WISCONSIN Comprehensive Cancer Control Program

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Ultraviolet Radiation and Wisconsin: Opportunities to Reduce Wisconsin Youth Exposure

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BACKGROUND

Skin cancer is the most common form of cancer in the United States.[1] Skin cancer is the uncontrolled growth of abnormal skin cells, and comes in three forms: basal cell, squamous cell carcinomas, and melanoma.[2] Basal cell and squamous cell carcinomas are the most common types of skin cancer and are largely curable, but in some cases can be disfiguring and/or costly to treat. Melanoma, the third most common skin cancer, is the most dangerous form of skin cancer because it has a high probability of spreading when it is not caught at an early stage and, as a result, causes the most deaths.[3] In 2014, the United States Surgeon General released a *Call to Action to Prevent Skin Cancer* raising the importance of this topic on a national scale.[4] This Wisconsin CCC Issue Brief considers youth exposure to ultraviolet (UV) radiation in Wisconsin and details opportunities for prevention of future skin cancer cases.

SKIN CANCER BY THE NUMBERS

In Wisconsin, while data on basal and squamous cell carcinomas are not collected by the state cancer registry,[5] data shows that the number of melanoma cases is increasing. From 1995-2012, the number of melanomas diagnosed annually in Wisconsin more than doubled from 574 to 1,451.[6,7] Age-adjusted incidence rates over this time period also show a two-fold increase from 11.2 cases per 100,000 in 1995 to 22.5 cases per 100,000 in 2012. While age-adjusted mortality held steady, roughly 153 Wisconsinites died from this cancer each year.[7,8] Melanoma is a particular concern for adolescents and young adults (aged 15-39 years) because it is the third most common cancer in this age group.[4] In the US, 5 million people are being treated for skin cancer each year, and treatment for skin cancer costs $8.1 billion annually.[4]

Key Points

- Melanoma is the most deadly form of skin cancer. Melanoma cases are increasing in Wisconsin.
- Several factors are associated with increased risk for developing melanoma, including but not limited to frequent sunburns, indoor tanning use, and lighter complexions.
- Only 3 out of 20 high school students in Wisconsin wear sunscreen most of the time or always.
- One in 5 female high school students in Wisconsin have used an indoor tanning device in the past year.
- Potential policies employed around the US and Canada to prevent skin cancer include:
  - sun protective gear allowed in schools,
  - required education of skin cancer prevention,
  - integrating shade policies in public spaces,
  - indoor tanning restrictions for minors
- Policies that include both education and regulation to encourage skin cancer prevention are all strategies that could potentially curb the increasing rate of melanoma in Wisconsin.

Risk Factors

Several factors are associated with increased risk for developing melanoma, including but not limited to frequent sunburns, indoor tanning use, and lighter complexions.[9]

Frequent Sunburns

Sunburns increase one's risk of developing melanoma. Five or more sunburns during a person's life doubles their risk for melanoma.[10] Protective skin behaviors are especially important during childhood as five or more sunburns during this period of life increases the risk of melanoma by 80%.[11]

Indoor Tanning

As many as 90% of melanomas are estimated to be caused by UV radiation exposure from the sun or indoor tanning devices.[12,13] Indoor tanning, or tanning with the use of a sunlamp, is a source of UV radiation[2] as intense as the sun at its highest peak of the day.[14] Using an indoor tanning device just once increases an individual's risk for developing melanoma by 15% and individuals who use indoor tanning devices before the age of 35 are at a 75% higher risk in developing melanoma.[15] One review of the literature suggests that each year roughly 419,000

cases of skin cancer are attributable to indoor tanning – over 6,000 of which are melanomas.[16]

Complexion

Individuals with lighter skin complexions burn more easily when exposed to UV radiation and are at an increased risk of developing skin cancers, including melanoma.[17] As such, skin cancer is most likely to be diagnosed in those with lighter complexions. Still, skin cancer poses a considerable health risk for all individuals[18] and disparities in mortality exist for some vulnerable populations. For example, studies find that Blacks in the US have proportionally higher mortality rates from skin cancer than Whites in spite of having a lower relative incidence of the disease.[18] Delayed treatment or a lack of knowledge about risk could be factors that fuel disparities.

