



Children's exposure to ultraviolet radiation – a risk profile for future skin cancers in Ireland

A report developed by the Institute of Public Health for the
National Cancer Control Programme

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Key points

Key points

Why has this report been developed?

Excessive exposure to ultraviolet (UV) radiation, sunburn and sunbed use in childhood are risk factors for developing skin cancer in adult life. This report presents data on these risk factors in Ireland for the first time. Data are presented principally from the *Irish Health Behaviour in School-aged Children (HBSC) Study 2018* (1). This report was developed to support implementation and monitoring of the Government's **National Skin Cancer Prevention Plan 2019-2022** (2).

What do we know about sunburn and sun protective behaviours in childhood?

Levels of self-reported childhood sunburn in Ireland were high. Nine out of 10 schoolchildren aged 10 to 17 reported at least one experience of sunburn. Around three quarters reported sunburn within the last year. Children from more affluent families were more likely to report experiencing sunburn.

Eight out of 10 schoolchildren reported wearing sunscreen and seven out of 10 reported using sunglasses on sunny days. Adoption of other sun protection measures, like covering up, wearing hats and avoiding peak UV hours, were less consistent. One in three children reported that they avoided peak UV hours and half reported wearing protective clothing to cover arms and legs when in the sun. Overall, girls were more likely to adopt sun protection behaviours but the patterns differed by gender with girls more likely to wear sunscreen, sunglasses, clothes that cover arms and legs as well as avoid peak UV hours. Boys were more likely to wear hats.

What do we know about skin type and children's attitudes to tanning?

Survey data from schoolchildren in Northern Ireland shows that 58% of children find tans appealing. However, 69% of children were unable to correctly identify risks associated with tanning. Most teens in Ireland identify as Fitzpatrick skin type I or II¹ indicating a significant population level genetic predisposition to future skin cancer (3). We could not source any reliable data on the use of fake tan or tanning accelerator type products.

What did children say about sunbed use?

Sunbed use was rare, as reported by 3% of children. The provision of sunbed services to children (aged under 18) is contrary to Irish law as outlined in the *Public Health (Sunbeds) Act 2014*.

How might our weather be affecting risk?

Six of the 10 warmest years in Ireland's history have occurred during the childhoods of the current cohort of 18 to 20-year olds. Since 2006, for the period May to September, around two thirds of days recorded a UV index of 3 or more. During school summer holidays, June to August, around three quarters of days recorded a UV index of 3 or more. A UV index of 3 or more results in greater risk for skin damage and it is strongly advised to protect the skin. When the UV Index is over 3 the WHO recommends practicing multiple sun protection

¹ Fitzpatrick skin type classification scale ranges from 1 (high risk) to 6 (low risk). It considers skin colour and how the skin reacts to UV (i.e. whether it always burns/ never tans or burns minimally/ rarely).

behaviors including seeking shade during midday hours, wearing on a shirt, putting on sunscreen and a hat.

Climate research predicts hotter summers and more heatwaves. This may present elevating risk for UV skin damage, particularly in terms of childhood exposure during the summer school holidays. The relationship between climate change and skin damage is poorly understood.

What are the priority issues for data and research?

Data presented in this report could have the potential to inform the development of indicators, policy monitoring and inform risk modelling studies.

The main data and research gaps identified include a lack of data on children under 10 years old and on sunburn severity, specifics on the types of sunscreens, hats and sunglasses being used, factors influencing children's risk behaviours, and the retail and marketing of commercial sunbed use to young people in Ireland.

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Summary of facts and figures



Summary of facts and figures

Skin cancer in Ireland

- Currently over 11,000 non-melanoma cases of skin cancer and about 1,100 invasive melanoma cases are diagnosed each year, this is projected to more than double by 2045 (2, 4).
- Non-melanoma skin cancer is the most common cancer in Ireland. Deaths from melanoma continue to increase in Ireland (4).
- The report provides baseline data to support monitoring of the government's *National Skin Cancer Prevention Plan 2019-2022* (2).

Childhood UV exposures and risk of skin cancer

- Childhood sunburn, excess sun exposure and use of sunbeds increase the risk of developing skin cancers later in life (5, 6). Severe sunburn during childhood (three or more instances before age 20) is associated with two to four times higher risk of developing melanoma in later life (5, 7).
- Children's skin is more vulnerable to damage from UV. This damage cannot be repaired, so UV protection is the only way to protect against risk (8).

Data sources

- Data from multiple sources are presented including the *Irish Health Behaviour in School-aged Children (HBSC) Study 2018*, meteorological data, *National Cancer Registry of Ireland*, the *Growing Up in Ireland National Longitudinal Survey of Children - Cohort 1998*, the *Hospital InPatient Enquiry (HIPE)*, *Young Persons Behaviour and Attitudes Survey 2016* and *2019 Healthy Ireland Survey*.

Sunburn

- 88% of 10 to 17 year olds reported experiencing sunburn (red skin for hours after being in the sun) in their lifetime. 74% experienced sunburn at least once during the past year.
- There are no reliable estimates of sunburn severity.
- There are no reliable estimates of numbers of child sunburn presentations in primary care.
- International estimates suggest that one third of hospital admissions for sunburn are adolescents and young adults aged 10 to 19 years, as such teenagers may represent a higher risk group for severe sunburn episodes (7).
- There are no data available in Ireland on self-reported or parent-reported sunburn in children under 10 years old.

Sunbed use

- 3% of 10 to 17 year olds reported using a sunbed. It is not clear whether this represents use in commercial or domestic environments. Providing a sunbed service to anyone under the age of 18 is a breach of the *Public Health (Sunbeds) Act 2014*.

- Older teens aged 15-17 years reported a marginally higher frequency of sunbed use than those aged 11-14, but this was not statistically significant.
- In 2018, the HSE recorded 475 inspections on sunbed premises. 10 fixed penalty payments of €120 and 3 prosecutions were progressed. None of the prosecutions were due to underage sunbed usage.
- In both the *2018 HBSC Survey* and *2019 Healthy Ireland Survey*, females were more likely than males to report ever having used a sunbed.

Sun protection behaviours

- 32% of schoolchildren reported that they avoided peak UV hours of the day between 12pm and 3pm².
- 50% of schoolchildren reported wearing protective clothing to cover arms and legs when in the sun.
- 83% of school children reported sometimes and always using sunscreen.
- 72% of schoolchildren reported that they wear sunglasses on a sunny day.
- There were significant gender differences. Girls more frequently reported using sunscreen. Boys (50%) more frequently reported wearing hats than girls (44%). Gendered sun protection patterns observed in the *2018 HBSC Survey* were consistent with those observed in the adult population in the *2019 Healthy Ireland Survey*.
- There were no data available on sun protection behaviours in children under 10 years old.

Skin type and attitudes to tanning

- The *Growing Up in Ireland Survey* recorded how 17 to 18 year olds identify across the Fitzpatrick skin type scale. 13.5% of 17-18 years olds identified as Fitzpatrick type I; 33.6% identified as Fitzpatrick type II; 38% identified as Fitzpatrick III, 13% identified as Fitzpatrick IV; 1.5% identified as Fitzpatrick V; less than 1% identified as Fitzpatrick VI (9). People with this skin type burn easily and are particularly vulnerable to UV damage and at a higher risk of skin cancer in later life.
- There were no data in Ireland on children's perceptions and attitudes around tanning. However, Northern Ireland's *Young Persons Behaviour and Attitudes Survey 2016* found that 58% of children agreed that "they look better with a tan". This was also reported more frequently for girls (66.4%) than for boys (50.6%). Sixty-nine percent of children reported they 'did not know' or 'disagreed' that tanning causes damage to the skin.

Ultraviolet (UV) Index

- Some of the warmest years in Ireland have occurred since 1990, during childhoods of the children included in the *2018 HBSC Survey* and the 1998 cohort of the *Growing Up in Ireland Survey* (10).
- Sunburn and UV related cancers are recognised public health impacts of heatwaves. Heatwaves in Ireland coincide with school summer holidays. In the period starting in May and ending in September, two thirds of days recorded a UV index of 3 or more, rising to three quarters of days in the school summer holiday period. Climate change research predicts hotter summers and more heatwaves in the future representing a pattern of elevating risk for young people (11).

² There is a minor discrepancy in the definition of peak hours between the *2018 HBSC Survey* data (12pm - 3pm) and the *National Skin Cancer Prevention Plan 2019 - 2022* (11am - 3pm)

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Data sources used in this report

Data sources used in this report

The *National Skin Cancer Prevention Plan 2019- 2022* called for the development of a comprehensive profile of children's risk and protective behaviours relating to UV exposure to inform the implementation of the plan.

