Frequency of sunburn in Queensland adults: still a burning issue

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Abstract

Objective: To assess the current frequency of sunburn, a preventable risk factor for skin cancer, among Queensland adults.

Design and setting: Cross-sectional population-based surveys of 16 473 residents aged ⩾ 18 years across Queensland in 2009 and 2010.

Main outcome measures: Proportion of the adult population reporting sunburn (skin reddening lasting 12 hours or more) during the previous weekend, by age, sex and other risk factors.

Results: One in eight men and one in 12 women in Queensland reported being sunburnt on the previous weekend. Age up to 65 years was the strongest predictor of sunburn: eg, people aged 18–24 years were seven times more likely (adjusted odds ratio [OR], 7.35; 95% CI, 5.09–10.62) and those aged 35–44 years were five times more likely (adjusted OR, 5.22) to report sunburn compared with those aged ⩾ 65 years. Not having a tertiary education and being in the workforce were also significantly associated with sunburn. Those who had undertaken any physical activity the previous week were more likely to be sunburnt than those who were physically inactive. Sunburn was significantly less likely among people who generally took sun-protective measures in summer. Sunburn was not related to location of residence, socioeconomic disadvantage, skin colour, body weight or current smoking status.

Conclusions: Sunburn remains a public health problem among Queensland residents, especially those under 45 years of age. Sun-safe habits reduce sunburn risk, but advice must be integrated with health promotion messages regarding physical activity to reduce the skin cancer burden while maintaining active wellbeing.

The impact of skin cancer is disproportionately high due to its extraordinarily high incidence in white populations compared with other cancers. In the United States, skin cancer costs an estimated US$2 billion annually.[1] In Australia, skin cancers cost more than other major cancers.[2] Sunburn, the acute inflammation caused by excessive exposure to solar ultraviolet radiation, is a determinant of all major skin cancers.[3] An estimated 1.3 million skin cancer cases were due to excessive sun exposure[4] in the US in 2003, and a regional study in Texas calculated the economic impact of sunburn as over US$10 million annually through lost work and treatment costs.[5] Sunburn prevalence (at least one sunburn in the past year) in white US adults aged 18–29 years has been constant for a decade at 66%.[6] Men, the young and high-income groups appear susceptible.[7] In Australia, weekend sunburn prevalence was 9% overall in Victoria in 2002[8] but in Queensland in 2004, 70% of surveyed residents aged 20–75 years reported sunburn in the past year.[9]

Sunburn is of crucial public health importance as a key preventable and common risk factor for skin cancer. We assessed frequency of sunburn and associated factors in Queensland in two surveys in 2009 and 2010.

Methods

The Queensland Health Population Epidemiology Unit conducted self-reported health status surveys from January to March 2009 (SRHS 2009) and from October 2009 to February 2010 (SRHS 2010) using computer-assisted telephone interviews[10] with approval from the Queensland Health Central Office Human Research Ethics Committee. The target population sourced by random-digit-dialling was Queensland households with a person aged ⩾ 18 years (SRHS 2009) or ⩾ 16 years (SRHS 2010). From each selected household, one eligible resident was asked to participate. Response rates were calculated as the number of completed interviews expressed as a percentage of the number of eligible persons contacted.

A structured interview using a scripted questionnaire covered demographic and risk factors including sunburn on the previous weekend. Sunburn was defined as any reddening of the skin lasting longer than 12 hours after sun exposure. Other information collected included age, sex, height and weight, education, marital and employment status, fruit and vegetable intake, smoking, general use of sun protection and physical activity based on the Active Australia instrument.[11] For analysis, employment status was categorised as employed, retired or student/carer/unemployed; fruit/vegetable consumption as meeting daily recommended levels (⩾ 2 serves of fruit and ⩾ 5 serves of vegetables);[12] smoking as daily or not; and physical activity as none, insufficient (1–4 sessions of walking/moderate/vigorous activity and/or < 150 minutes total, weekly), or sufficient to meet national guidelines[13] (⩾ 5 sessions for ⩾ 150 minutes total, weekly). Statistical Local Areas of residence were classified by the Accessibility/Remoteness Index of Australia[14] (ARIA+), the Socio-Economic Indexes For Areas[15] (SEIFA) and geographically (North, Central, South and West Queensland).

