Public Health England

Protecting and improving the nation's health

National Cancer Intelligence Network

Malignant melanoma in older persons

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The intelligence networks

Public Health England operates a number of intelligence networks, which work with partners to develop world-class population health intelligence to help improve local, national and international public health systems.

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National Cardiovascular Intelligence Network

The National Cardiovascular Intelligence Network (NCVIN) analyses information and data and turns it into meaningful timely health intelligence for commissioners, policy makers, clinicians and health professionals to improve services and outcomes.

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The National Child and Maternail Health Intelligence Network (NCMHIN) provides information and intelligence to improve decision-making for high quality, cost effective services. Their work supports policy makers, commissioners, managers, regulators and other health stakeholders working on children's, young people's and maternal health.

National Mental Health Intelligence Network

The National Mental Health Intelligence Network (NMHIN) is a single shared network in partnership with key stakeholder organisations. The Network seeks to put information and intelligence into the hands of decision makers to improve mental health and wellbeing.

National End of Life Care Intelligence Network

The National End of Life Care Intelligence Network (NEoLCIN) aims to improve the collection and analysis of information related to the quality, volume and costs of care provided by the NHS, social services and the third sector to adults approaching the end of life. This intelligence will help drive improvements in the quality and productivity of services.

Contents

Executive summary

In this study we have shown that the increase in melanomas in older people (and especially in men) has been in superficial spreading melanomas on intermittently sun-exposed sites: truncal tumours in men and tumours on the legs in women. This pattern is the same as recorded over time and epidemiological studies have provided strong evidence that sunny holidays and sunburn incidence risk of this most common melanoma type.[1]

The incidence of all thicknesses of melanoma is increasing over time, but the thinner tumours (less than 1mm in thickness) have increased most rapidly.

Epidemiological studies have previously suggested that sunburn early in life may be especially associated with melanoma risk. When patients now being diagnosed with melanoma over the age of 60, were young, relatively few took sunny holidays overseas and these data may therefore suggest that the increased incidence in older patients is likely to be associated with sunny holidays as adults.

There is a different age distribution for melanoma on the trunk and head and neck especially in men: truncal tumours were most frequent between the ages of 50 and 80 years whereas head and neck tumours became increasingly more frequent with increasing age (as is the case for many solid cancers). This difference may suggest that head and neck melanomas could be related to a different aetiological route to melanoma.

Melanoma incidence rates increased in all deprivation groups but rates in the least deprived population increased faster for older men than younger men.

The proportion of melanoma patients that previously had a squamous cell carcinoma increased faster for older men than younger men. The epidemiology of squamous cell carcinoma appears to be more clearly related to chronic excessive exposure to the sun as would be experienced in outdoor workers. These data, in conjunction with the continued increased frequency of melanomas of the head and neck, especially in men, adds support to the view that chronic sun exposure may have contributed to the increased incidence of melanoma in older men in this body site.

These data suggest that health promotion campaigns should:

- emphasise the risks associated with excessive recreational sun exposure at all ages in those at risk of skin cancer
- encourage the avoidance of chronic sun exposure especially on the head and neck
- deliver early detection campaigns to older individuals and especially to men

1.Introduction

In 2010, malignant melanoma (MM) was the sixth most common cancer reported in England, with 10,736 new cases and 1,823 deaths (NCIN, 2013). MM incidence rates were nearly three times higher in 2010 compared to 1990 (6.4 vs 17.3 per 100,000). Previous reports from the UK had highlighted a higher incidence in women and a marked increase in the incidence of better prognosis (thinner) tumours in younger people[1] but in a recent NCIN report we described a change in the pattern of the disease. We reported a considerable change in melanoma incidence and a remarkable change in that the most rapid increase is occurring in older people (over the age of 60 years) and especially in men, see Figures 1.1 and 1.2. Here we have explored the characteristics of the melanoma population in further detail in order to understand the changed incidence in melanoma.

Epidemiological studies have reported a complex relationship between sun exposure and melanoma risk. A pooled data analysis of 15 large case-control studies reported clear evidence for sunburn and sun bathing as risk factors for melanoma with no evidence of large cumulative sun exposures as a risk factor in Europe.[2] Migration studies suggested that early sun exposure was possibly more important than years of sun exposure[3] and case-control studies gave support to this hypothesis in that sunburn under the age of 15 years was often reported to be associated with risk more strongly than later in life.[4] It was supposed therefore that early sun exposures were playing a key role in melanoma pathogenesis. Although there is good evidence that sunbed usage is associated with increased melanoma risk,[5] in a recent UK study, sunbed usage seemed not to explain much of the melanoma incidence in the Northern UK population at least.[6]

The body site distribution of melanoma is different for men and women internationally in that the most common site in men is on the upper back and in women on the legs, and this pattern has been attributed to the established relationship between holiday or recreational sun exposure and melanoma risk. Both these sites are intermittently sun exposed and exposed especially at times of leisure. Melanoma in all previous studies has also been more common in people of higher socio-economic status with greater economic access to sunny holidays. In both body sites (trunk and limbs) the most common type of melanoma is the superficial spreading melanoma. In recent years the biological differences between morphological sub-types of melanoma have become better understood, and the genetic mutation driving superficial spreading melanomas has been shown to be *BRAF* which was also more frequently associated with an origin from naevi.[7] That nodular melanomas associated with another driver mutation, in *NRAS,* have been seen especially in older patients has lead to the supposition that there is more than one ‘route’ to melanoma: one associated with sunny holidays, superficial melanomas and sites on the back or legs, and one associated with more chronic exposure on the head and neck (for which there is less evidence in Europe).

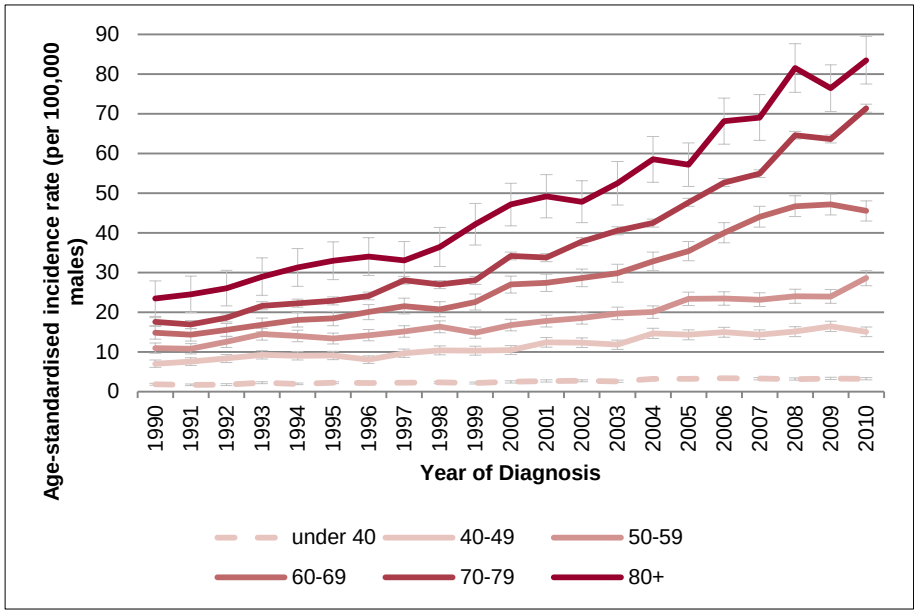
The view taken in light of these epidemiological studies was therefore that increased access to sunny holidays for UK residents was likely the predominant explanation for the increased melanoma incidence reported previously. The data suggesting that early (childhood) sun exposure was particularly deleterious seemed consistent with a marked increased incidence in younger people as the ONS data suggest a dramatic increased frequency of sunny holidays over time.

The current trend of large increases in incidence in older people was unexpected, although in other countries, differences in mortality rates between different age cohorts have been reported recently, for example in Australia and New Zealand[8] and previously in a study of 22 countries.[9]

Understanding the nature of the changed incidence in the UK now reported is particularly important as mortality is greater with age and the male sex,[10] and because approaches to primary and secondary prevention would differ by birth cohort and sex. In this study we asked the question “is melanoma in people over the age of 60 years different to that in other age groups”. This is an an attempt to understand whether we are currently seeing a pattern emerging indicative of a different proportion of tumours related to a different aetiological ‘route’ to melanoma?

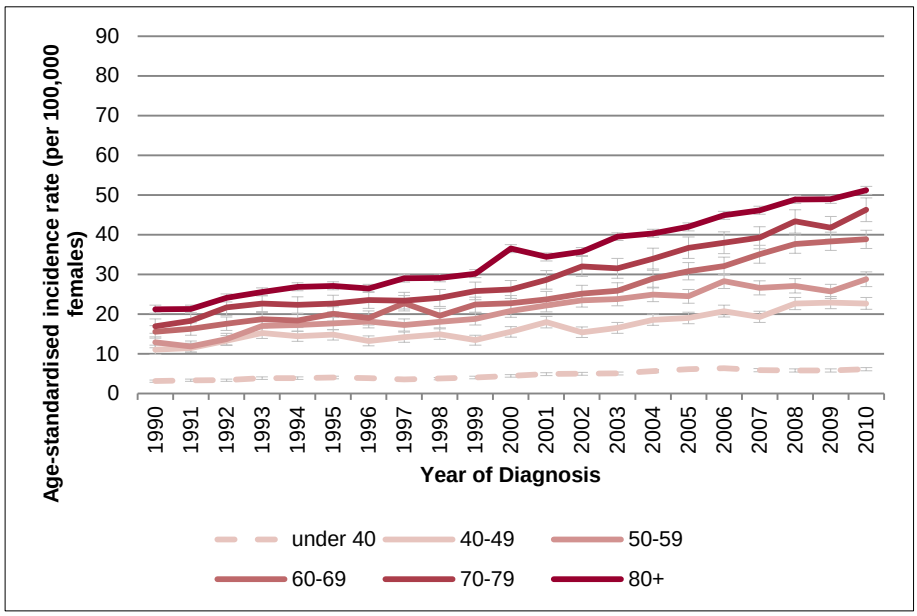
We examined melanoma incidence trends comparing those in males 60+ years (older men) with females 60+ years (older women) and males under 60 years (younger men). The following variables were investigated: anatomical site; socio-economic deprivation; morphology type; breslow thickness; and whether a previous non-melanoma skin cancer had been diagnosed (indicative perhaps of rising chronic sun exposure through life). Females under 60 years (younger women) were included for completeness.