Data referenced in this report were collected from the following sources:

Health Behaviour in School-aged Children Survey 2018 (Ireland)



The *Health Behaviour in School-aged Children Survey* is a cross-national research study conducted in collaboration with the World Health Organization Regional Office for Europe. The overall aim of the study is to increase understanding of young people's health and well-being, health behaviours and their social context. The *2018 HBSC Survey (Ireland)* introduced variables that measured UV protection and risk for data collection among Irish school-aged children, aged 10-17 years. Prior to the main survey, a pilot study was conducted to ensure respondents' understanding of the questionnaire. A pilot report was subsequently published which demonstrated that in general, schoolchildren found the questions on UV exposure understandable and easily answerable (12).

Data collection took place between April and December 2018 in 254 schools (109 primary schools and 145 post-primary schools). Children from 5th class in primary school to 5th year in post-primary school answered questions on UV protection and risk. A further inclusion criterion was applied to the present analysis to include respondents with valid responses to the UV risk and protection behaviours. These were also analysed according to gender, age group, and social class background. The final sample size included a total of 10,271 respondents.

Growing Up in Ireland National Longitudinal Survey of Children - Cohort 1998



The *Growing Up in Ireland Survey* is a population representative cohort study of children and young people in Ireland that began in 2006. The study follows the progress of two groups of children: 8,000 9-year-olds (Child Cohort/Cohort 1998) and 10,000 9-month-olds (Infant Cohort/Cohort 2008). Data used in this report are derived from the Child Cohort/Cohort 1998 group and relates to self-reported skin type according to the Fitzpatrick I-VI classification.

UV Index for Ireland 1983-2015



Data on the UV index in Ireland was collected by Met Éireann and provided by the centralised data system operated by Deutscher Wetterdienst.

Hospital In-Patient Enquiry 2006-2017



An Roinn Sláinte
Department of Health

Data were provided by the national database of hospital discharge activity by public hospitals in Ireland (HIPE system). Emergency Department attendances and outpatient activity are not collected on HIPE. HIPE includes patients who attended the emergency department if they were subsequently admitted to hospital. Discharges were coded using the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM). It was not possible to present data on sunburn presentations by age due to low numbers.

National Cancer Registry Ireland 1994-2016



Data were accessed from the National Cancer Registry Ireland and the European Cancer Information System from 1994-2016 to provide information on case counts and incidence rates (cases per 100,000 per year) of melanoma and non-melanoma cancer. Information is compiled on every case of cancer diagnosed in the Republic of Ireland as collected by trained nurses and maintained in a central register to provide a national cancer dataset on the incidence of cancer in Ireland. Data are subject to rigorous quality assurance, including external checks developed by the International Association for Research on Cancer, ensuring that the data conforms to the highest international standards in cancer registration.

Healthy Ireland Survey 2019



The *Healthy Ireland Survey* is an annual survey commissioned by the Department of Health. It is a population representative sample of people aged 15 and older (n=7,413). UV protection variables were included for the first time in the data collection in 2018/2019. Appendix 2 contains a comparison of findings from the *2019 Healthy Ireland Survey* and the *2018 HBSC Survey* on care in the sun variables. This presents patterns of UV exposure risk and protection behaviours among children and adults in Ireland, but data are not comparable due to differences in survey design.

Young Persons Behaviour and Attitudes Survey 2016



The *Young Persons Behaviour and Attitudes Survey (YPBAS) 2016* is a school-based survey conducted among 11-16 year-olds in Northern Ireland. The survey is commissioned by multiple government departments and examines children's attitudes and behaviours across a wide variety of topics including sun and UV exposure behaviours and attitudes. The 'Care in the Sun' questions referenced in this report were from the most recent wave of available results from autumn 2016.

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Results



Results

In this section, findings from the datasets are presented. Detailed tables of outputs from the 2018 HBSC Survey with indications of statistical significance are included in Appendix 1.

2018 Health Behaviour in School-Aged Children Survey (Ireland)

Of 10,271 respondents, using sunscreen was the most popular method of sun protection reported. This was followed by wearing sunglasses and by wearing protective clothes that cover arms and legs. Younger children were more likely to report adopting sun protection behaviours than older children. Overall, girls were more likely to adopt sun protection behaviours than boys.

Figure 1 presents the topline findings on sun protection behaviours among 10 to 17-year old schoolchildren in Ireland. Data in Figure 1 were analysed by younger and older children. Younger children are defined as 10-11 years old and older children are presented those who identified as 15-17 years during the 2018 HBSC data collection.

Table 1. Sun protection behaviours in 10-17 year old schoolchildren in Ireland by age, gender and social class (2018 HBSC)

	Gender		Age of children		Social Class	
	Girls	Boys	Younger	Older	Higher	Lower
Avoiding the sun during peak UV hours	36.8%	27.6%	38.8%	28.9%	31.6%	36.8%
Wearing protective clothing	50.8%	48.9%	44.3%	54.7%	49.1%	56.4%
Hat use on a sunny day	44.3%	50.6%	63.5%	40.7%	48.6%	43%
Wearing sunglasses	83.5%	60.1%	74.0%	73.8%	72.3%	71.2%
Wearing sunscreen	87.4%	76.9%	91.3%	78.2%	84.2%	75%

Figure 1. Overview of sun protection behaviours, sunburn and sunbed use among 10-17 year old schoolchildren in Ireland (2018 HBSC)



Percentages of self-reported sunburn during the past summer were high amongst children. Figure 2 shows that girls were more likely to report experiencing sunburn last summer. Girls reported a combined percentage of 75.4% of 1 or more instances of sunburn last summer.

Boys were less likely to report they had experienced sunburn last summer, with 29% indicating they had never experienced sunburn. However, boys were more likely than girls to report 5 instances or more of sunburn during the past summer.

Figure 2. Self-reported frequency of sunburn last summer among school-children aged 10-17 in Ireland (2018 HBSC)

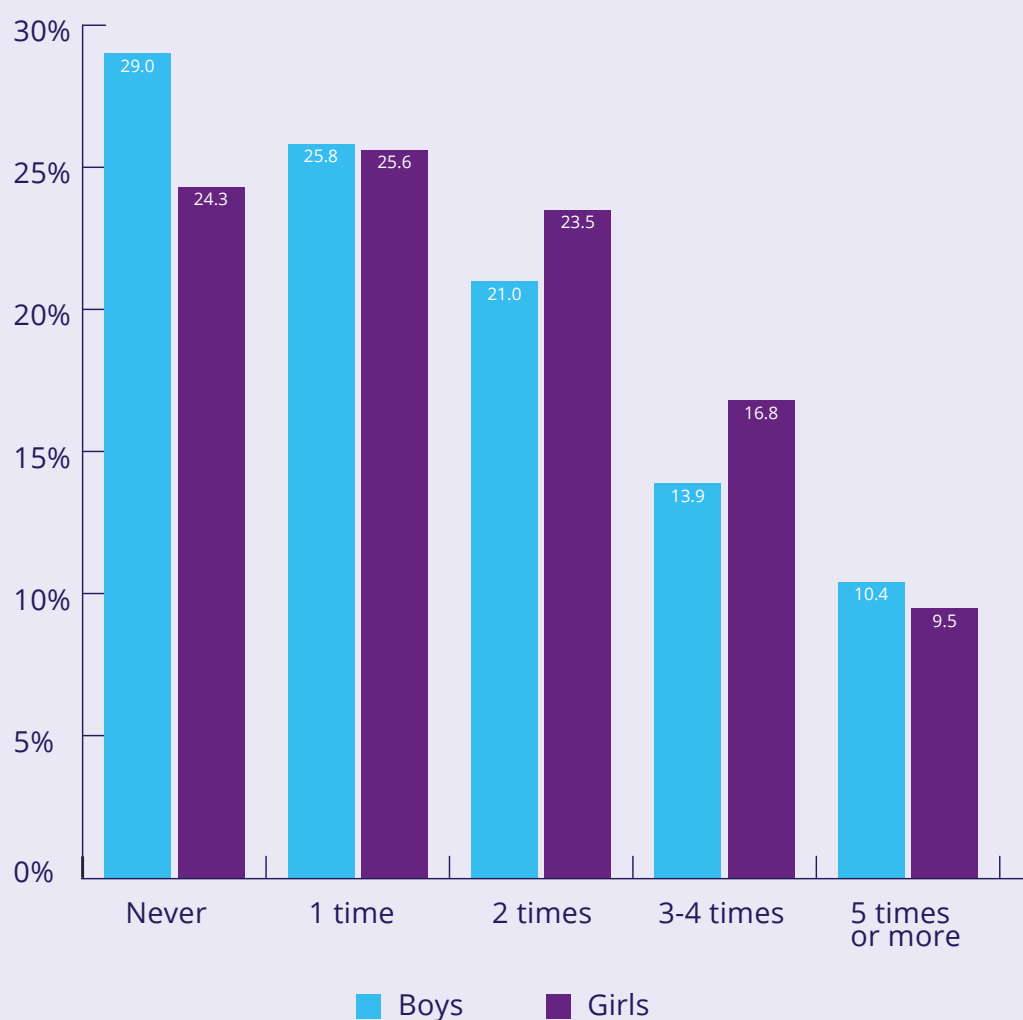
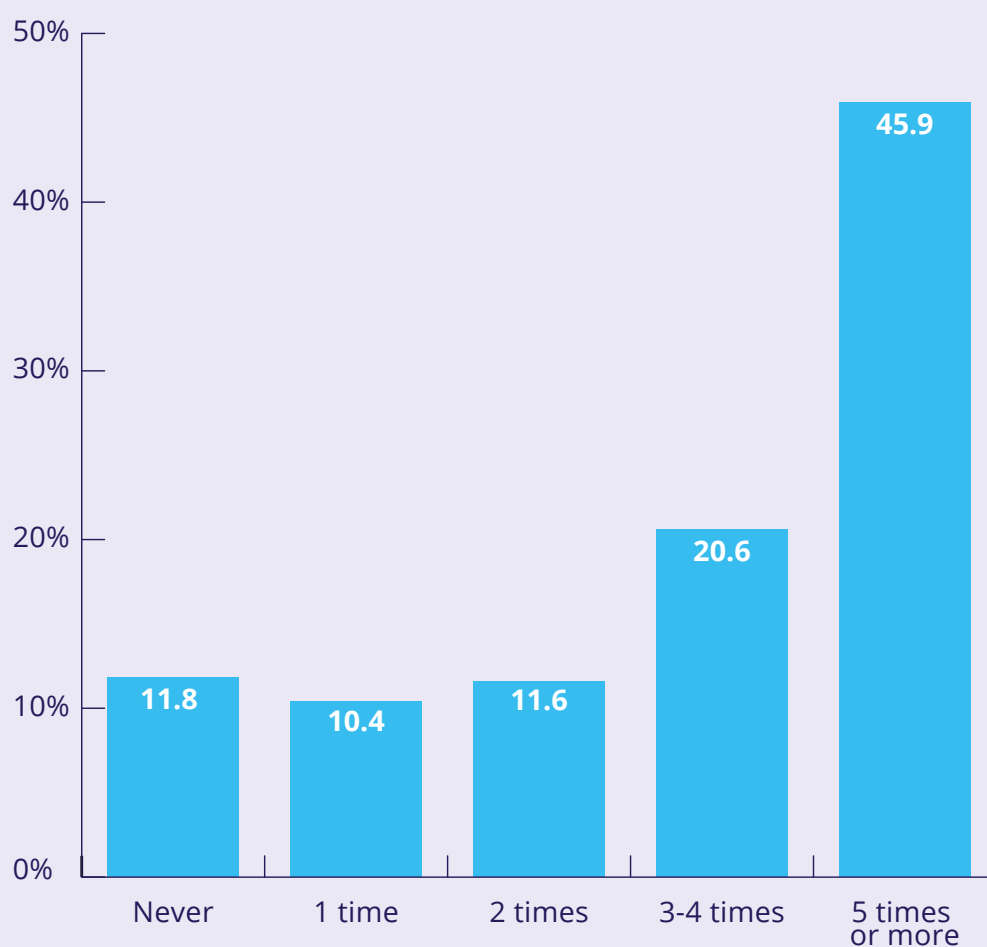