Identical variables from the 2009 and 2010 surveys were pooled for adults aged ⩾ 18 and weighted by age, sex and Queensland Health Service District distribution using 2008 estimated resident population data for Queensland (Australian Bureau of Statistics, http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3235.02008?OpenDocument) to minimise bias due to over- or underrepresentation of any demographic group, and by the number of in-scope people and fixed telephone lines per household to minimise selection bias. Weighted proportions (with 95% confidence intervals) of the population who reported being sunburnt the previ-

1 Prevalence of being sunburnt on the previous weekend, by sex and age

	Men			Women		
Age group	Total no.	No. sunburnt	Proportion (95% CI)*	Total no.	No. sunburnt	Proportion (95% CI)*
18–24 years	459	102	22.0% (17.7%–27.0%)	373	60	15.3% (11.2%–20.6%)
25–34 years	932	173	16.9% (14.1%–20.1%)	1038	123	13.1% (10.5%–16.3%)
35–44 years	1431	235	15.4% (13.3%–17.8%)	1540	156	10.5% (8.7%–12.6%)
45–54 years	1647	198	12.7% (10.7%–14.9%)	1763	159	8.0% (6.6%–9.8%)
55–64 years	1743	139	8.1% (6.7%–9.8%)	1659	63	4.0% (3.0%–5.2%)
⩾ 65 years	1938	54	2.2% (1.6%–3.0%)	1950	35	1.8% (1.2%–2.6%)
All age groups	8150	901	12.9% (11.9%–14.0%)	8323	596	8.6% (7.7%–9.6%)

* Prevalence estimates and associated 95% confidence intervals weighted to the 2008 estimated resident Queensland population (http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3235.02008?OpenDocument). ◆

ous weekend were calculated, stratified by age and sex. Univariate and multivariate logistic regressions — adjusting for age (18–24, 25–34, 35–44, 45–54, 55–64, ⩾ 65 years), sex, education (bachelor degree or higher, diplomas/certificates/trade, no qualifications) and physical activity — were undertaken to estimate the association between sunburn and risk factors, using Stata SE, version 11.0 (StataCorp).

Results

Response rates were 57% (7537/13 289) and 65% (8938/13 857) in the 2009 and 2010 surveys, respectively. Pooling of the two surveys (results did not differ) provided a total of 16 473 Queensland adults. Of these, 15% lived in North, 20% in Central, 63% in South, and 2% in West Queensland, while 55% lived in major cities, 39% in regional areas and 6% in remote areas, based on census data of the estimated resident population of Queensland. Of the 8150 men, 901 (12.9%, weighted; 95% CI, 11.9%–14.0%) reported being sunburnt the previous weekend, compared with 596 of 8323 women (8.6%, weighted; 95% CI, 7.7%–9.6%) (Box 1). Peak weighted prevalence of 22% (102/459) was among young men aged 18–24 years. There was a clear trend of decreasing sunburn prevalence with increasing age in both sexes ($P < 0.001$), such that sunburn was least common among participants aged ⩾ 65 years (men, 2.2%, weighted [54/1938]; women, 1.8%, weighted [35/1950]) (Box 1).

After adjustment, the strongest predictor of sunburn was youth: people aged 18–24 years were seven times more likely to report being sunburnt than those aged ⩾ 65 years, although adults aged 45–64 years were also at significantly higher risk of being sunburnt than those ⩾ 65 years (Box 2).

Other sunburn predictors were male sex, not having a tertiary education, and being in the workforce. People who had undertaken physical activity in the previous week, regardless of frequency or duration, were more likely to be sunburnt than those who did not. People who undertook the recommended level of physical activity had twice the odds of sunburn of inactive people, while those who undertook one to four sessions were also at risk (Box 2). Those who generally used sunscreen in summer tended to be less likely to be sunburnt than non-users (adjusted OR, 0.86) (Box 2). Although hat-wearing per se was not associated with sunburn after adjustment for confounding factors (Box 2), those who usually sought shade or wore protective clothing in summer also had significantly lower odds of sunburn than those who did not, and respondents' most common explanation for sunburn was failure to use clothing or sunscreen protection (SRHS 2010 only; data not shown).

No other factors, including marital status, body weight, smoking, fruit/vegetable consumption, location of residence, socioeconomic status (Box 2) or skin colour (SRHS 2010 only; data not shown) were associated with sunburn.