UV RADIATION EXPOSURE IN WISCONSIN YOUTH

Data tables from the 2013 Youth Risk Behavior Survey (YRBS) are presented to illustrate trends in UV radiation exposure among Wisconsin youth. The YRBS is an ongoing, nationally representative sample of the US population, conducted primarily through in-person household interviews.[19] The YRBS was administered to 2,843 students in 53 public schools in Wisconsin during the spring of 2013, with a school response rate of 82%, student response rate of 84%, and overall response rate of 68%. **Table 1** presents the percentage of the sample who responded: "most of the time" and "always" – as opposed to "never", "rarely", and "sometimes" – to the question: "When you are outside for more than one hour on a sunny day, how often do you wear sunscreen with an SPF of 15 or higher?"

TABLE 1. Percentage of students who most of the time or always wear sunscreen with an SPF of 15 or higher when they are outside for more than one hour on a sunny day by race/ethnicity, grade level, and gender

	Wisconsin			US		
	Male	Female	All	Male	Female	All
Overall	10.1	19.8	14.8	6.9	13.2	10.1
Race/Ethnicity						
White	10.6	21.2	15.7	7.9	15.1	11.5
Black	6.5+	6.5+	6.5+	3.3	6.0	4.7
Asian	4.5+	25.5+	15.4+	8.0	14.0	16.3
Hispanic	8.7	14.9+	11.0	6.2	11.7	9.0
Grade						
9th	9.7	20.8	15.1	6.7	12.6	9.6
10th	14.3	23.9	18.9	7.1	13.9	10.5
11th	6.7	18.9	12.4	5.4	12.6	9.1
12th	9.7	16.4	13.0	8.4	13.8	11.1

+ Fewer than 100 students in these subgroups responded to the survey. While these estimates are the best available for the data points, they are unlikely to be wholly representative of the population of interest.

TABLE 2. Percentage of students who used an indoor tanning device such as a sunlamp, sunbed, or tanning booth one or more times during the past 12 months by race/ethnicity, grade level, and gender

	Wisconsin			US		
	Male	Female	All	Male	Female	All
Overall	6.0	20.5	13.0	5.3	20.2	12.8
Race/Ethnicity						
White	5.4	23.6	14.3	6.1	30.7	18.3
Black	10.9+	0+	6.4+	3.2	2.5	2.8
Asian	9.1+	4.2+	6.5+	4.4	3.4	3.9
Hispanic	6.7	10.6+	6.7	4.4	7.9	6.2
Grade						
9th	4.0	6.0	5.0	3.9	12.9	8.4
10th	4.2	11.4	7.6	4.3	19.0	11.7
11th	6.0	29.8	17.3	4.0	23.0	13.9
12th	10.1	33.2	21.5	9.1	18.2	27.2

+ Fewer than 100 students in these subgroups responded to the survey. While these estimates are the best available for the data points, they are unlikely to be wholly representative of the population of interest.

This table presents comparisons between Wisconsin and the US as a whole as well as categorization by sex, race/ethnicity and grade-level. **Table 2** presents responses to the question: "During the past 12 months, how many times did you use an indoor tanning device such as a sunlamp, sunbed, or tanning booth?" Responses to this question were dichotomized into those who reported any use and those who reported no use.

DISCUSSION

Only 3 out of 20 high school students in Wisconsin (14.8%) wear sunscreen most of the time or always (**Table 1**). Female high school students in Wisconsin (19.8%) and across the US (13.2%) use sunscreen roughly two times more than male students (10.1% and 6.9%, respectively). Of all students in Wisconsin and nationally, non-Hispanic white females wear

recommended sunscreen most frequently, however recommended sunscreen use decreases among females by grade level. In 10th grade 6 out of 25 Wisconsin females use sunscreen as recommended, however, usage at the recommended level drops to 4 out of 25 by 12th grade.