Figure 3 presents the self-reported experience of sunburn over the lifetime of children surveyed. These data are not reported by gender as the difference was not statistically significant in the analysis. Almost half (45.9%) of children reported that they had experienced sunburn 5 times or more within their lifetime. 11.8% of children reported they had never experienced sunburn.

Figure 3. Lifetime frequency of sunburn among school-children aged 10-17 in Ireland (2018 HBSC)



Appendix 2 presents a comparison of data collected on adults and children in the context of sun protection behaviours. The *2019 Healthy Ireland Survey* collected data on sun protection behaviours from the general population aged 15 and older. Ninety-two percent of respondents said that they use of some form of sun protection when in the sun for more than 30 minutes. The most popular method of sun protection reported was sunscreen use (68%) followed by wearing sunglasses (60%) and wearing a hat (42%). Men were more likely to report wearing a hat than women. Women were more likely to report use of sunscreen and sunglasses. This pattern is consistent with the data reported in children in Ireland and with sun protection behaviour patterns observed internationally (13, 14).

Hospital In-Patient Enquiry

Excessive sun exposure in Ireland occasionally results in engagement of health services including primary care, secondary care and hospitalisations. There were no data available on primary care consultations for childhood sunburn. Discharges from public hospitals due to sunburn as the principal diagnosis were sought. Data were not released for under 18s due to small numbers in certain years. Annual hospital discharges (adults and children) for diagnosis of sunburn (ICD-10-AM code 'L55: Sunburn') ranged from 6 – 15 cases of per year from 2006 – 2017. The exceptions were 2011 and 2015 when frequencies were less than five. However, international estimates suggest that one third of total hospital admissions for sunburn are adolescents and young adults in the age range 10 to 19 years, suggesting they are a high risk group for severe sunburn episodes (15, 16).

UV Index for Ireland

Daily data on UV indices were collected by Met Éireann and provided by Deutscher Wetterdienst the German Meteorological Service for the period 1983 to 2015. Data for 2006 to 2015 were examined with a view to considering the likely outdoor environmental exposure for the current cohort of children.

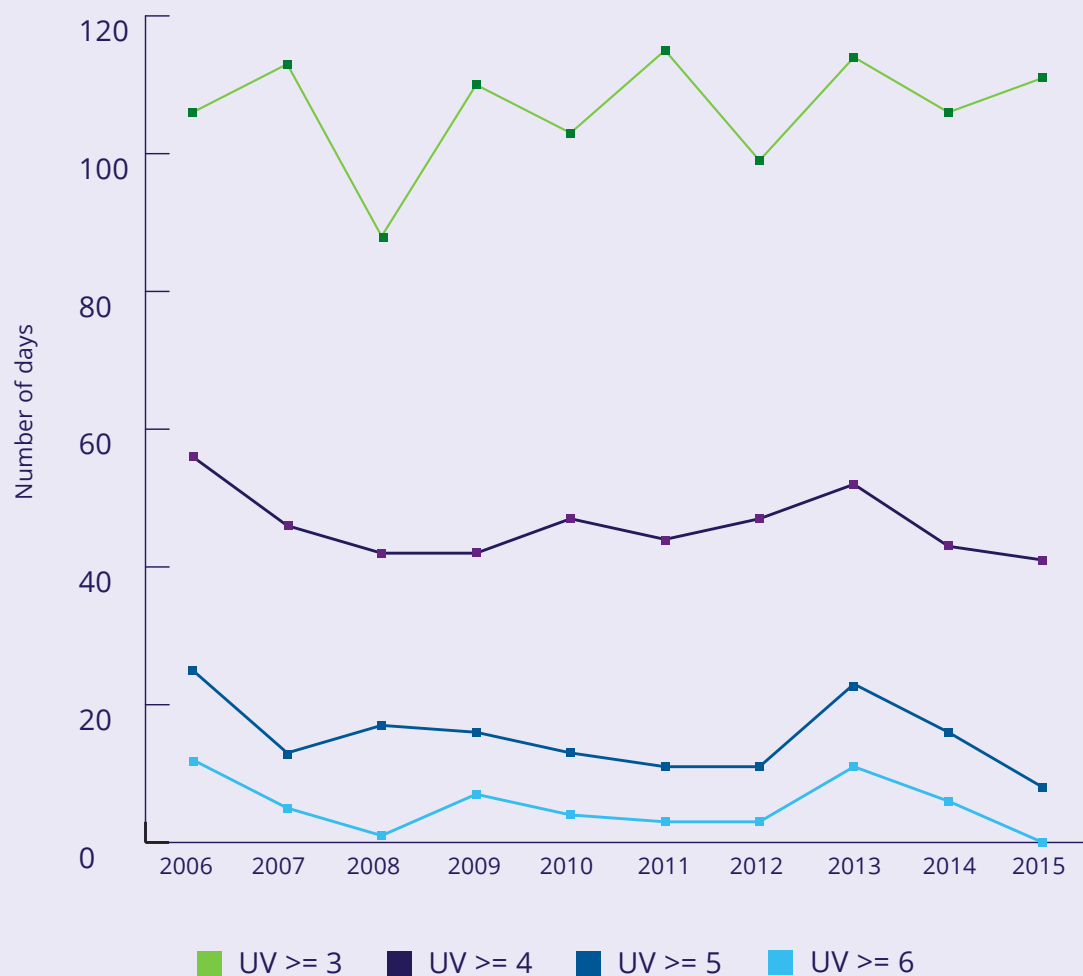
Table 2 below presents an analysis of days where Ireland's UV index was equal or more than 3. Three time periods were examined – (a) the full year (b) the period start May to end September and (c) school summer holidays considered as June, July and August. Across the year, around 3 in 10 days recorded a UV index of 3 or more. In the period starting in May and ending in September, almost two thirds of days recorded a UV index of 3 or more, rising to three quarters of days in the school summer holiday period. There was some variation across the years with the range in the proportion of days with UV index recordings of 3 or more, extending from 53% in 2008 to 68% in 2013.