Figure 1.1: Directly age standardised melanoma incidence rates per 100,000 for males by age group, England, 1990-2010.



Source: Public Health England; Office for National Statistics.

Figure 1.2: Directly age standardised melanoma incidence rates per 100,000 for females by age group, England, 1990-2010.



Source: Public Health England; Office for National Statistics.

2.Methodology

The cohort was based on melanoma (ICD-10 C43) cases resident in England and diagnosed between 1990 and 2010. This was extracted from an analysed dataset from all former cancer registries in England. Population data was extracted from the Office for National Statistics (ONS).

An older person was defined as 60+ years, see 3.1 preliminary analysis section.

Trends of directly age standardised melanoma incidence rates (standardised to the European population standard) were calculated for males 60+ years (older men) and compared with incidence trends for females 60+ years (older women) and males under 60 years (younger men). Incidence rates were also calculated for females under 60 years (younger women). Rates were broken down by the following: anatomical site; socio-economic deprivation; morphology type; breslow thickness; and whether a previous skin cancer had been diagnosed. Direct standardisation allowed a fair comparison between these cohorts, since this accounts for the different age structures and changes in age structure over time.

Poisson regression was used to model the age standardised rates. This was used to calculate the annual percentage change (APC) in melanoma incidence trends. This also enabled the change in melanoma incidence rates to be compared within each variable examined, as well as between the three cohorts.

The trend in the proportion of melanoma patients who had previous skin tumours over time is constrained by the number of years of available tumour registrations. The analysed dataset contains tumour registrations from 1990 onwards so that, for example, a diagnosis in 1991 (when there was only about 1 year of cancer registrations) is much less likely to be associated with a previous tumour than a diagnosis in 2001 (when there were roughly 11 years of cancer registrations). For this reason, the current analysis was constrained to the period 2001-2010 so that there were at least 11 years of previous registrations to consider in all cases, reducing the aforementioned effect.

3.Preliminary analysis

3.1Patterns of changed incidence

Between 1990 and 2010, the change in melanoma incidence rate over time increased faster in males than females, although this was not statistically significant (5.5% vs 4.1% per annum, p=0.37), see Figures 1.1 and 1.2 in the introduction. However the change in melanoma incidence rates over time varied by age group for males (3.4% vs 7.6% per annum, $p < 0.01$), but not for females (3.3% vs 4.8% per annum, p=0.78), see table 3.1.1 below.

The melanoma incidence rate in the 60+ age group increased faster in males than females (7.0% vs 4.8% per annum, p=0.03). The melanoma incidence rate in males 60+ years increased faster than for males under 60 years, although this was also not statistically significant (7.0% vs 4.1%, p=0.08).

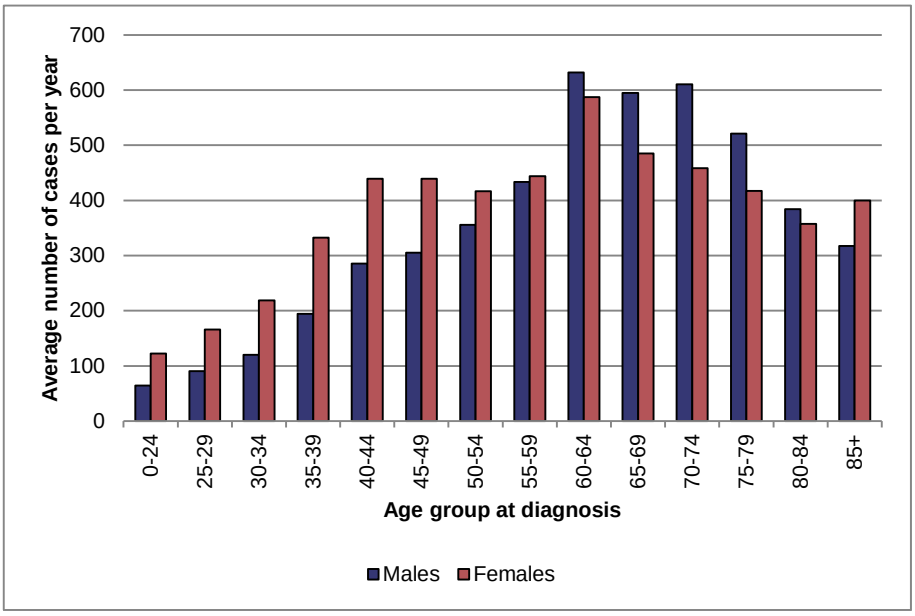
Between 2008 and 2010, the largest number of melanoma cases for both sexes occured in the 60-64 age groups, see Figure 3.1.1 below. Given the high incidence in the 60-69 and 70-79 age groups and that the changes in rate in the 60+ age groups are similar, it was decided to define an older person as 60+ years in this report.

Table 3.1.1: Annual percentage change (APC) by sex and by age group, England, 1990-2010. 95% confidence intervals (LCI, UCI) are also reported.

	Males				Females			
	1990		2010		1990		2010	
Age group (years)	Cases	ASR	Cases	ASR	Cases	ASR	Cases	ASR
under 40	264	1.9	469	3.3	441	3.1	868	6.2
40-49	221	7.1	578	15.1	342	11.0	883	22.7
50-59	276	11.0	740	28.6	326	12.9	917	28.8
60-69	338	14.9	1,232	45.6	395	15.5	1,112	38.8
70-79	249	17.6	1,229	71.4	344	17.0	933	46.3
80+	119	23.5	754	83.5	257	21.3	792	51.2
All ages	1,467	6.2	5,002	17.1	2,105	7.7	5,505	17.3

Source: Public Health England; Office for National Statistics.

Figure 3.1.1: Average number of malignant melanoma cases per year by age group, England, 2008-2010.



Source: Public Health England; Office for National Statistics.

4.Results

4.1 Melanoma incidence trends by anatomical location of the primary tumour

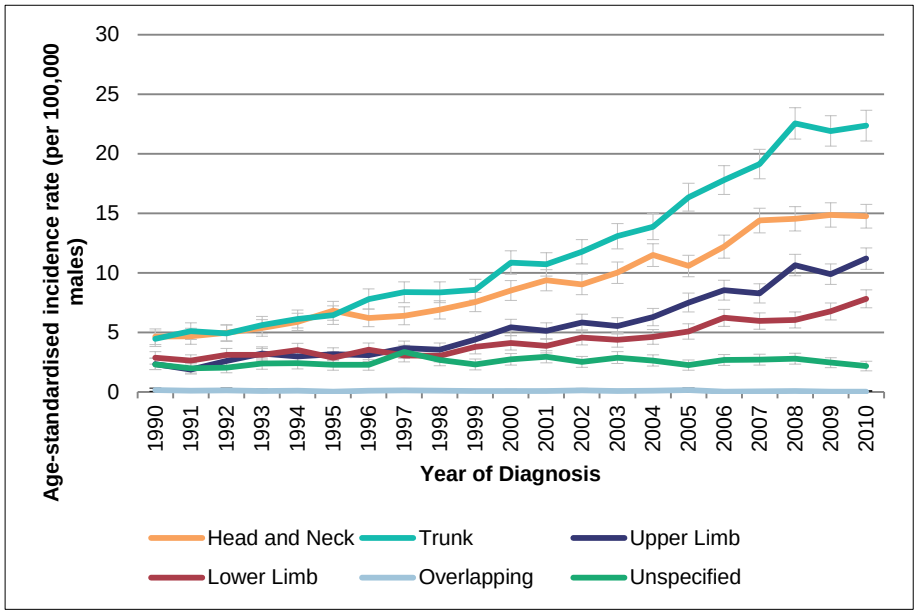
In Figures 4.1.1 and 4.1.2 below, the sex differences in site have been maintained over time; as discussed above, melanoma in men was and remains most frequent on the trunk (especially the back) and in women on the legs. The most common anatomical sites for melanoma in males 60+ years were the trunk (4.5 per 100,000 in 1990; 22.4 per 100,000 in 2010) and head and neck (4.6 per 100,000 in 1990; 14.8 per 100,000 in 2010), see table 4.1.1.

Between 1990 and 2010, the change in the melanoma incidence rate over time for males 60+ years varied by anatomical site (-4.0% to 8.9% per annum, $p< 0.01$), see table 4.1.2. However there was no statistically significant variation for females 60+ years (-2.8% to 8.8% per annum, $p=0.07$) or for males under 60 years (-4.9% to 5.1% per annum, $p=0.89$).

For males aged 60+ years, the melanoma incidence rates increased fastest for the trunk (8.9% per annum) and upper limbs (8.8% per annum). The change in melanoma incidence rates in males 60+ years increased faster across all anatomical sites (excluding overlapping) compared to females 60+ years and males under 60 years. For the more common sites, the incidences were similarly higher in males 60+ years than those in females 60+ years and males under 60 years, at the trunk (8.9% vs 8.8% and 4.9% per annum) and head and neck (6.5% vs 3.8% and 4.0% per annum).