Discussion

If sunburn in Australia were reduced, decreased rates of skin cancer would follow.[3] Queensland has the highest melanoma rates in Australia, and Australia and New Zealand have the highest rates in the world.[16] We have shown that around one in 10 Queensland adults report being sunburnt on the weekend in summer. Men were about 50% more likely than women to experience sunburn and adults aged under 65 years were more likely to be sunburnt than those aged 65 years and over. Youngest adults (aged 18–24 years) were sunburnt most often. While people in the workforce and those without tertiary qualifications are more likely to report sunburn than others, this probably reflects sunburn in leisure more than work hours, since weekend sunburn prevalence was assessed. Physical activity was also associated with sunburn.

Our results are broadly consistent with a 2004 Queensland survey showing young age and male sex greatly increase odds of sunburn.[9] An earlier analysis of SRHS 2010 data also showed that people engaging in physical activity were more likely to experience sunburn on the previous weekend and during the past year, especially those who undertook ⩾ 7 hours of activity per week.[17] Sun-safety and physical activity promotion messages must be integrated, acknowledging the importance of both for health and wellbeing.

This study was drawn from adults of all ages across Queensland but excluded households without fixed

2 Characteristics of people sunburnt on the previous weekend, showing prevalence distribution and associated odds ratio (OR) of being sunburnt

Characteristic	Proportion sunburnt (95% CI)	Weighted OR* (95% CI)	*P*	Adjusted OR† (95% CI)	*P*
Age, years			< 0.001		< 0.001
18–24	18.8% (15.7%–22.3%)	11.46 (8.18–16.04)		7.35 (5.09–10.62)	
25–34	15.0% (13.0%–17.2%)	8.74 (6.45–11.85)		5.95 (4.23–8.36)	
35–44	12.9% (11.5%–14.5%)	7.36 (5.52–9.83)		5.22 (3.78–7.22)	
45–54	10.3% (9.03%–11.6%)	5.67 (4.23–7.60)		4.04 (2.91–5.60)	
55–64	6.1% (5.2%–7.1%)	3.20 (2.35–4.36)		2.23 (1.59–3.14)	
⩾ 65	2.0% (1.5%–2.5%)	1‡		1‡	
Sex			< 0.001		< 0.001
Female	8.6% (7.7%–9.6%)	1‡		1‡	
Male	12.9% (11.9%–14.0%)	1.57 (1.34–1.82)		1.47 (1.25–1.72)	
Highest level of education			< 0.001		< 0.001
Bachelor degree or higher	9.1% (7.9%–10.6%)	1‡		1‡	
Diploma/certificate/trade	13.2% (12.0%–14.5%)	1.51 (1.24–1.84)		1.56 (1.27–1.91)	
No post-school qualifications	9.2% (8.2%–10.4%)	1.01 (0.82–1.25)		1.28 (1.03–1.61)	
Employment status			< 0.001		< 0.001
Employed	13.3% (12.4%–14.3%)	1‡		1‡	
Retired	2.1% (1.6%–2.6%)	0.14 (0.11–0.18)		0.46 (0.32–0.64)	
Student/carer/unemployed	10.2% (8.4%–12.2%)	0.74 (0.59–0.92)		0.71 (0.56–0.91)	
Marital status			0.005		0.85
Married/de facto	10.0% (9.3%–10.8%)	1‡		1‡	
Not married/separated/widow	12.4% (10.9%–14.1%)	1.27 (1.07–1.51)		0.98 (0.81–1.20)	
Fruit and vegetable intake§			0.08		0.63
Not meeting recommendations	10.9% (10.2%–11.7%)	1.30 (0.97–1.74)		1.08 (0.79–1.46)	
Meeting recommendations	8.6% (6.7%–11.1%)	1‡		1‡	
Smoking status			< 0.001		0.16
Not a daily smoker	10.2% (9.4%–11.0%)	1‡		1‡	
Daily smoker	13.7% (11.9%–15.6%)	1.40 (1.17–1.67)		1.15 (0.95–1.39)	
Body mass index, kg/m^2			0.83		0.22
< 18.5	12.9% (8.2%–19.6%)	1.28 (0.76–2.14)		1.33 (0.76–2.31)	
18.5–24.9	10.4% (9.2%–11.6%)	1‡		1‡	
25–29.9	11.2% (10.0%–12.4%)	1.09 (0.91–1.29)		1.20 (1.00–1.45)	
30–39.9	10.8% (9.3%–12.4%)	1.04 (0.85–1.27)		1.24 (1.00–1.53)	
⩾ 40	10.7% (6.8%–16.4%)	1.04 (0.62–1.72)		1.23 (0.72–2.09)	
Physical activity¶			< 0.001		< 0.001
No physical activity	5.8% (4.4%–7.5%)	1‡		1‡	
Insufficient time or sessions	10.2% (9.0%–11.5%)	1.85 (1.36–2.53)		1.66 (1.21–2.29)	
Sufficient time and sessions	13.6% (12.5%–14.7%)	2.57 (1.90–3.46)		2.13 (1.57–2.89)	
Use sunscreen in summer			0.99		0.07
No	10.7% (9.7%–11.8%)	1‡		1‡	
Yes	10.7% (9.8%–11.7%)	1.00 (0.86–1.16)		0.86 (0.73–1.01)	
Wear hat in summer			0.77		0.11
No	10.9% (9.5%–12.6%)	1‡		1‡	
Yes	10.7% (9.9%–11.5%)	0.97 (0.81–1.16)		1.17 (0.96–1.41)	
SEIFA			0.36		0.44
Disadvantaged	10.2% (8.9%–11.7%)	1.05 (0.82–1.35)		1.20 (0.92–1.56)	
Quintile 2	11.2% (9.7%–12.8%)	1.16 (0.90–1.50)		1.18 (0.90–1.54)	
Quintile 3	10.5% (9.1%–12.0%)	1.08 (0.84–1.39)		1.12 (0.87–1.46)	
Quintile 4	12.0% (10.4%–13.9%)	1.26 (0.98–1.63)		1.29 (0.99–1.68)	
Advantaged	9.8% (8.2%–11.6%)	1‡		1‡	
ARIA+			0.47		0.53
Major cities	10.4% (9.4%–11.5%)	1‡		1‡	
Inner regional	11.8% (10.3%–13.5%)	1.15 (0.95–1.39)		1.16 (0.95–1.42)	
Outer regional	10.6% (9.3%–12.1%)	1.02 (0.85–1.22)		1.05 (0.87–1.27)	
Remote/very remote	10.2% (8.4%–12.3%)	0.97 (0.76–1.24)		1.01 (0.78–1.31)	
Geographical location**			0.15		0.41
North Queensland	10.9% (9.6%–12.5%)	1.04 (0.87–1.24)		1.00 (0.83–1.21)	
West Queensland	12.8% (11.2%–14.6%)	1.24 (1.03–1.49)		1.16 (0.95–1.41)	
Central Queensland	10.9% (9.5%–12.6%)	1.04 (0.86–1.25)		1.11 (0.91–1.35)	
South Queensland	10.6% (9.7%–11.6%)	1‡		1‡	