Table 2. Median number of days with UV index of 3 or more in Ireland (2006-2015)

Period	Median (no. days)	Median (%)
Full year	108	30%
May to September inclusive	94	61%
School summer holidays	69	76%

Of those days where the UV index was recorded at 3 or more, 43% recorded a UV of 4 or more, 14% recorded a UV of 5 or more and 4.9% recorded a UV of 6 or more.

Figure 4. Total number of days with UV index of 3 or more, 4 or more, 5 or more or higher (Ireland; 2006-2015)



Growing Up in Ireland National Longitudinal Survey of Children - Cohort 1998

Findings from the most recent *Growing Up in Ireland Survey* of the Child Cohort/Cohort 1998 shows that 17 to 18 year olds identify across the Fitzpatrick skin type scale. 13.5% identified as Fitzpatrick type I; 33.6% identified as Fitzpatrick type II; 38% identified as Fitzpatrick III, 13% identified as Fitzpatrick IV; 1.5% identified as Fitzpatrick V; less than 1% identified as Fitzpatrick VI. This indicates a high level of population vulnerability to future skin cancer.

National Cancer Registry Ireland 1994-2016

Data were provided by the National Cancer Registry Ireland on incidence of malignant melanoma. Table 3 presents case counts per year and incidence rates (cases per 100,000 per year) for all melanoma patients. The data suggest consistent increases in melanoma incidence among males and females alongside a narrowing of the gender gap.

Table 3. Annual incidence of melanoma skin cancer among men and women in Ireland by case counts and rates (cases per 100,000)

	Females		Males	
Year	Cases	Rate	Cases	Rate
1996	234	13.25	132	8.31
2006	377	17.12	260	13.15
2016	614	23.58	524	21.11

Figure 5 presents melanoma incidence in European member states with rates above the EU -28 average. This demonstrates that while Ireland ranks in the top 10 European countries for melanoma incidence, rates are substantially lower than Nordic countries and some other Northern European countries.

Figure 5. Profile of age standardised melanoma incidence rates in 'above average' European member states 2018 (European Information System 2018)

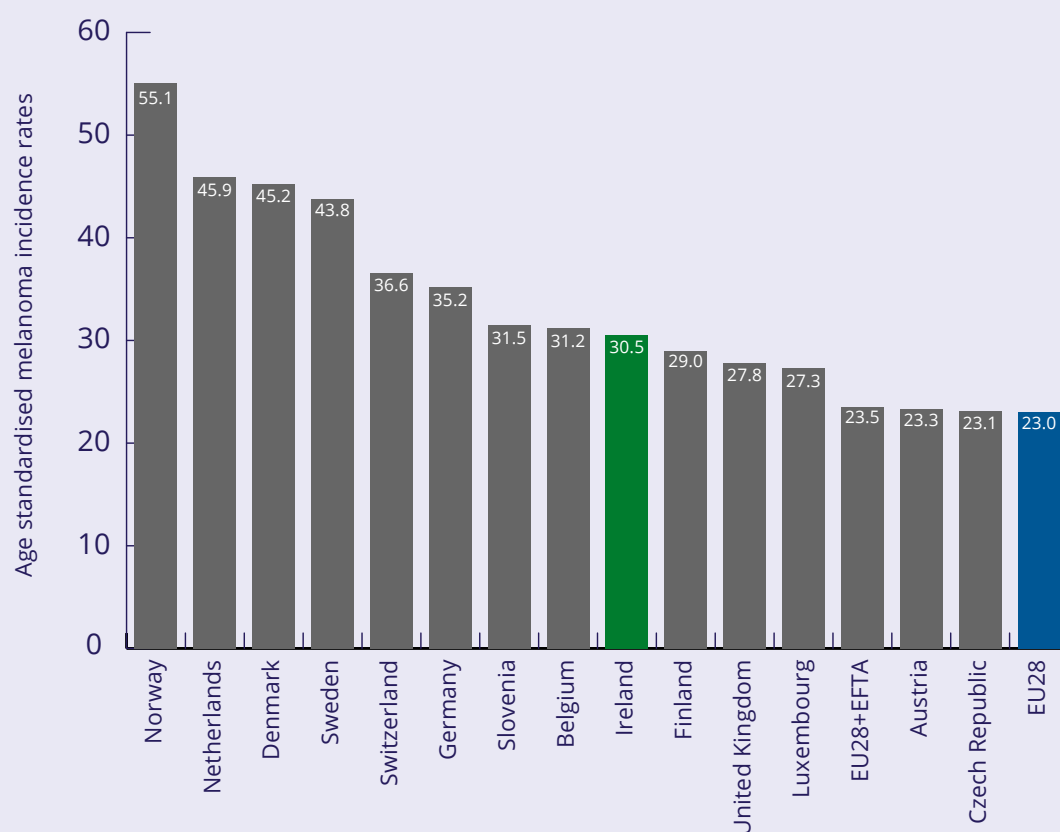


Table 4 presents data on the location of melanoma on the body by gender. This shows gender differences in the distribution of melanoma. Women were more likely to experience melanoma on their legs and arms. Men were more likely to experience melanoma on their trunk and face.

These data are presented as they are potentially relevant to gendered patterns of exposure to UV in childhood and adult life. For example, use of hats and sunglasses may be a relevant consideration to the occurrence of facial melanoma. Gendered patterns in covering the legs, trunk and arms, or use of sunscreen on these areas, may also be relevant to understanding skin cancer risk.

Table 4. Primary melanoma cancer sites on female bodies in Ireland (NCRI, 2014-2016)

Primary melanoma site	Count
Lower limb, including hip	585
Upper limb, including shoulder	447
Trunk	268

Table 5. Primary melanoma cancer sites on male bodies in Ireland (NCRI, 2014-2016)

Primary melanoma site	Count
Trunk	487
Upper limb, including shoulder	298
Face and neck (including lip)	276

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Discussion



Discussion

This report presents data relevant to the risk of future skin cancer in Ireland. It provides early data on the scope for improvement in the national risk profile with a focus on the critical period of childhood and adolescence.

Developed to support the implementation of the *National Skin Cancer Prevention Plan 2019-2022*, the report presents data on health behaviours alongside other evidence on risk including skin type and UV indices in Ireland. The data can be used to inform the content of public awareness and health behaviour change interventions working to support reduction of skin cancer risk.

This report was developed as a collaboration between the Institute of Public Health and the Health Promotion Research Centre (HPRC), National University of Ireland Galway, with close partnership from the National Cancer Control Programme (NCCP). The Department of Health and HPRC, as the Irish partner in the World Health Organization Health Behaviour in School-Aged Children Survey, are committed to the collection of data on children's sun protection behaviours in the context of rising skin cancer incidence in Ireland.

UV risk and protection behaviours

Overall, the data on sunburn frequency are concerning. While sunscreen use overall was reasonably high, children, with or without input from their parents, do not appear to be taking precautions in a way that recognises sunscreen as the last line of defence after clothing, shade, hat and sunglasses. Half of children do not wear a hat or long-sleeved clothing in the sun and three quarters reported experiencing sunburn during the previous summer. Only one in ten children reported that they had never been sunburnt.

The data suggest that different approaches may be needed to change UV risk behaviours for younger children as compared to older teens. Differences by gender were also observed. For example, girls more frequently reported using sunscreen, but they were also more likely to engage in intentional tanning using sunbeds. Compared with girls, boys were less likely to wear sunscreen but more frequently reported wearing hats than girls.

Sunburn

Experiencing sunburn was reported more frequently among children in high and middle socio-economic groups than their less affluent peers. This pattern was observed in both lifetime experience of sunburn as well as reporting experiencing sunburn last summer. This effect may be attributable to a higher likelihood of higher and middle socio-economic groups travelling on foreign holidays. It is not known what proportion of holidays are to 'sun destinations' but this is a reasonable assumption that could be explored in future research. This group represents a distinct target group and further work is urgently needed in terms of designing, delivering, and evaluating effective health behaviour change interventions with a focus on 'holiday risk'.

Sunbeds

Under current legislation, sunbeds cannot be provided for use by a commercial entity to anyone under the age of 18. Sunbeds emit UV-A radiation which penetrates the skin more deeply than other UV rays. This report found that a small proportion of children under 18

are using sunbeds, but we are not clear whether this use is occurring in home settings or commercial premises. However, a 2019 Irish Cancer Society/ IPSOS MRBI secret shopper exercise found substantial violations among 40 sunbed operators in the greater Dublin area. The report found that only three out of five sunbed operators asked for identification when minors attempted to make a booking. One third of sunbed operators surveyed in Dublin attempted to book an underage user even when the user failed to provide a state issued identification to verify age (17).