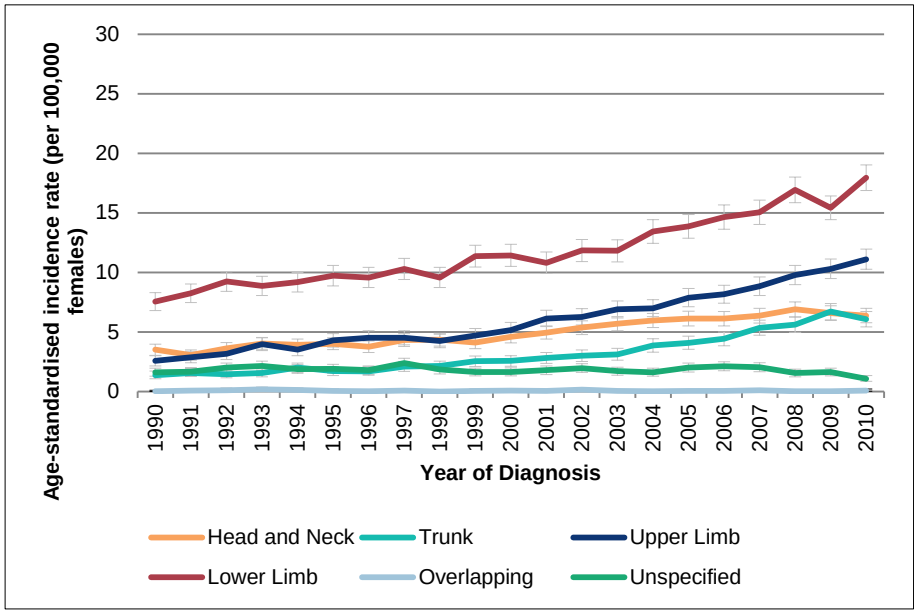
There was a small decline in the proportion of tumours in unspecified sites, probably indicative of improving registration.

Figure 4.1.1: Directly age standardised melanoma incidence rates per 100,000 for males 60+ years, by anatomical location, England, 1990-2010.



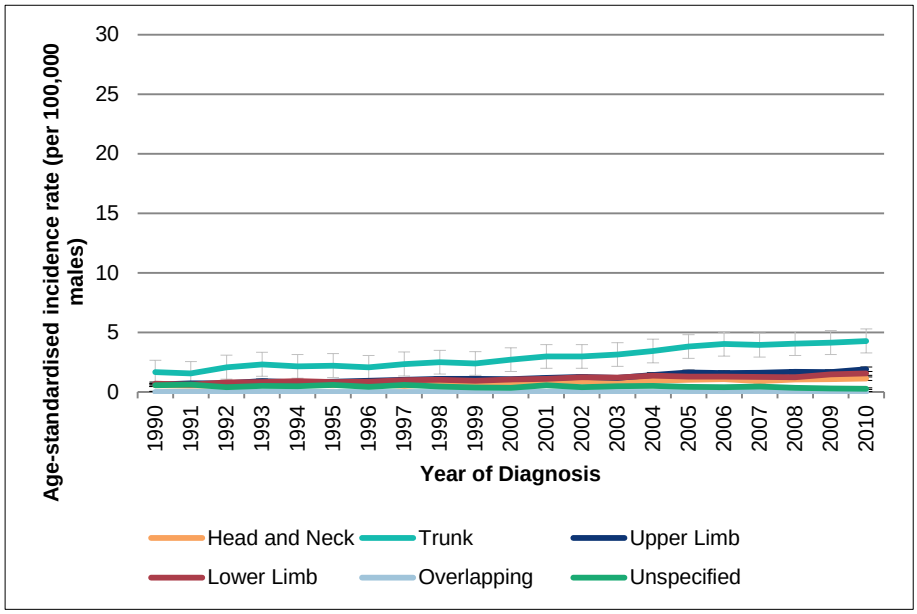
Source: Public Health England; Office for National Statistics.

Figure 4.1.2: Directly age standardised melanoma incidence rates per 100,000 for females 60+ years, by anatomical location, England, 1990-2010.



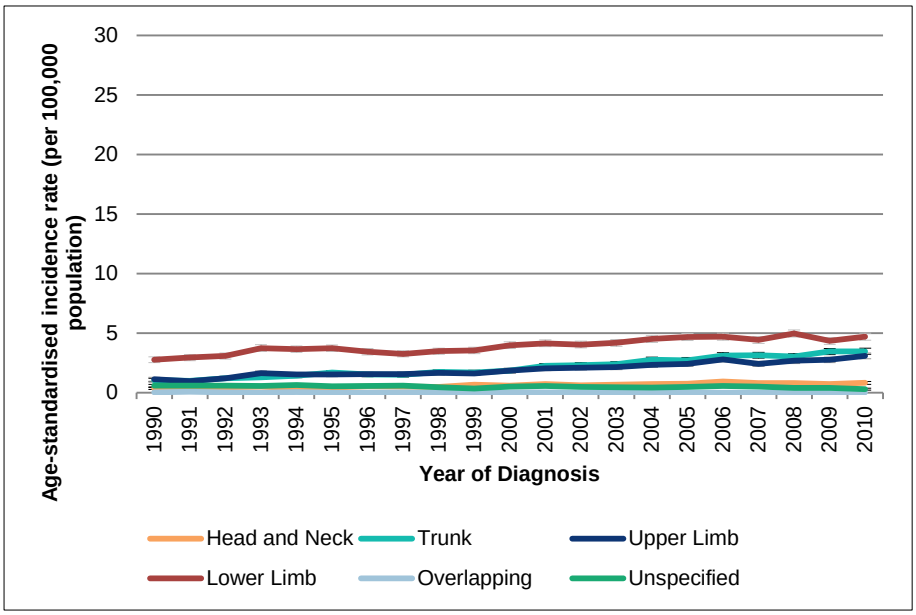
Source: Public Health England; Office for National Statistics.

Figure 4.1.3: Directly age standardised melanoma incidence rates per 100,000 for males under 60 years, by anatomical location, England, 1990-2010.



Source: Public Health England; Office for National Statistics.

Figure 4.1.4: Directly age standardised melanoma incidence rates per 100,000 for females under 60 years, by anatomical location, England, 1990-2010.



Source: Public Health England; Office for National Statistics.

Table 4.1.1: Directly age standardised melanoma incidence rates per 100,000 for males 60+ years, females 60+ years, males under 60 years and females under 60 years by anatomical location, England, 1990-2010.

	Males 60+				Males under 60			
	1990		2010		1990		2010	
Anatomical location	Cases	ASR	Cases	ASR	Cases	ASR	Cases	ASR
Head and Neck	198	4.6	867	14.8	104	0.6	240	1.1
Lower Limb	123	2.9	419	7.8	134	0.7	331	1.6
Overlapping	7	0.2	1	0.0	4	0.0	1	0.0
Trunk	184	4.5	1,197	22.4	305	1.7	904	4.3
Unspecified	96	2.3	121	2.2	102	0.6	60	0.3
Upper Limb	98	2.3	610	11.2	112	0.6	400	1.9
	Females 60+				Females under 60			
	1990		2010		1990		2010	
Anatomical location	Cases	ASR	Cases	ASR	Cases	ASR	Cases	ASR
Head and Neck	239	3.5	496	6.4	63	0.3	177	0.8
Lower Limb	428	7.6	1,171	18.0	514	2.8	1014	4.7
Overlapping	3	0.0	5	0.1	7	0.0	5	0.0
Trunk	79	1.4	366	6.1	203	1.1	747	3.5
Unspecified	94	1.6	77	1.1	111	0.6	62	0.3
Upper Limb	153	2.6	722	11.1	211	1.1	663	3.1

Source: Public Health England; Office for National Statistics.

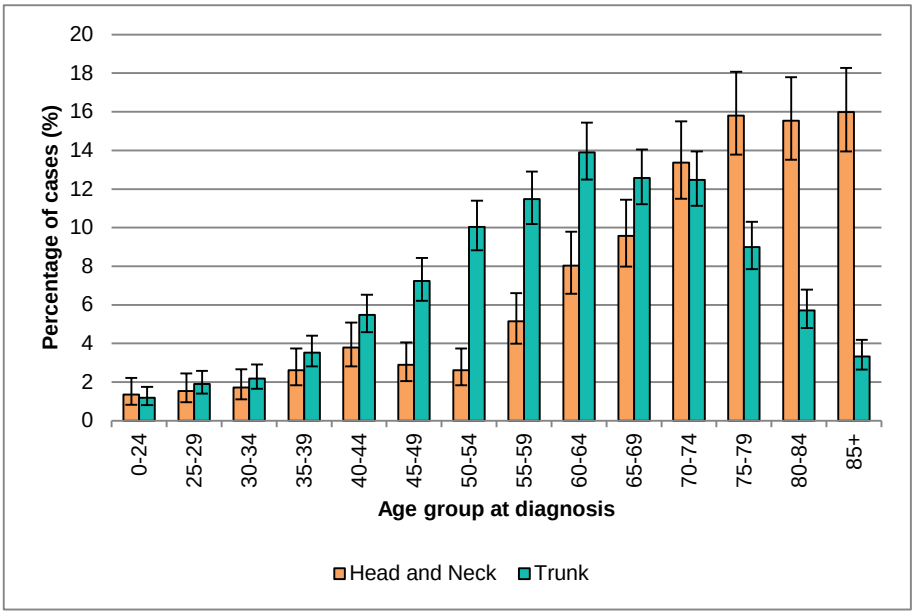
Table 4.1.2: Annual percentage change (APC) for males 60+ years, females 60+ years, males under 60 years and females under 60 years by anatomical location, England, 1990-2010. 95% confidence intervals (LCI, UCI) are also reported.

