out in two parts: part I records the immediate cause of death and any associated conditions leading up to the death; part II records details of any other conditions which contributed to the death (but were not part of the main sequence of events leading up to it).
SKIN CANCER

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CANCER RESEARCH UK
CANCER STATISTICS

Written for health professionals, we provide cancer statistics for the UK and around the world.

We have data for more than 30 common cancers including:

- Incidence, survival and mortality stats
- Variation by age, ethnicity and socio-economic group
- Prevalence and lifetime risk estimates
- Risk factors evidence
- Treatment, screening and clinical trials stats

Over 650 charts, tables, PowerPoint slides, reports, briefings and Key Facts publications give top-line cancer stats or in-depth analyses and interpretation about cancer statistics in the UK and around the world, and are all free to download.

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