The passage of the sunbed legislation was a long process over a period of 10 years, with final enactment in 2014. These data, alongside other developments in the evidence, demonstrate that the adequacy of the legislation may need to be revisited. This evidence supports the aspiration of the *National Skin Cancer Prevention Plan 2019-2022* "to explore the feasibility of a complete ban on sunbeds". Complete bans have been successfully introduced in Australia and Brazil (18). The 2017 World Health Organisation report titled "Artificial tanning devices: Public health interventions to manage sunbeds" indicates that artificial tanning is responsible for some skin cancers and outlines various paths to allow individual member states to further regulate sunbeds (19). In this context, there is both scope to act in domestic law alongside proven feasibility and international precedent. A 2020 modelling exercise predicted the health and economic benefits of banning sunbeds for children and adults from 12 to 35 years old in Europe and North America. This study estimated that a sunbed ban could prevent 448,000 melanomas and 9.7 million non-melanoma skin cancers and generate healthcare cost savings of US\$5.7billion. However, their modelling analysis revealed that prohibiting only minors from indoor tanning could produce only one-third of these benefits demonstrating the need for a more comprehensive sunbed ban (18).

The marketing and promotion techniques for retail of 'sunbed minutes' across social media channels popular with young people in Ireland is poorly understood. We could find no studies of the youth marketing tactics of the tanning industry in Ireland, but it is clear from the international literature that the sunbed industry use marketing tactics that are based on advertising, promotions and pricing controls (20). The industry tend to employ marketing strategies which downplay health risks, emphasising physical attractiveness and target subgroups including young women (20, 21).

The health inequalities dimension to the pattern of sunbed use was notable. Children from less affluent backgrounds appear to be more likely to report having used a sunbed 5 times or more in the past 12 months than their more advantaged peers, although the numbers were small, so caution is warranted in interpretation. This suggests that both interventions and awareness measures will need to be carefully designed to target vulnerable groups. It also raises the possibility of enhanced regulations to address the affordability of current models of supply (cheap minutes or discounts).

Although not the subject of this report, it is imperative that early detection of skin cancers remains a priority alongside primary prevention and that young people are informed on detecting the early signs of potential skin cancer.

Indicators and target setting

This report presents baseline data and is intended to serve as a starting point with regards to policy targets for UV exposure risk reduction in Ireland. Some targets based on the data are proposed. The estimates in Table 6 were calculated using the Central Statistics Office (CSO) population data from the 2011-2016 census. Data were extracted for children 10-17 years old and targets were derived based on the overall population for this age group (503, 426).

These are based on those adopted in Australia from the Queensland *Skin Cancer Prevention Strategy 2017-2020* (22, 23). Table 6 below proposes targets for consideration by the National Cancer Control Programme. The data collected over time could be inputted into models of skin cancer incidence according to various risk scenarios to address critical questions supporting prioritisation like 'What reduction might be achieved by enhancing sun protection behaviours?' and 'What reduction can be assumed from banning sunbeds entirely?'

Table 6: Proposed indicators and targets for monitoring childhood exposures to UV

Goal	Current pattern 2020	Proposed target 2022	Numbers of children needed to reach targets in 2022
Increase the adoption of sun protection behaviours	60.4% of children currently use three or more sun behaviours	65% of children using three or more sun protection behaviours	22,150 more children reporting using 50+ sunscreen, wearing broad brimmed hats, wearing protective clothing, wearing sunglasses or limiting time in sun when UV is strongest between 12pm- 3pm April to September ³
Decrease the frequency of sunburn episodes	74% of children reported experiencing sunburn at least once last summer	Halve the frequency of children reporting sunburn in the last year	192,308 fewer sunburns reported
Eliminate childhood use of sunbeds	3% of children report using a sunbed within the last 12 months	Eliminate completely any use of sunbeds by children	13,089 fewer children reporting using a sunbed

Climate and environmental impacts

The climate crisis may impact on the risk of skin cancer in Ireland. With temperature changes of between 1.5 and 4 degrees Celsius predicted by the end of the century, Ireland is predicted to experience hotter, drier weather compounded by more frequent heatwaves (24).

To protect future generations from an elevated risk of skin damage from UV, implementation of the recommendations committed in the *Climate Action Plan* (2019) and *Health Climate Change Sectoral Adaptation Plan* (2019-2024) is necessary (10, 24). The *Health Climate Change Sectoral Adaptation Plan* (2019-2024) identifies excess exposure to

³ There is a minor discrepancy in the definition of peak hours between the 2018 HBSC survey data (12pm - 3pm) and the *National Skin Cancer Prevention Plan 2019 - 2022* (11am - 3pm)

UV radiation as a principle threat due to climate change. A key action within the plan is to increase public awareness in order to address UV risk factors (10). Sun protection should remain prominent within emergency planning and messaging in heatwaves, with specific attention to children and young people during school holidays (10).

Future Research

Additional research and data are required to better understand the patterns underlying UV-related risk and protective behaviours. Qualitative data based on research with parents and young children would be beneficial to identify supportive and effective behaviour change mechanisms.

Future research will also need to continue to investigate the relationship between increasing climate changes, UV exposure and cancers (10).

Longitudinal data is also vital to analyse children's skin cancer knowledge, tanning attitudes as well as sun related behaviours over time. In addition, more sophisticated analyses are warranted with a focus on exploring the correlates of high-risk groups like 'high sunburn frequency' children or 'Fitzpatrick type I and II' children.

Research focused on sunbed industry marketing strategies in the Irish context is needed. The mechanisms leveraged to target young people as well as shape attitudes and perceptions to tanning is a supplementary area that should be explored further.

Evidence of success in changing children's UV exposure

Australia has implemented one of the most sustained and comprehensive suites of programmes for skin cancer prevention since 1988. These measures have included provisions for hat wearing and access to shade for children, the availability of more effective sunscreens that extend protection time and filter a greater range of UV rays, the inclusion of sun protection items as a tax deductible expense for outdoor workers, the increased availability of long-sleeved sun protective swimwear; a ban on use of sunbeds in 2014; the provision of UV forecasts in weather reports; and, in recent years, a comprehensive programme of grants for community shade (25). These measures have started to deliver returns. Several studies have shown the cost-benefit of skin cancer prevention with returns on investments estimates of more than \$3 (AUD) gained for each dollar invested (26).

An increase in knowledge and awareness of UV harms for children is a key lever for the success of Ireland's **National Skin Cancer Prevention Plan 2019-2022**. There is evidence to support investment in public health messaging campaigns especially those aimed at children and their parents. Public health media campaigns developed in Australia are understood to have contributed to decreases in the incidences of melanoma in adults (27). The United States have also experienced decreasing rates of melanoma and research suggests that national awareness campaigns were a significant component in driving these reductions (28). In Denmark, sun protection campaigns have also demonstrated clear returns on investment. A study led by the Danish Cancer Society, investigated the launch of the "Danish Sun Safety Campaign" which ran from 2007- 2015. The media campaign included the use of television advertising, social media, print media, press, public affairs, structural prevention strategies, and volunteer efforts in several settings such as kindergartens, music festivals, and running events (29). The research found that the campaign was most successful in achieving results for sunburn and sunbed use as

these did not return to pre-campaign levels. It was also estimated that for every Euro spent by the awareness campaign, it saved the approximately €2.18 in health expenses for the Danish health system. (29)

A recent review of environmental interventions for changing behaviour among children found that although free sunscreen provision was the most popular intervention, it proved to have inconsistent results over time (30). Environmental interventions such as shade provision had positive and promising impacts on triggering children's shade seeking behaviour. Other studies have found that installing UV radiation meters in schools have had promising results on children's knowledge and awareness of UV radiation (31).

National Skin Cancer Prevention Plan in Ireland 2019 - 2022

The aim of the *National Skin Cancer Prevention Plan 2019-2022* is to radically reduce the incidence of skin cancer. The data contained in this report will help inform actions to achieve that goal (32). Summarised below are the current recommendations for children and young people in the national plan.

Action Area 3: Children and young people

- Develop skin protection resources for use by school, Early Learning and Care (ELC) and School-Age Children (SAC) settings
- Include children and young people in the development of resources and implementation of programmes in which they are key stakeholders
- In line with the updating of the Quality and Regulatory Framework/s for ELC settings, include current messages and advice about skin cancer prevention for young children Tusla/DCYA Implementation group
- Communicate up to date messages and advice about skin cancer prevention for young children in Tusla communications with ELC and SAC settings including periodic newsletters, with a focus on how ELC and SAC settings can incorporate this into their work
- Identify opportunities to include messages about skin cancer prevention for babies, children and young people in communications with parents, including through initiatives identified in First 5 Strategy
- Develop resources to increase awareness of UV risk and protection among young children attending ELC settings, in line with the roll-out of Aistear, the National Curriculum for Early Childhood
- Ensure the provision of shade is prioritised in the Universal Design Guidelines for Early Learning and Care Settings
- Disseminate and promote resources to support the curriculum in relation to skin protection for use in primary and post primary schools, including through the official Scoilnet portal

6

Appendices



Appendix 1: Data from the Irish Health Behaviour in School-aged Children (HBSC) Study 2018

SUN PROTECTION

Using a sun hat

If you go outside on a sunny day, do you use a sun hat?