ARIA+ = Accessibility/Remoteness Index for Australia.[14] SEIFA = Socio-Economic Indexes For Areas.[15] *Population-weighted (based on 2008 estimated resident Queensland population, http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3235.02008?OpenDocument) analyses unadjusted. † Population-weighted (based on 2008 estimated resident Queensland population) analyses adjusted for age, sex, physical activity and education level. ‡ Reference group. § National Health and Medical Research Council dietary guidelines for Australian adults.[12] ¶ Department of Health and Ageing national physical activity guidelines for adults.[13] ** North Queensland = Cairns and Hinterland, Mackay, Torres Strait Island, Townsville; West Queensland = Cape York, Central West, Mt Isa, South West Queensland; Central Queensland = Central Queensland, Darling Downs/West Moreton and Wide Bay; South Queensland = Sunshine Coast, Metro North, Metro South and Gold Coast. ◆

telephones, and restricted detail was available about timing of physical activity in relation to sunburn. However, we have shown that despite half a century of campaigns, sun protection in Queensland remains far from optimal. Vigilance to avoid sunburn is essential among active adults. Men still are more likely to be sunburnt and need targeted encouragement to practise prevention measures. By experiencing sunburn, often repeatedly,[9] Queenslanders are driving their already high risk of skin cancer higher.[3] In Victoria, where the SunSmart program originated, prevention programs have recently stalled.[8] Redoubled efforts are required through television and other media campaigns to improve sun-protection and ultimately reduce skin cancer.

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