One of 5 female high school students in Wisconsin use indoor tanning devices, similar to the national rate (**Table 2**). Female high school students, both in Wisconsin (20.5%) and nationally (20.2%), use indoor tanning devices three times more than male students (6.0% and 5.3%, respectively). However, both male and female Wisconsin students indicate increased use of indoor tanning devices by grade level. Wisconsin female students exhibit the sharpest increase in indoor tanning use from 9th grade (6.0%) to 12th grade (33.2%).

SKIN CANCER PREVENTION POLICIES

Promotion of Skin Protective Behaviors

Various states and localities are implementing policies to promote skin protective behaviors. In Wisconsin, state statute requires parental permission for students to be administered a nonprescription drug product and for many schools this includes sunscreen.[20] Moreover, local school dress codes often prohibit wearing sunglasses or hats. A few states, including New York and California, have passed laws to add exceptions for schools to allow the use of sunscreen (New York and California) and sun-protective clothing (California only)[4] providing an opportunity for students to protect their skin while outdoors during school. Wisconsin does not specifically require skin cancer prevention be taught as a part of health education. However, skin cancer prevention would be considered part of Standard 1: "Students will comprehend concepts related to health promotion and disease prevention to enhance health" in Wisconsin's Health Education Standards.[21] Arizona and New York have mandated that skin cancer prevention be included in health education.[4]

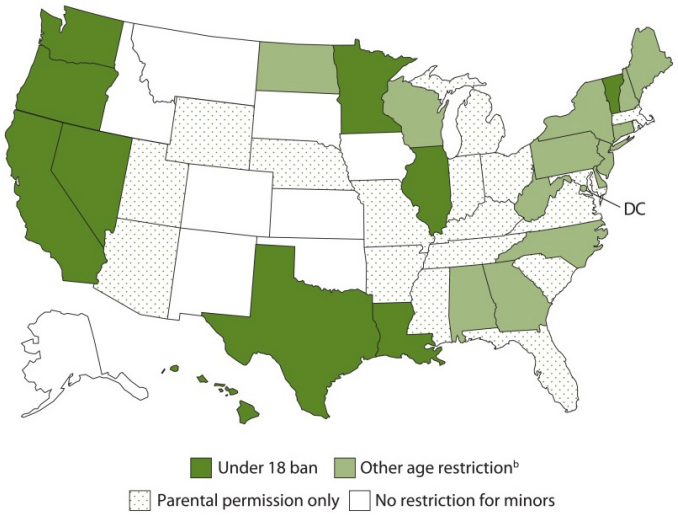
Another policy strategy for promoting sun protection is through natural or built shade structures. Shade structures can provide sun protection in parks, school playgrounds, and public gathering places. The City of Toronto, Canada has adopted and is implementing a "Shade Policy and Guidelines" to ensure shade is a key consideration in planning and design of all city owned and operated outdoor venues.[22]

Indoor Tanning

Policies relating to indoor tanning are of particular importance for skin cancer prevention, as the use of tanning beds increases your risk for melanoma.[15] In 2009, the International Agency for Research on Cancer (IARC) classified indoor tanning devices to its highest cancer risk category – "carcinogenic to humans"; the same risk category as tobacco.[23] More recently, in May of 2014, the US Food and Drug Administration reclassified sunlamp products (including tanning beds and tanning booths) from a low risk (class I) to a moderate risk (class II) device. This allows the FDA more regulatory control. With this new reclassification, the FDA now requires these devices to carry a visible black box warning stating that the device should not be used on persons under the age of 18 years.[24] However, this is a suggestion and not a statutory requirement for users.

Wisconsin law bans tanning only for minors under age 16. On occasion, exceptions have been approved for those under 16 to use tanning booths, but only with a physician's order. These are handled on a case-by-case basis and must be approved by the state

FIGURE 1: Legislative Restrictions on Access to Indoor Tanning by Minors in the United States[a]



[a] Map represents legislation passed before July 10, 2014.

Note: State laws in Oregon and Washington allow minors younger than age 18 years to use indoor tanning facilities with a doctor's prescription.

[b] Defined as a restriction for any other age group, including for minors younger than age 17, 16, 15, or 14 years.