Table 1. Use of a hat on a sunny day, overall

	Frequency	Percent	Valid percent
Always	410	4.0	4.1
Sometimes	4,331	42.2	43.2
Never	5,291	51.5	52.7
Total	10,032	97.7	100
Missing	239	2.3	

Table 2. Use of a hat on a sunny day, by sex (%)***

	Boys	Girls
Always	5.5	2.8
Sometimes	45.1	41.5
Never	49.4	55.7

Table 3. Use of a hat on a sunny day, by age group (%)***

	10-11 years old	12-14 years old	15-17 years old
Always	7.0	3.6	3.3
Sometimes	56.5	42.4	37.4
Never	36.5	54.0	59.4

Table 4. Use of a hat on a sunny day, by social class (%)**

	SC1-2	SC3-4	SC5-6
Always	3.9	4.4	3.9
Sometimes	44.7	42.1	39.1
Never	51.4	53.5	57.0

*p<0.05; **p<0.01; ***p<0.001: There were statistically significant differences in using a hat on a sunny day by sex and across, age groups and social classes.

Wearing sunglasses

If you go outside on a sunny day, do you wear sunglasses?

Table 5. Wearing sunglasses on a sunny day, overall

	Frequency	Percent	Valid percent
Always	1,496	14.6	14.8
Sometimes	5,836	56.8	57.8
Never	2,762	26.9	27.4
Total	10,094	98.3	100
Missing	177	1.7	

Table 6. Wearing sunglasses on a sunny day, by sex (%)***

	Boys	Girls
Always	8.0	20.7
Sometimes	52.1	62.8
Never	39.8	16.5

Table 7. Wearing sunglasses on a sunny day, by age group (%)**

	10-11 years old	12-14 years old	15-17 years old
Always	13.5	14.4	16.2
Sometimes	60.5	57.0	57.6
Never	26.1	28.6	26.3

Table 8. Wearing sunglasses on a sunny day, by social class (%)

	SC1-2	SC3-4	SC5-6
Always	14.4	15.1	15.8
Sometimes	57.9	58.5	55.4
Never	27.7	26.4	28.9

*p<0.05; **p<0.01; ***p<0.001: There were statistically significant differences in wearing sunglasses on a sunny day by sex and across age groups, but not across social classes.

Wearing protective clothes*If you go outside on a sunny day, do you wear clothes that cover arms and legs?***Table 9. Wearing protective clothes on a sunny day, overall**

	Frequency	Percent	Valid percent
Always	620	6.0	6.2
Sometimes	4,404	42.9	43.7
Never	5,048	49.1	50.1
Total	10,072	98.1	100
Missing	199	1.9	

Table 10. Wearing protective clothes on a sunny day, by sex (%)**

	Boys	Girls
Always	6.8	5.6
Sometimes	42.1	45.2
Never	51.1	49.2

Table 11. Wearing protective clothes on a sunny day, by age group (%)***

	10-11 years old	12-14 years old	15-17 years old
Always	4.6	6.4	6.7
Sometimes	39.7	42.2	48.0
Never	55.7	51.5	45.3

Table 12. Wearing protective clothes on a sunny day, by social class (%)***

	SC1-2	SC3-4	SC5-6
Always	5.7	6.3	8.2
Sometimes	43.4	42.9	48.2
Never	50.9	50.9	43.6

*p<0.05; **p<0.01; ***p<0.001: There were statistically significant differences in wearing protective clothes on a sunny day by sex and across, age groups and social classes.

Avoiding the sun at UV peak period

If you go outside on a sunny day, do you avoid the sun between 12 and 3pm?

Table 13. Avoidance of the sun between 12 and 3pm, overall

	Frequency	Percent	Valid percent
Always	338	3.3	3.4
Sometimes	2,935	28.6	29.2
Never	6,785	66.1	67.5
Total	10,058	97.9	100
Missing	213	2.1	

Table 14. Avoidance of the sun between 12 and 3pm, by sex (%)***

	Boys	Girls
Always	3.1	3.6
Sometimes	24.5	33.2
Never	72.4	63.2

Table 15. Avoidance of the sun between 12 and 3pm, by age group (%)***

	10-11 years old	12-14 years old	15-17 years old
Always	4.4	3.4	2.8
Sometimes	34.4	29.5	26.1
Never	61.1	67.1	71.2

Table 16. Avoidance of the sun between 12 and 3pm, by social class (%)**

	SC1-2	SC3-4	SC5-6
Always	3.4	3.0	4.3
Sometimes	28.2	29.7	32.5
Never	68.4	67.3	63.2

*p<0.05; **p<0.01; ***p<0.001: There were statistically significant differences in avoiding the sun between 12 and 3pm by sex and across age groups and social classes.

*Using sunscreen**If you go outside on a sunny day, do you use sunscreen?***Table 17. Use of sunscreen on a sunny day, overall**

	Frequency	Percent	Valid percent
Always	3,105	30.7	30.9
Sometimes	5,248	51.1	51.6
Never	1,781	17.3	17.5
Total	10,180	99.1	100
Missing	92	0.9	

Table 18. Use of sunscreen on a sunny day, by sex (%)***

	Boys	Girls
Always	22.8	38.1
Sometimes	54.1	49.3
Never	23.1	12.6

Table 19. Use of sunscreen on a sunny day, by age group (%)***

	10-11 years old	12-14 years old	15-17 years old
Always	45.6	31.8	22.1
Sometimes	45.7	50.5	56.1
Never	8.7	17.7	21.8

Table 20. Use of sunscreen on a sunny day, by social class (%)***

	SC1-2	SC3-4	SC5-6
Always	32.0	30.7	26.6
Sometimes	52.2	51.5	48.4
Never	15.8	17.8	25.0

*p<0.05; **p<0.01; ***p<0.001: There were statistically significant differences in using sunscreen on a sunny day by sex and across age groups and social classes.

At least three of five protective behaviours

Prevalence of children reporting 'always' or 'sometimes' reporting three or more of the following protective behaviours when going out on a sunny day: use a hat, wear sunglasses, wear clothes that cover arms and legs, avoid sun between 12 and 3pm, use sunscreen.

Table 21. At least three of five protective behaviours, overall

	Frequency	Percent	Valid percent
Three or more protective behaviours	6,212	60.5	60.6
One or two protective behaviours	3,714	36.2	36.3
None of these protective behaviours	319	3.1	3.1
Total	10,245	99.7	100
Missing	26	0.3	

Table 22. At least three of five protective behaviours, by sex (%)***

	Boys	Girls
Three or more protective behaviours	54.3	66.2
One or two protective behaviours	40.8	32.3
None of these protective behaviours	4.9	1.5

Table 23. At least three of five protective behaviours, by age group (%)***

	10-11 years old	12-14 years old	15-17 years old
Three or more protective behaviours	68.8	59.0	58.7
One or two protective behaviours	28.9	37.7	37.9
None of these protective behaviours	2.2	3.2	3.4

Table 24. At least three of five protective behaviours, by social class (%)

	SC1-2	SC3-4	SC5-6
Three or more protective behaviours	61.1	60.7	58.3
One or two protective behaviours	35.9	36.1	38.4
None of these protective behaviours	3.0	3.2	3.3

*p < 0.05; **p < 0.01; ***p < 0.001: There were statistically significant differences in reporting at least three of the five forms of sun protection methods by sex and across age groups. There is no significant difference across social classes.

SUNBURN

Sunburn, last summer

How many times did you get sunburn (red skin for hours after being in the sun) last summer?

Table 25. Frequency of sunburn last summer, overall

	Frequency	Percent	Valid percent
Never	2,666	26.0	26.5
1 time	2,594	25.3	25.8
2 times	2,249	21.9	22.4
3-4 times	1,553	15.1	15.4
5 times or more	997	9.7	9.9
Total	10,059	97.9	100
Missing	212	2.1	

Table 26. Frequency of sunburn last summer, by sex (%)***

	Boys	Girls
Never	29.0	24.3
1 time	25.8	25.6
2 times	21.0	23.5
3-4 times	13.9	16.8
5 times or more	10.4	9.5

Table 27. Frequency of sunburn last summer, by age group (%)***

	10-11 years old	12-14 years old	15-17 years old
Never	32.4	26.9	22.8
1 time	26.8	27.0	23.6
2 times	20.1	22.2	23.8
3-4 times	12.2	14.0	19.1
5 times or more	8.5	9.9	10.6

Table 28. Frequency of sunburn last summer, by social class (%)***

	SC1-2	SC3-4	SC5-6
Never	26.0	25.8	31.5
1 time	26.6	25.6	21.6
2 times	22.7	22.2	21.4
3-4 times	15.4	16.1	13.4
5 times or more	9.4	10.0	12.1

*p<0.05; **p<0.01; ***p<0.001: There were statistically significant differences in frequency of sunburn last summer by sex and across, age groups and social classes.