	Males 60+		Males under 60	
Anatomical location	APC (LCI,UCI) %	p-value	APC (LCI,UCI) %	p-value
Head and Neck	6.5 (4.0, 9.2)	< 0.01	4.0 (-4.1, 12.8)	0.34
Lower Limb	5.3 (1.7, 9.0)	< 0.01	3.8 (-3.1, 11.2)	0.29
Overlapping	-4.0 (-23.6, 20.7)	0.73	-4.9 (-54.9, 64.9)	0.86
Trunk	8.9 (6.5, 11.4)	< 0.01	4.9 (0.6, 9.5)	0.03
Unspecified	0.7 (-3.7, 5.3)	0.77	-2.2 (-11.9, 8.6)	0.68
Upper Limb	8.8 (5.3, 12.4)	< 0.01	5.1 (-1.8, 12.4)	0.14
	Females 60+		Females under 60	
Anatomical location	APC (LCI,UCI) %	p-value	APC (LCI,UCI) %	p-value
Head and Neck	3.8 (0.5, 7.2)	0.02	4.1(-5.0, 14)	0.39
Lower Limb	4.0 (1.8, 6.2)	< 0.01	2.4 (-1.2, 6.1)	0.20
Overlapping	-2.8 (-24.8, 25.7)	0.83	-6.5 (-42.2, 51.2)	0.78
Trunk	8.8 (4.2, 13.5)	< 0.01	6.4 (1.1, 11.9)	0.02
Unspecified	-0.7 (-5.8, 10.4)	0.78	-0.02 (-11.4, 8.1)	0.68
Upper Limb	7.1 (3.9, 10.4)	< 0.01	4.9 (0.0, 10.4)	0.07

Source: Public Health England; Office for National Statistics.

The most common anatomical sites for melanoma in males 60+ years were head and neck and trunk. Therefore the age distribution of these sites for all ages was examined, see Figure 4.1.5.

Figure 4.1.5: The age distribution of head and neck and truncal tumours for males, England, 2010.



Source: Public Health England; Office for National Statistics.

The incidence of truncal tumours had a skewed normal distribution while the incidence of head and neck tumours was more typical of the rates of most solid cancers being increasingly common with age. For truncal tumours, there were peak numbers of cases diagnosed in the 60-75 age groups, and less than a fifth in the 75+ age groups (18%). For head and neck tumours, nearly fourth fifths were diagnosed in the 60+ age groups (78.3%), while almost half were in the 75+ age groups (47.3%).

A similar pattern was observed in females in 2010 (not shown here), albeit the incidence was approximately half that of the men in these two sites. For truncal tumours, 32.9% and 9.3% were in the 60+ and 75+ age groups respectively. For head and neck tumours, 73.7% and 46.7% were in the 60+ age groups and 75+ age groups respectively.

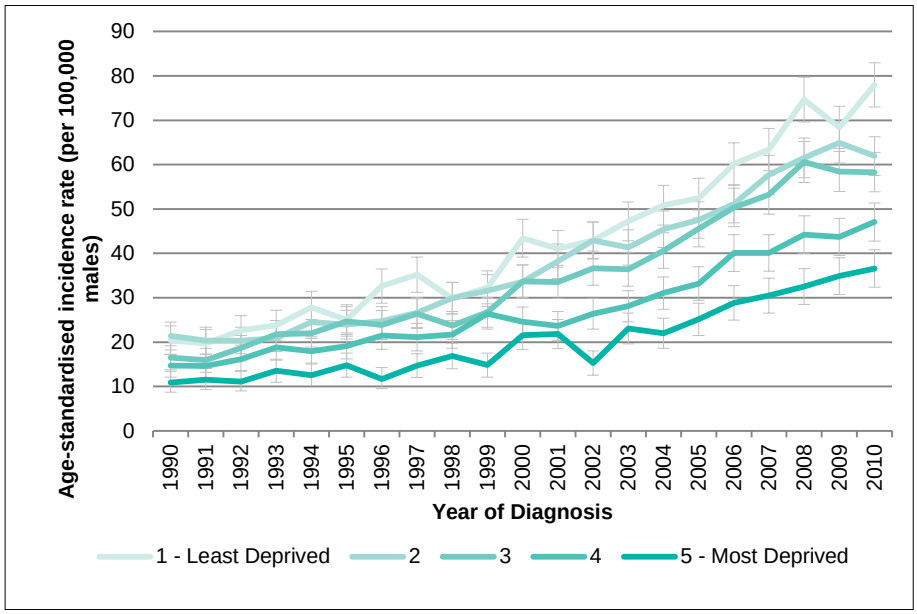
4.2 Melanoma incidence trends by socio-economic deprivation

Over the past 20 years, the melanoma incidence rate in the least deprived fifth of the population of England was higher than that in the most deprived fifth of the population. For males 60+ years, the melanoma incidence rate in the least deprived population remained approximately double that of the most deprived population, over this period of time (20.4 vs 10.9 per 100,000 in 1990; 78.0 vs 36.6 per 100,000 in 2010), see table 4.2.1.

Between 1990 and 2010, there was no statistically significant difference in the change in melanoma incidence rates over time across socio-economic variation for either males 60+ years (p=0.88), females 60+ years (p=0.43) or males under 60 years (p=0.99), see table 4.2.2. Thus the socio-economic differential was maintained.

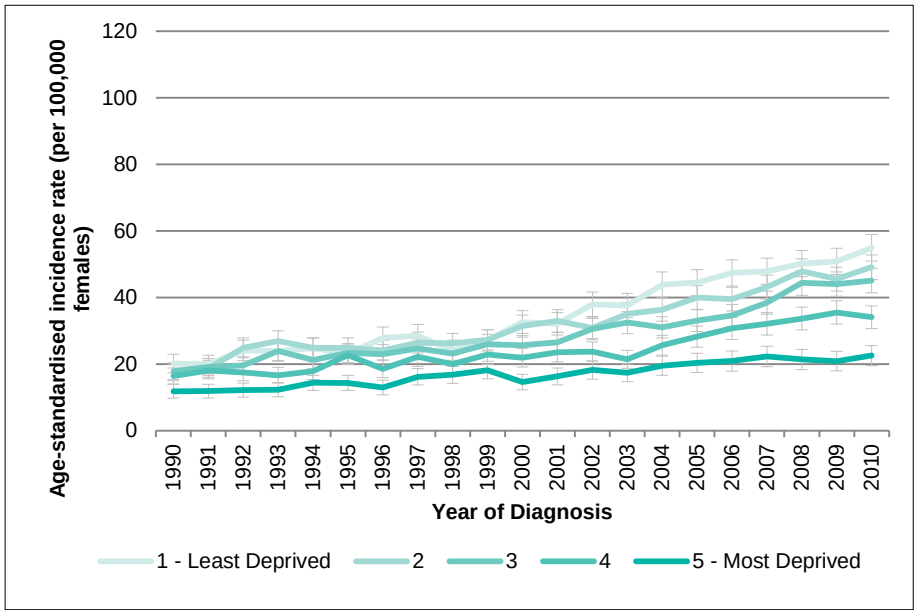
For melanoma patients resident in the least deprived areas, the change in the melanoma incidence rate for 60+ males increased faster than 60+ females, although this was not statistically significant (7.1% vs 5.4% per annum, p =0.06). However the change in the melanoma incidence rate for 60+ males increased faster than for males under 60 years of age (7.1% vs 3.9% per annum, p=0.03).

Figure 4.2.1: Directly age standardised melanoma incidence rates per 100,000 for males aged 60 years and over, by income deprivation quintile, England, 1990-2010.



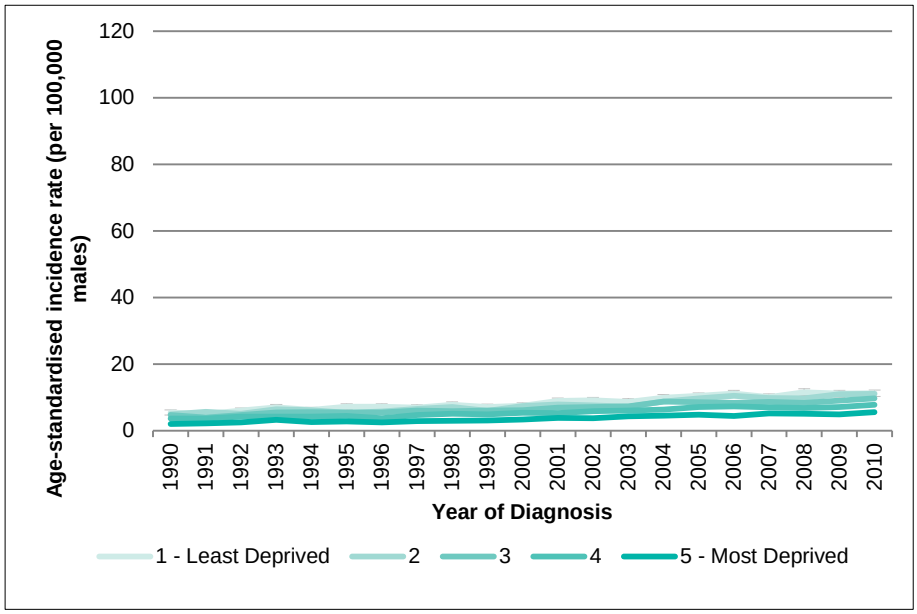
Source: Public Health England; Office for National Statistics.

Figure 4.2.2: Directly age standardised melanoma incidence rates per 100,000 for females aged 60 years and over, by income deprivation quintile, England, 1990-2010.