Sunburn, lifetime

How many times did you get sunburn (red skin for hours after being in the sun) in your lifetime?

Table 29. Frequency of sunburn, lifetime, overall

	Frequency	Percent	Valid percent
Never	1,177	11.5	11.8
1 time	1,042	10.1	10.4
2 times	1,156	11.3	11.6
3-4 times	2,061	20.1	20.6
5 times or more	4,556	44.4	45.9
Total	9,992	97.3	100
Missing	279	2.7	

Table 30. Frequency of sunburn, lifetime, by sex (%)

	Boys	Girls
Never	12.6	11.0
1 time	10.4	10.4
2 times	11.4	11.7
3-4 times	19.7	21.5
5 times or more	45.8	45.4

Table 31. Frequency of sunburn, lifetime, by age group (%)***

	10-11 years old	12-14 years old	15-17 years old
Never	14.7	12.7	8.9
1 time	15.7	10.6	7.5
2 times	13.1	12.2	9.8
3-4 times	21.5	20.5	20.3
5 times or more	35.0	43.9	53.5

Table 32. Frequency of sunburn, lifetime, by social class (%)***

	SC1-2	SC3-4	SC5-6
Never	11.1	11.3	16.9
1 time	10.0	10.7	11.7
2 times	11.4	11.9	11.7
3-4 times	21.7	20.4	16.1
5 times or more	45.9	45.8	43.7

*p<0.05; **p<0.01; ***p<0.001: There were statistically significant differences in lifetime frequency of sunburn across age groups and social classes, but not by sex.

SUNBED USE

Sunbed use, last 12 months

How many times have you used a tanning solarium or sunbed (lying down or standing up) in the last 12 months?

Table 33. Frequency of sunbed use in the last 12 months, overall

	Frequency	Percent	Valid percent
Never	9,753	95.0	97.4
1 time	108	1.1	1.1
2 times	51	0.5	0.5
3-4 times	36	0.4	0.4
5 times or more	70	0.7	0.7
Total	10,018	97.5	100
Missing	253	2.5	

Table 34. Frequency of sunbed use in last 12 months, by sex (%)*

	Boys	Girls
Never	97.8	96.9
1 time	0.9	1.2
2 times	0.4	0.6
3-4 times	0.2	0.5
5 times or more	0.5	0.9

Table 35. Frequency of sunbed use in last 12 months, by age group (%)

	10-11 years old	12-14 years old	15-17 years old
Never	97.7	97.5	96.9
1 time	1.2	1.0	1.2
2 times	0.4	0.6	0.4
3-4 times	0.3	0.3	0.5
5 times or more	0.4	0.6	1.0

Table 36. Frequency of sunbed use in last 12 months, by social class (%)***

	SC1-2	SC3-4	SC5-6
Never	98.0	96.6	97.4
1 time	0.9	1.3	1.4
2 times	0.3	0.9	0.6
3-4 times	0.3	0.4	0.3
5 times or more	0.5	0.8	1.3

*p<0.05; **p<0.01; ***p<0.001: There were statistically significant differences in sunbed use in the last 12 months by sex and across social classes, but not across age groups.

Sunbed use, lifetime

How many times have you used a tanning solarium or sunbed (lying down or standing up) in your lifetime?

Table 37. Frequency of sunbed use, lifetime, overall

	Frequency	Percent	Valid percent
Never	9,747	94.9	96.7
1 time	111	1.1	1.1
2 times	49	0.5	0.5
3-4 times	66	0.6	0.7
5 times or more	104	1.0	1.0
Total	10,077	98.1	100
Missing	194	1.9	

Table 38. Frequency of sunbed use, lifetime, by sex (%)*

	Boys	Girls
Never	97.3	96.2
1 time	0.9	1.3
2 times	0.4	0.6
3-4 times	0.6	0.7
5 times or more	0.8	1.2

Table 39. Frequency of sunbed use, lifetime, by age group (%)

	10-11 years old	12-14 years old	15-17 years old
Never	97.2	96.9	96.2
1 time	1.0	1.1	1.2
2 times	0.6	0.5	0.4
3-4 times	0.4	0.5	0.9
5 times or more	0.7	1.0	1.3

Table 40. Frequency of sunbed use, lifetime, by social class (%)***

	SC1-2	SC3-4	SC5-6
Never	97.5	95.9	95.8
1 time	1.0	1.1	1.5
2 times	0.4	0.7	0.3
3-4 times	0.5	0.8	0.9
5 times or more	0.6	1.4	1.5

*p<0.05; **p<0.01; ***p<0.001: There were statistically significant differences in lifetime sunbed use across social classes, but not by sex or across age groups.

CIRCUMSTANCES OF SUNBED USE⁴

Asking about age

If you have used a tanning solarium or sun bed (lying down or standing up) were you asked how old you were? ⁵

Table 41. Frequency of being asked their age when using a sunbed, overall

	Frequency	Percent	Valid percent
Never used a sunbed	9,111	88.7	94.0
Yes, every time	55	0.5	0.6
Yes, at least once	80	0.8	0.8
No	339	3.3	3.5
I don't remember	110	1.1	1.1
Total	9,695	94.4	100
Missing	576	5.6	

Table 42. Frequency of being asked their age when using a sunbed, by sex (%)***

	Boys	Girls
Never used a sunbed	93.5	94.4
Yes, every time	0.5	0.6
Yes, at least once	0.6	1.0
No	4.3	2.8
I don't remember	1.2	1.1

⁴ These percentages should be interpreted cautiously as so few of the participating children had ever used a sunbed at all.

⁵ Data not cleaned by reported sunbed use.

Table 43. Frequency of being asked their age when using a sunbed, by age group (%)***

	10-11 years old	12-14 years old	15-17 years old
Never used a sunbed	92.1	93.9	95.1
Yes, every time	0.3	0.6	0.6
Yes, at least once	0.8	0.8	0.9
No	5.1	3.6	2.6
I don't remember	1.7	1.1	0.8

Table 44. Frequency of being asked their age when using a sunbed, by social class (%)**

	SC1-2	SC3-4	SC5-6
Never used a sunbed	95.0	92.8	92.6
Yes, every time	0.4	0.8	1.0
Yes, at least once	0.7	0.9	1.0
No	2.9	4.3	3.9
I don't remember	1.0	1.2	1.5

*p<0.05; **p<0.01; ***p<0.001: There were statistically significant differences in the frequency of being asked about age when using a sunbed by sex and across age groups and social classes.

Protective goggles

If you have used a tanning solarium or sunbed (lying down or standing up), were you told to wear protective eye goggles?⁶

Table 45. Frequency of being told to wear protective goggles when using a sunbed, overall

	Frequency	Percent	Valid percent
Never used a sunbed	9,073	88.3	93.9
Yes, every time	110	1.1	1.1
Yes, at least once	51	0.5	0.5
No	349	3.4	3.6
I don't remember	84	0.8	0.9
Total	9,667	94.1	100
Missing	604	5.9	

Table 46. Frequency of being told to wear protective goggles when using a sunbed, by sex (%)***

	Boys	Girls
Never used a sunbed	93.4	94.3
Yes, every time	0.8	1.5
Yes, at least once	0.4	0.6
No	4.4	2.9
I don't remember	1.0	0.7

⁶ Data not cleaned by reported sunbed use.

Table 47. Frequency of being told to wear protective goggles when using a sunbed, by age group (%)***

	10-11 years old	12-14 years old	15-17 years old
Never used a sunbed	91.6	93.8	95.1
Yes, every time	1.1	1.0	1.3
Yes, at least once	0.5	0.5	0.6
No	5.4	3.8	2.4
I don't remember	1.5	0.8	0.6

Table 48. Frequency of being told to wear protective goggles when using a sunbed, by social class (%)**

	SC1-2	SC3-4	SC5-6
Never used a sunbed	94.8	92.8	92.5
Yes, every time	1.0	1.2	1.5
Yes, at least once	0.5	0.5	0.6
No	2.9	4.5	4.1
I don't remember	0.7	1.0	1.2

*p<0.05; **p<0.01; ***p<0.001: There were statistically significant differences in the frequency of being instructed to use protective goggles at the sunbed by sex and across age groups and social classes.

Advice on skin type

If you have used a tanning solarium or sunbed (lying down or standing up) were you given advice on your skin type?⁷

Table 49. Frequency of being given advice on their skin type when using a sunbed, overall

	Frequency	Percent	Valid percent
Never used a sunbed	9,048	88.1	93.7
Yes, every time	80	0.8	0.8
Yes, at least once	70	0.7	0.7
No	364	3.5	3.8
I don't remember	96	0.9	1.0
Total	9,658	94.0	100
Missing	613	6.0	

Table 50. Frequency of being given advice on their skin type when using a sunbed, by sex (%)**

	Boys	Girls
Never used a sunbed	93.3	94.0
Yes, every time	0.6	1.1
Yes, at least once	0.7	0.8
No	4.2	3.4
I don't remember	1.2	0.8

⁷ Data not cleaned by reported sunbed use.