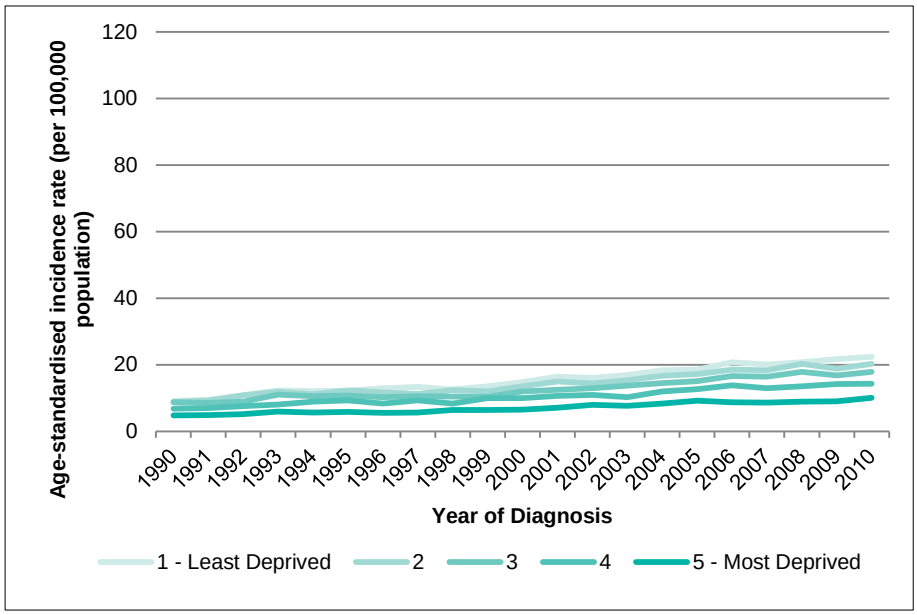
Source: Public Health England; Office for National Statistics.

Figure 4.2.3: Directly age standardised melanoma incidence rates per 100,000 for males aged under 60 years, by income deprivation quintile, England, 1990-2010.



Source: Public Health England; Office for National Statistics.

Figure 4.2.4: Directly age standardised melanoma incidence rates per 100,000 for females aged under 60 years, by income deprivation quintile, England, 1990-2010.



Source: Public Health England; Office for National Statistics.

Table 4.2.1: Directly age standardised melanoma incidence rates per 100,000 for males 60+ years, females 60+ years, males under 60 years and females under 60 years by socioeconomic deprivation, England, 1990-2010.

	Males 60+				Males under 60			
	1990		2010		1990		2010	
Deprivation quintile	Cases	ASR	Cases	ASR	Cases	ASR	Cases	ASR
1 (Least Deprived)	159	20.4	949	78.0	206	5.5	495	11.2
2	185	21.4	802	61.9	184	4.9	480	11.1
3	145	16.5	690	58.3	168	4.6	414	9.7
4	128	14.7	479	47.1	129	3.6	324	7.7
5 (Most Deprived)	89	10.9	295	36.6	74	2.0	223	5.6
	Females 60+				Females under 60			
	1990		2010		1990		2010	
Deprivation quintile	Cases	ASR	Cases	ASR	Cases	ASR	Cases	ASR
1 (Least Deprived)	218	20.2	765	54.9	266	7.0	700	16.2
2	216	17.4	743	49.1	273	7.2	642	14.7
3	216	17.9	653	45.1	259	7.0	551	12.7
4	203	16.4	435	34.1	183	5.0	451	10.6
5 (Most Deprived)	143	11.9	241	22.5	128	3.5	324	7.7

Source: Public Health England; Office for National Statistics.

Table 4.2.2 Annual percentage change (APC) for males 60+ years, females 60+ years, males under 60 years and females under 60 years by socioeconomic deprivation, England, 1990-2010. 95% confidence intervals (LCI, UCI) are also reported.

	Males 60+		Males under 60	
Deprivation quintile	APC (LCI,UCI) %	p-value	APC (LCI,UCI) %	p-value
1 (Least Deprived)	7.1 (5.9, 8.4)	< 0.01	3.9 (1.3, 6.5)	< 0.01
2	6.7 (5.4, 8.0)	< 0.01	4.1 (1.5, 6.9)	< 0.01
3	7.1 (5.7, 8.4)	< 0.01	3.9 (1.1, 6.8)	< 0.01
4	6.2 (4.7, 7.7)	< 0.01	3.9 (0.8, 7.2)	0.01
5 (Most Deprived)	6.7 (4.9, 8.4)	< 0.01	4.8 (0.9, 8.8)	0.02
	Females 60+		Females under 60	
Deprivation quintile	APC (LCI,UCI) %	p-value	APC (LCI,UCI) %	p-value
1 (Least Deprived)	5.4 (4.1, 6.7)	< 0.01	3.8 (1.6, 6.0)	< 0.01
2	4.7 (3.3, 6.0)	< 0.01	3.7 (1.4, 5.9)	< 0.01
3	4.6 (3.2, 6.1)	< 0.01	3.4 (0.1, 5.8)	< 0.01
4	4.0 (2.5, 5.5)	< 0.01	3.6 (0.1, 6.2)	< 0.01
5 (Most Deprived)	3.4 (1.6, 5.2)	< 0.01	3.9 (0.1, 7.2)	0.02

Source: Public Health England; Office for National Statistics.

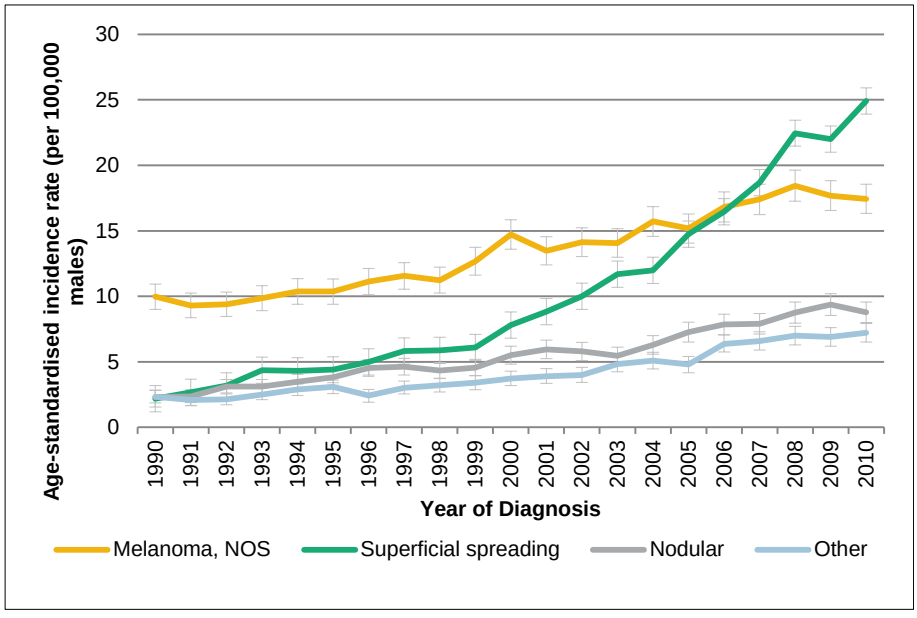
4.3 Melanoma incidence trends by morphology group

Over the past 20 years, the incidence rate for superficial spreading melanoma has increased rapidly, and it is now the most common type of melanoma. In 1990, for males 60+ years, the incidence rate for melanoma of unspecified type was four times higher than that for superficial spreading (10.0 vs 2.2 per 100,000), see table 4.3.1. However in 2010, the incidence rate for superficial spreading was higher (24.9 vs 17.4 per 100,000). Furthermore, the other melanoma morphology types have increased faster than melanoma NOS, which indicate more complete classification of morphology type over time.

Between 1990 and 2010, the change in the melanoma incidence rate for superficial spreading increased faster than the other types of melanoma for both males 60+ years ($p< 0.01$) and females 60+ years ($p< 0.01$), see table 4.3.2. However there was no statistically significant difference in the change of melanoma incidence rate over time across the other morphology types for males 60+ years ($p= 0.52$) and females 60+ years ($p=0.052$). There was also no statistically significant difference in the change of melanoma incidence rate across all morphology types for males under 60 years ($p=0.29$).

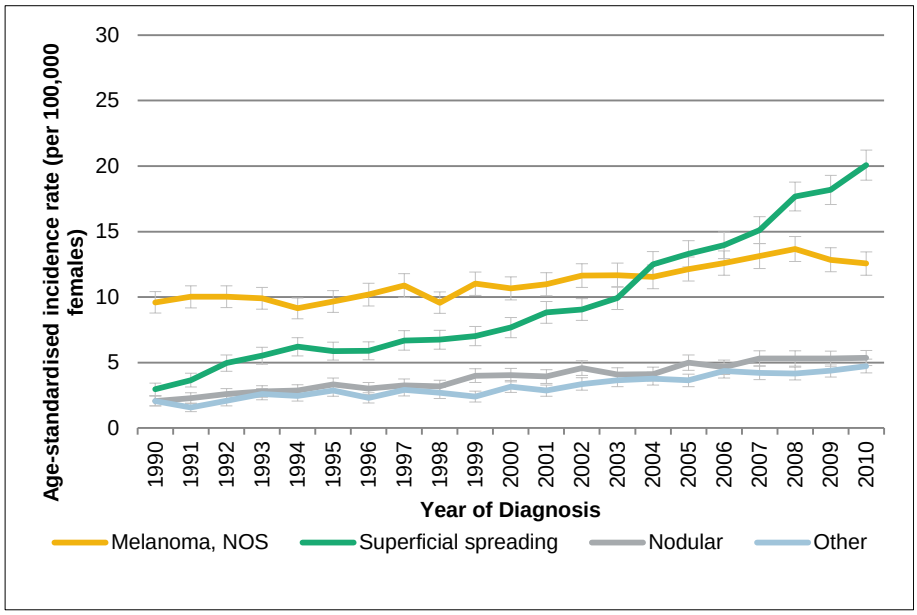
The incidence rate for superficial spreading melanoma in males 60+ years increased faster than females 60+ years (12.4% vs 8.9% per annum, $p=0.07$) and males under 60 years (12.4% vs 7.9% per annum, $p=0.12$), although these differences were not statistically significant.

Figure 4.3.1: Directly age standardised melanoma incidence rates per 100,000 for males aged 60 years and over, by morphology type, England, 1990-2010.



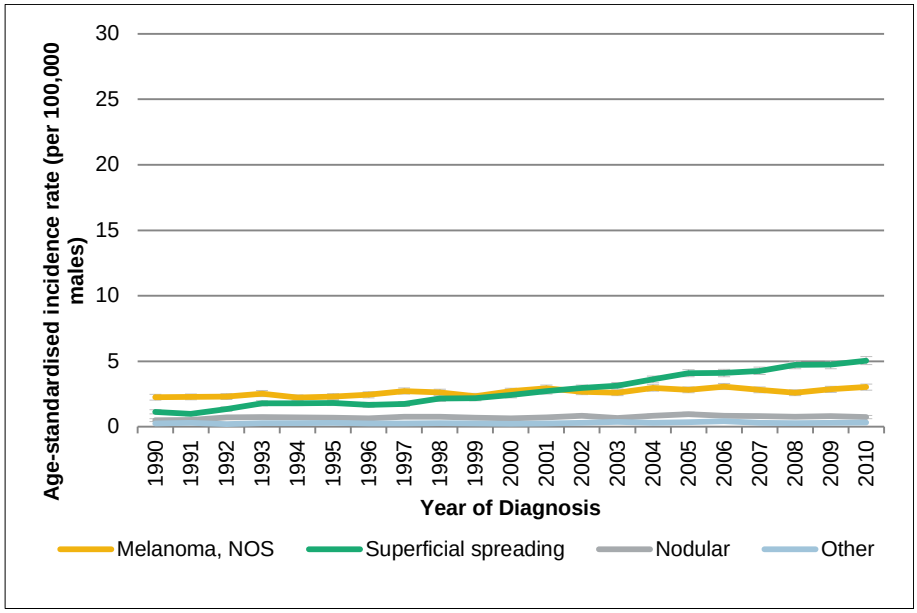
Source: Public Health England; Office for National Statistics.

Figure 4.3.2: Directly age standardised melanoma incidence rates per 100,000 for females aged 60 years and over, by morphology type, England, 1990-2010.



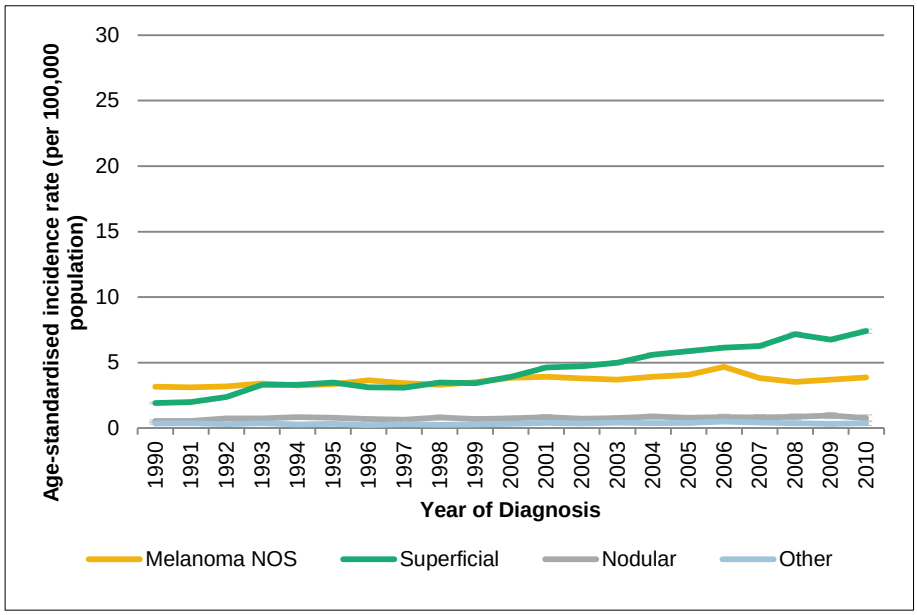
Source: Public Health England; Office for National Statistics.

Figure 4.3.3: Directly age standardised melanoma incidence rates per 100,000 for males aged under 60 years, by morphology type, England, 1990-2010.



Source: Public Health England; Office for National Statistics.

Figure 4.3.4: Directly age standardised melanoma incidence rates per 100,000 for females aged under 60 years, by morphology type, England, 1990-2010.



Source: Public Health England; Office for National Statistics.

Table 4.3.1: Directly age standardised melanoma incidence rates per 100,000 for males 60+ years, females 60+ years, males under 60 years and females under 60 years by morphology type, England, 1990-2010.

	Males 60+				Males under 60			
	1990		2010		1990		2010	
Morphology type	Cases	ASR	Cases	ASR	Cases	ASR	Cases	ASR
Melanoma, NOS	418	10.0	969	17.4	414	2.3	641	3.0
Superficial spreading	92	2.2	1,324	24.9	210	1.1	1,068	5.0
Nodular	97	2.3	500	8.8	92	0.5	157	0.7
Other	99	2.3	422	7.2	45	0.3	70	0.3

	Females 60+				Females under 60			
	1990		2010		1990		2010	
Morphology type	Cases	ASR	Cases	ASR	Cases	ASR	Cases	ASR
Melanoma, NOS	583	9.6	859	12.6	588	3.2	827	3.9
Superficial spreading	160	3.0	1,242	20.1	354	1.9	1,596	7.4
Nodular	126	2.1	389	5.4	100	0.5	167	0.8
Other	127	2.1	347	4.7	67	0.4	78	0.4

Source: Public Health England; Office for National Statistics.

Table 4.3.2: Annual percentage change (APC) for males 60+ years, females 60+ years, males under 60 years and females under 60 years by morphology type, England, 1990-2010. 95% confidence intervals (LCI, UCI) are also reported.

	Males 60+		Males under 60	
Morphology type	**APC (LCI,UCI) %**	**p-value**	**APC (LCI,UCI) %**	**p-value**
Melanoma, NOS	3.7 (1.7, 5.8)	< 0.01	1.4 (-3.0, 5.9)	0.54
Superficial spreading	12.4 (9.6, 15.3)	< 0.01	7.9 (3.1, 12.9)	< 0.01
Nodular	6.7 (3.3, 10.1)	< 0.01	1.6 (-6.5, 10.3)	0.82
Other	6.9 (3.1, 10.8)	< 0.01	1.6 (-10.8, 15.7)	0.71
	Females 60+		**Females under 60**	
Morphology type	**APC (LCI,UCI) %**	**p-value**	**APC (LCI,UCI) %**	**p-value**
Melanoma, NOS	1.8 (-0.3, 4.0)	< 0.01	0.1 (-2.5, 5.0)	0.53
Superficial spreading	8.9 (6.2, 11.6)	< 0.01	9.6 (8.0, 11.2)	< 0.01
Nodular	4.5 (0.7, 8.4)	< 0.01	5.1 (2.8, 7.5)	< 0.01
Other	4.5 (0.3, 8.8)	< 0.01	5.5 (2.8, 8.2)	< 0.01

Source: Public Health England; Office for National Statistics.

4.4 Melanoma incidence trends by Breslow thickness

Figures 4.4.1 to 4.4.4 show the proportion of melanomas with an unknown thickness is decreasing over time, which indicates improving data quality.

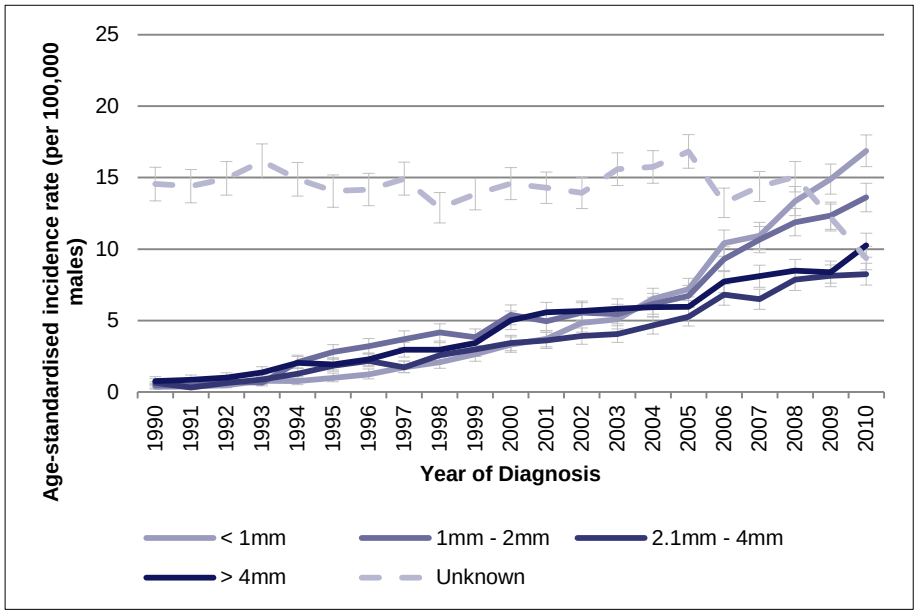
In 2010, the majority of melanomas had a recorded Breslow thickness less than 1mm in thickness at diagnosis, see table 4.4.1.

Between 1990 and 2010, the change in the melanoma incidence rate over time for males 60+ years varied by recorded Breslow thickness (20.1% vs 11.5% per annum, p< 0.01), see table 4.4.2. However there was no statistically significant variation for females 60+ years (17.1% vs 10.1% per annum, p=0.09) or for males under 60 years (14.2% vs 6.3% per annum, p=0.78).

That is, that in all age groups there was an increased incidence of melanoma of all thickness groups but the greatest change was the increased incidence of thinner (better prognosis) tumours.