Table 51. Frequency of being given advice on their skin type when using a sunbed, by age group (%)***

	10-11 years old	12-14 years old	15-17 years old
Never used a sunbed	91.4	93.7	94.9
Yes, every time	0.6	0.8	1.0
Yes, at least once	1.1	0.6	0.7
No	5.2	3.9	2.8
I don't remember	1.7	1.0	0.6

Table 52. Frequency of being given advice on their skin type when using a sunbed, by social class (%)**

	SC1-2	SC3-4	SC5-6
Never used a sunbed	94.7	92.6	92.3
Yes, every time	0.7	0.9	1.2
Yes, at least once	0.6	0.9	0.5
No	3.2	4.4	4.6
I don't remember	0.8	1.2	1.4

*p<0.05; **p<0.01; ***p<0.001: There were statistically significant differences in being advised on skin type when using the sunbed across sexes, age groups and social classes.

Being told about health risks

If you have used a tanning solarium or sunbed (lying down or standing up), were you told about the health risks?⁸

Table 53. Frequency of being told about health risks when using a sunbed

	Frequency	Percent	Valid percent
Never used a sunbed	9,033	87.8	93.5
Yes, every time	100	1.0	1.0
Yes, at least once	74	0.7	0.8
No	353	3.4	3.7
I don't remember	98	1.0	1.0
Total	9,658	94.0	100
Missing	556	6.0	

Table 54. Frequency of being told about health risks when using a sunbed, by sex (%)**

	Boys	Girls
Never used a sunbed	93.0	93.9
Yes, every time	0.8	1.2
Yes, at least once	0.8	0.8
No	4.1	3.3
I don't remember	1.3	0.8

⁸ Data not cleaned by reported sunbed use.

Table 55. Frequency of being told about health risks when using a sunbed, by age group (%)***

	10-11 years old	12-14 years old	15-17 years old
Never used a sunbed	90.7	93.6	94.9
Yes, every time	0.9	1.0	1.2
Yes, at least once	1.1	0.7	0.7
No	5.2	3.8	2.6
I don't remember	2.1	0.9	0.6

Table 56. Frequency of being told about health risks when using a sunbed, by social class (%)***

	SC1-2	SC3-4	SC5-6
Never used a sunbed	94.6	92.3	92.9
Yes, every time	0.7	1.2	1.8
Yes, at least once	0.6	0.9	0.9
No	3.1	4.4	3.7
I don't remember	0.9	1.1	1.3

*p<0.05; **p<0.01; ***p<0.001: There were statistically significant differences in being told about health risks when using the sunbed across sexes, age groups and social classes.

FAMILY HOLIDAYS

How many times did you and your family travel out of Ireland for a holiday last year?⁹

Table 57. Frequency of holidays abroad, overall

	Frequency	Percent	Valid percent
Not at all	2,181	21.2	22.2
Once	3,921	38.2	39.9
Twice	2,028	19.7	20.7
More than twice	1,685	16.4	17.2
Total	9,815	95.6	100
Missing	456	4.4	

Table 58. Frequency of holidays abroad, by sex (%)**

	Boys	Girls
Not at all	2.2	3.1
Once	41.4	8.7
Twice	21.1	20.3
More than twice	16.2	18.0

Table 59. Frequency of holidays abroad, by age group (%)*

	10-11 years old	12-14 years old	15-17 years old
Not at all	20.0	21.5	4.5
Once	41.1	40.1	39.1
Twice	21.0	21.0	20.0
More than twice	17.9	17.4	16.4

9 No further questions were administered on the location, length, or season of the holiday(s).

Table 60. Frequency of holidays abroad, by social class (%)***

	SC1-2	SC3-4	SC5-6
Not at all	18.7	24.9	1.5
Once	38.9	41.5	40.2
Twice	23.0	18.4	16.5
More than twice	19.5	15.2	11.8

*p<0.05; **p<0.01; ***p<0.001: There were statistically significant differences in the frequency of holidays abroad across sexes, age groups and social classes.

Appendix 2: Comparison between 2019 Healthy Ireland Survey and 2018 HBSC Survey

Variable	2019 Healthy Ireland Survey	2018 HBSC Survey
Sun Protection		
Sun Protection	92% of the general population aged 15 and older, reported use of some form of sun protection when in the sun for more than 30 minutes	60-80% of children reported that they “at least sometimes” used hats, sunglasses, protective clothing or sunscreen to avoid sun exposure
Most popular sun protection practices	1. Sunscreen (68%) 2. Sunglasses (60%) 3. Wearing a hat (42%)	1. Sunscreen (82.5%) 2. Sunglasses (72.6%) 3. Protective clothes (49.9%)
Gender differences, Sun Protection	Women more likely than men to report using sunscreen (96% vs. 89%). Men less likely to report using each type of sun protection behaviours except wearing a hat (49% vs. 36%)	Girls more frequently reported to use sunscreen than boys (87.4 & 76.9%) respectively. Boys more likely to report wearing a hat (50.6 vs 44.3%) than girls
Sunburn		
Sunburn, last summer	Variable N/A	74% of the respondents got sunburnt at least once last summer, boys and girls reported similar frequencies
Sunburn, lifetime	Variable N/A	Nine out of 10 schoolchildren in Ireland reported at least one experience of sunburn; boys and girls reported similar frequencies

Sunbed Use		
Sunbed, last 12 months	3% report using regularly or time to time. Usage among women is higher than men (4% vs. 1%).	3% of schoolchildren reported using a sunbed in the last 12 months.
Sunbed, lifetime	Usage highest among women aged 25- 34 Usage of sunbeds is higher in Dublin (5%) than outside Dublin (2%) and higher in more deprived areas (4%)	3% of schoolchildren reported having ever used a sunbed

Appendix 3: NCRI Skin cancer incidence in Ireland (1994-2016)

Case counts per year and incidence rates (cases per 100,000 per year) for patients of all ages and for age bands <30, 30-49, 50-69 and 70+ separately. The data is presented in 10-year intervals to demonstrate upward trends in both melanoma and non-melanoma skin cancer for both men and women.

Melanoma skin cancer incidence by age - all case females										
<30 years		30-49 years		50-69 years		70+ years		total		
Year	cases	rate	cases	rate	cases	rate	cases	rate	cases	rate
1996	26	3.07	61	12.67	83	26.74	64	35.74	234	13.25
2006	22	2.05	105	17.46	126	31.65	124	62.72	377	17.12
2016	28	3.50	167	23.57	215	41.76	204	89.77	614	23.58

Melanoma skin cancer incidence by age - all cases males										
<30 years		30-49 years		50-69 years		70+ years		total		
	cases	rate	cases	rate	cases	rate	cases	rate	cases	rate
1996	6	0.72	37	7.64	45	14.80	44	37.27	132	8.31
2006	12	1.14	55	8.77	96	23.92	97	70.69	260	13.15
2016	11	1.34	100	14.55	195	38.44	218	114.37	524	21.11

Non-melanoma skin cancer incidence by age - all case females										
<30 years			30-49 years		50-69 years		70+ years		total	
	cases	rate	cases	rate	cases	rate	cases	rate	cases	rate
1996	18	2.13	215	44.81	819	261.07	1363	784.45	2415	125.81
2006	20	1.85	328	55.90	1105	277.82	1607	814.94	3060	134.61
2016	22	2.60	498	71.30	1607	306.80	2338	969.71	4465	156.46

Non-melanoma skin cancer incidence by age - all case males										
<30 years			30-49 years		50-69 years		70+ years		total	
	cases	rate	cases	rate	cases	rate	cases	rate	cases	rate
1996	21	2.48	225	47.42	1160	376.91	1504	1314.39	2910	189.27
2006	21	1.86	336	56.33	1542	385.44	1869	1377.41	3768	197.79
2016	15	1.83	512	74.98	2179	422.67	3383	1776.79	6089	239.15

Appendix 4: Provisions in relation to children within the Public Health (Sunbeds) Act 2014

Section 4 (1-3) Prohibition on permitting use of sunbed by person under 18 years of age on sunbed premises¹⁰

4. (1) The owner, manager or employee of a sunbed business shall not—
- (a) sell the use of a sunbed on a sunbed premises to a person under 18 years of age,
 - (b) permit a person under the age of 18 years to be in a restricted area, except in the course of employment in or for the purpose of the provision of services to the sunbed business concerned, or
 - (c) permit a person under the age of 18 years to use a sunbed on a sunbed premises.
- (2) A person who contravenes subsection (1) commits an offence.
- (3) In any proceedings against a person for an offence under subsection (1), it shall be a defence for such person to prove that the person under 18 years of age produced to him or her—
- (a) an age card,
 - (b) a passport, or
 - (c) a driving licence, relating to that person.

¹⁰ Government of Ireland. Public Health (Sunbeds) Act 2014. Ireland; 2014.

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