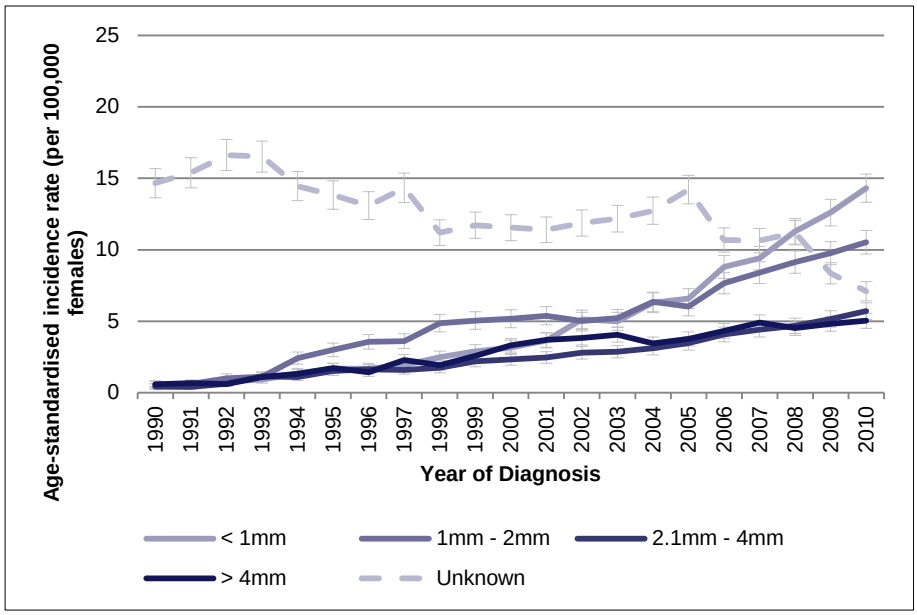
The melanoma incidence rate for tumours less than 1mm in thickness in males 60+ years increased faster than females 60+ years (20.1% vs 17.1% per annum, p =0.36) and males under 60 years (20.1% vs 14.2% per annum, p=0.25), although these differences were not statistically significant.

Figure 4.4.1: Directly age standardised melanoma incidence rates per 100,000 for males aged 60 years and over, by Breslow thickness, England, 1990-2010.



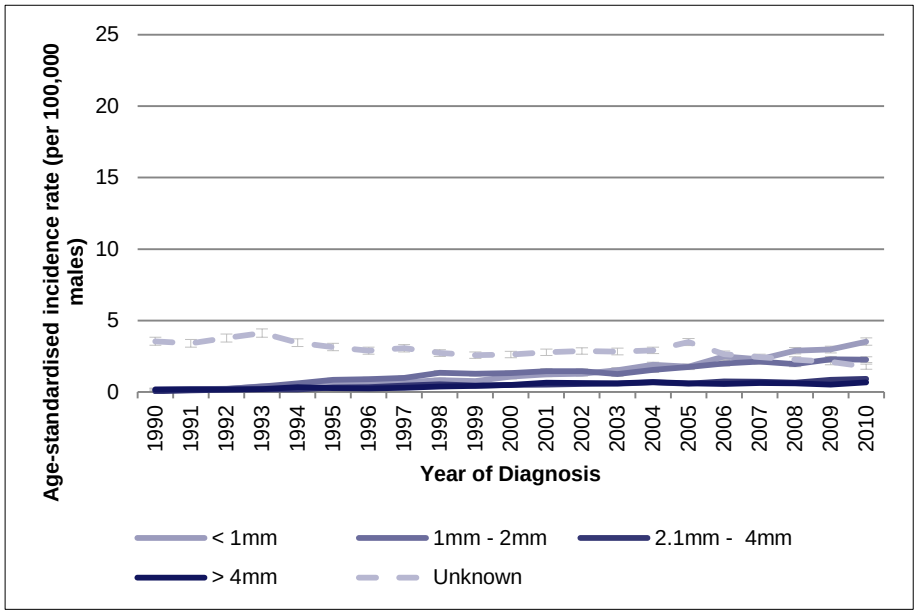
Source: Public Health England; Office for National Statistics.

Figure 4.4.2: Directly age standardised melanoma incidence rates per 100,000 for females aged 60 years and over, by Breslow thickness, England, 1990-2010.



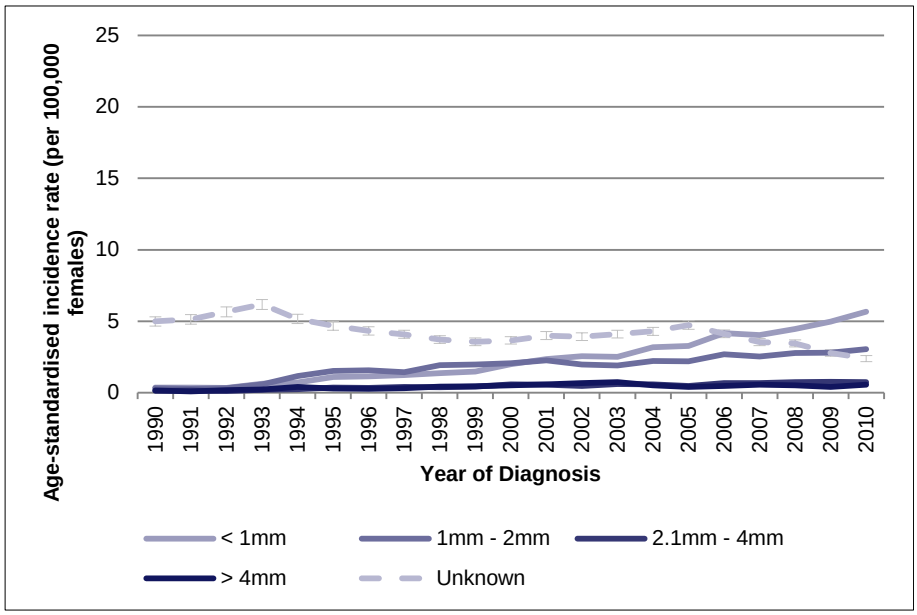
Source: Public Health England; Office for National Statistics.

Figure 4.4.3: Directly age standardised melanoma incidence rates per 100,000 for males aged under 60 years, by Breslow thickness, England, 1990-2010.



Source: Public Health England; Office for National Statistics.

Figure 4.4.3: Directly age standardised melanoma incidence rates per 100,000 for females aged under 60 years, by Breslow thickness, England, 1990-2010.



Source: Public Health England; Office for National Statistics.

Table 4.4.1: Directly age standardised melanoma incidence rates per 100,000 for males 60+ years, females 60+ years, males under 60 years and females under 60 years by Breslow thickness, England, 1990-2010.

	Males 60+				Males under 60			
	1990		2010		1990		2010	
Breslow thickness	Cases	ASR	Cases	ASR	Cases	ASR	Cases	ASR
< 1mm	15	0.4	907	16.9	35	0.2	747	3.5
1.1-2 mm	20	0.5	738	13.6	33	0.2	478	2.3
2.1-4mm	28	0.7	456	8.2	11	0.1	196	0.9
> 4 mm	32	0.8	597	10.3	30	0.2	141	0.7
Not recorded	611	14.6	517	9.4	652	3.6	374	1.8
	Females 60+				Females under 60			
	1990		2010		1990		2010	
Breslow thickness	Cases	ASR	Cases	ASR	Cases	ASR	Cases	ASR
< 1mm	23	0.4	869	14.3	67	0.4	1,221	5.7
1.1-2 mm	32	0.6	682	10.5	58	0.3	655	3.0
2.1-4mm	26	0.4	414	5.7	26	0.1	158	0.7
> 4 mm	40	0.6	404	5.0	29	0.2	120	0.6
Not recorded	875	14.7	468	7.1	929	5.0	514	2.4

Source: Public Health England; Office for National Statistics.

Table 4.4.2: Annual percentage change (APC) for males 60+ years, females 60+ years, males under 60 years and females under 60 years by Breslow thickness, England, 1990-2010.
95% confidence intervals (LCI, UCI) are also reported.

	Males 60+		Males under 60	
Morphology type	APC (LCI,UCI) %	p value	APC (LCI,UCI) %	p value
< 1mm	20.1 (15.2, 25.3)	< 0.01	14.2 (6.1, 22.8)	< 0.01
1.1-2 mm	13.7 (9.7, 17.8)	< 0.01	9.4 (2.1, 17.1)	0.01
2.1-4mm	12.9 (8.2, 17.9)	< 0.01	8.7 (-2.5, 21.3)	0.13
> 4 mm	11.5 (7.4, 15.7)	< 0.01	6.3 (-4.7, 18.6)	0.27
Not recorded	-0.1 (-0.3, 1.3)	0.52	-2.5 (-6.5, 1.7)	0.24
	Females 60+		Females under 60	
Morphology type	APC (LCI,UCI) %	p value	APC (LCI,UCI) %	p value
< 1mm	17.1 (14.3, 20.0)	< 0.01	13.3 (7.3, 19.7)	< 0.01
1.1-2 mm	11.3 (8.9, 13.7)	< 0.01	7.9 (2.0, 14.1)	< 0.01
2.1-4mm	11.6 (8.3, 14.9)	< 0.01	7.5 (-0.04, 20.0)	0.20
> 4 mm	10.1 (7.2, 13.1)	< 0.01	5.1 (-6.0, 17.5)	0.38
Not recorded	-0.2 (-0.3, 0.0)	0.01	-2.7 (-6.0, 0.7)	0.12

Source: Public Health England; Office for National Statistics.

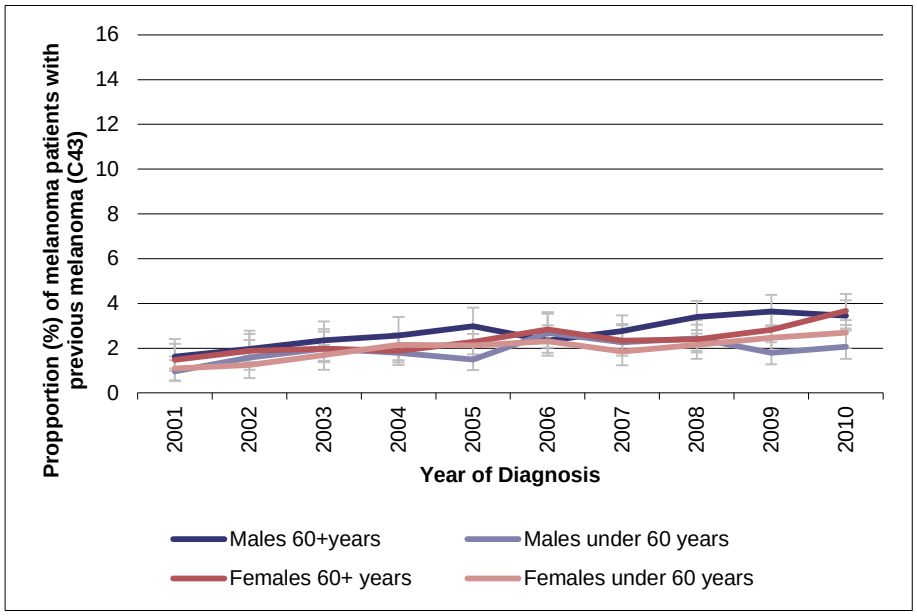
4.5 Proportion of melanoma patients with a previous skin cancer

4.5.1 Proportion of melanoma patients with a previous melanoma cancer

Between 2001 and 2010, the proportion of melanoma patients that had a previous melanoma more than doubled for: males 60+ years (1.6% vs 3.5%); females 60+ years (1.5% vs 3.7%); and males under 60 years (1.0% vs 2.1%), see Figure 4.5.1.

For males 60+ years, there was no statistically significant difference in the change in the proportion of melanoma patients that had a previous melanoma, over time, compared with females 60+ years (p=0.78) and males under 60 years (p=0.31).

Figure 4.5.1: Proportion of melanoma patients with a previous melanoma for males 60+ years, females 60+ years, males under 60 years and females under 60 years, England, 1990-2010.



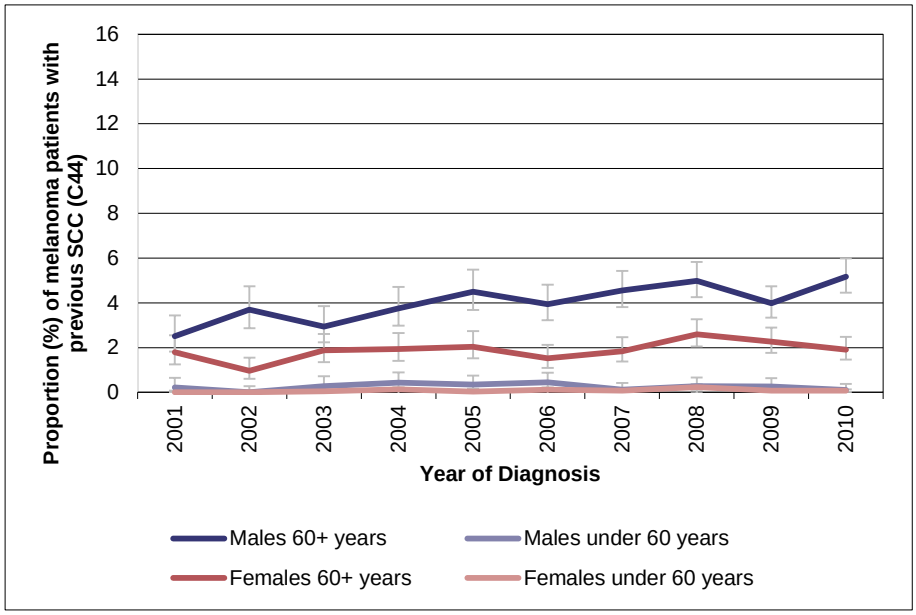
Source: Public Health England

4.5.2 Proportion of melanoma patients with a previous squamous cell cancer

Between 2001 and 2010, the proportion of melanoma patients that had a previous squamous cell carcinoma more than doubled for males 60+ years (2.5% vs 5.2%). This was also constantly higher over time compared to females 60+ years (p<0.01) and males under 60 years (p<0.01), see Figure 4.5.2.

The change in the proportion of melanoma patients that had a previous squamous cell carcinoma over time for males 60+ years increased faster compared with males under 60 years (p=0.046). However this increase in males 60+ years was not statistically significant when compared to females 60+ years (p=0.51).

Figure 4.5.2: Proportion of melanoma patients with a previous squamous cell carcinoma for males 60+ years, females 60+, males under 60 years and females under 60 years, England, 1990-2010.



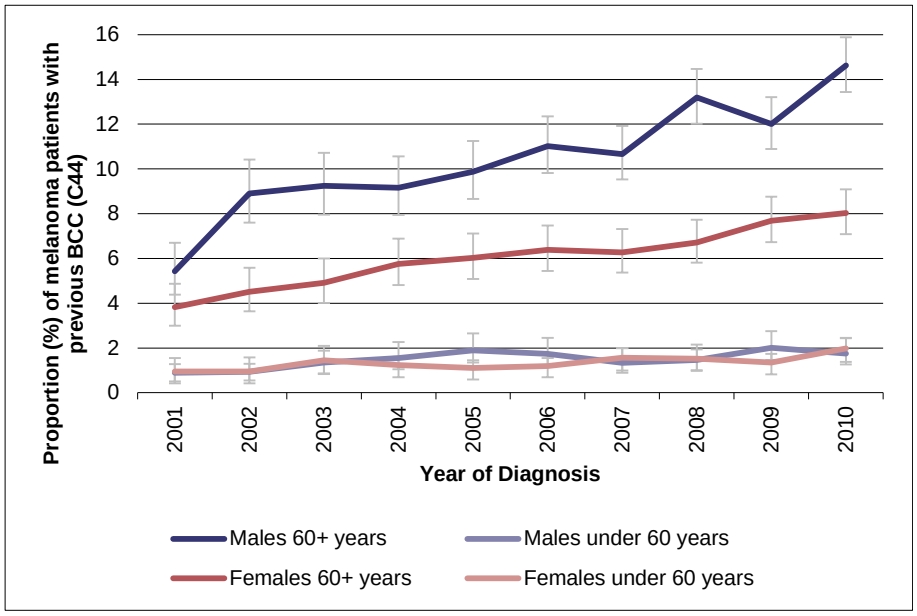
Source: Public Health England

4.5.3 Proportion of melanoma patients with a previous basal cell cancer

Between 2001 and 2010, the proportion of melanoma patients that had a previous basal cell carcinoma has more than doubled for: males 60+ years (5.4% vs 14.6%); females 60+ years (3.8% vs 8.0%); and males under 60 years (0.9% vs 1.8%), see Figure 4.5.3.

For males 60+ years, the proportion of melanoma patients that had a previous basal cell carcinoma was constantly higher over time compared to females 60+ years ($p<0.01$) and males under 60 years ($p<0.01$). However there was no statistically significant difference in the change in the proportion of melanoma patients that had a previous basal cell carcinoma for males 60+ years, over time, compared to females 60+ years ($p=0.75$) and males under 60 years ($p=0.49$).

Figure 4.5.3: Proportion of melanoma patients with a previous basal cell carcinoma for males 60+ years, females 60+ years, males under 60 years and females under 60 years, England, 1990-2010.



Source: Public Health England

5.Conclusion

In this report we have described the previously reported considerable increase in melanoma incidence over the age of 60 years in England between 1990 and 2010. That increase was especially marked in males.

Most melanoma is associated with sunny holidays and sunburn, and previous epidemiological studies had suggested that early sun exposure was particularly harmful. As the proportion of English people diagnosed with melanoma over the age of 60 years in this period were young at a time when travel to hotter countries was much less common, the recent dramatic increased incidence in older people was surprising. We carried out this study to explore the hypothesis that the older patients had developed tumours with the clinico-pathological features associated with a different 'route' to melanoma. Whiteman has postulated one route associated with lots of naevi, intermittent sun exposure, superficial spreading melanomas and tumours on the back or legs (dominant in the UK) and another associated with sun-damage (actinic keratosis) in the fair skinned.[11] The latter 'route' might have been indicative of chronic sun damage although more recently a large study did not show any evidence of occupational sun exposure being associated with melanomas even on the head and neck and in hot countries such as Australia.[12]

In this study we have shown that the predominant increase in melanomas in older patients (and especially in men) has been in tumours with the features reported to be associated with sunny holidays, ie superficial spreading melanomas, truncal tumours and tumours on the legs in men and women, and thinner tumours (less than 1mm in thickness**).** These data would suggest that the increased incidence in older patients is likely to be associated with sunny holidays and the implication is that exposure in life after childhood has likely contributed to this. Access to sunny holidays for the English population has increased dramatically in the last 50 years and indeed older people now may spend longer periods in sunny climes. It seems likely that increased access to sunny weather has resulted in the changed incidence with age.

The proportion of melanoma patients that had a previous squamous cell carcinoma was higher for older men than for older women and younger men. Furthermore, the change in this proportion in older men increased faster over time than that for younger men. This also increased faster in older men than older women, although this was not statistically significant. The epidemiology of squamous cell carcinoma appears to be more clearly related to chronic excessive exposure to the sun as would be experienced in outdoor workers. These data, in conjunction with the continued frequency of melanomas of the head and neck especially in men, does add some support to the view that chronic sun exposure may have added to the increased incidence in older men, despite the lack of evidence for this internationally.[12]

Patterns of sun exposure and sunscreen use in older birth cohorts will be explored in epidemiological data at the University of Leeds to determine if male patients have reported different patterns of behaviour in the sun. These data will contribute to information designed to inform sun protection advice to be directed to UK adults.

6.References

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