Source: National Conference of State Legislatures, Indoor Tanning Restrictions for Minors: A State-by-State Comparison website (http://www.ncsl.org/research/health/indoor-tanning-restrictions.aspx) and AIM at Melanoma, 2014 Indoor Tanning Legislation website (http://www.aimatmelanoma.org/en/aim-for-a-cure/legislative-accomplishments-in-melanoma/2014-indoor-tanning.html).

health department (based on Wis. Code Ann. § 255.08 (9)(a)).[25] Currently, 16 states, including Minnesota and Illinois, have passed laws that ban minors under age 18 from using an indoor tanning facility.[24] See **Figure 1** on page 3 for a map of legislative restrictions.

POLICY IMPLICATIONS

Wisconsin could be doing more to encourage the prevention of skin cancer. In line with the 2014 Surgeon General's Call to Action, the soon to be released Wisconsin Comprehensive Cancer Control Plan 2015-2020 includes a priority on decreasing exposure to UV radiation with strategies that include education about skin cancer prevention, increasing opportunities for outdoor sun protection, and decreasing the use of tanning beds.

As evidenced from the data collected through the Wisconsin YRBS, very few high school females in 9th grade and 10th grade have used a tanning bed at least once in the past year, however, that number jumps to almost 1 in 3 in 11th and 12th grade (approximately females aged 16-18) students who fall outside of current Wisconsin law. Further, when compared to national usage rates among females in 9th and 10th grades, Wisconsin's rates (6.0% and 11.4%) are about half the nationwide percentages for that same age group (12.9% and 19.0%, respectively), while Wisconsin 11th and 12th grade females are tanning at a much higher rate (29.8% and 33.2%) then their national peers (23% and 18%). Research has found that indoor tanning laws that have age restrictions seem to be effective in reducing indoor tanning.[26] Wisconsin data suggests that the ban on those under 16 years old has been effective in preventing the majority of this age group from using tanning beds.

Another concern is a potential lack of enforcement around laws and recommendations for tanning salons. A 2012 investigative report, which surveyed tanning salons across the country with at least three from every state, found that nearly all the salons denied the known risks of indoor tanning and many failed to follow FDA regulations on tanning frequency while using a variety of approaches to downplay the health risks of indoor tanning. The report also found that 4 out of 5 salons falsely claimed that indoor tanning is beneficial to a young person's health and targeted teenage girls in their advertisements.[27]

Currently the Wisconsin Department of Health Services (WI DHS) must regulate tanning facilities as outlined in State Statute 255.08, and can issue fines between $50 and $250 for violations.[25] The WI DHS administers a $10 registration fee per tanning facility annually, regardless of the number of beds the facility has. While the WI DHS has regulatory authority of tanning salons, they do not have the adequate capacity to monitor the 1044 tanning facilities currently registered in Wisconsin.[28] The 2015-2017 Wisconsin state budget proposes to move regulation of tanning facilities and operators to a newly created Department of Financial Institutes and Professional Standards; if passed this may mean changes for how tanning facilities are regulated.[29]

The density of tanning salons is also worth considering. Research indicates that availability of tanning salons may increase use.[30] According to a study of Wisconsin published in 2009, there were 31 tanning salons in Madison which is almost 15 salons per 100,000 people. In Milwaukee, the study found that there were 68 tanning salons; which amounts to roughly 11 salons per 100,000 people. While business related data changes somewhat from year to year, comparing these numbers to Midwestern neighboring cities paints an interesting picture. Minneapolis, Minnesota has a density of 10 salons per 100,000 and Chicago, Illinois has a density of barely 5 tanning salons per 100,000 people.[30] As such, regulation of the number of many salons allowed to operate within a municipality may be another potential option to prevent dangerous exposures to UV radiation.

Finally, as presented in the YRBS data above, the overall lack of sunscreen use by Wisconsin high school students on a regular basis is concerning. Skin cancer prevention education standards, as well as educational materials directly targeted for disparate populations, would contribute to raising awareness about the importance of sun protective behaviors. Integrating shade structures into parks, school playgrounds, and public gathering places is one way to create an environment that helps to minimize excessive UV radiation exposure. Policies that include both education and regulation to encourage skin cancer prevention are all strategies which could potentially curb the increasing rate of melanoma.

This Issue Brief is a collaborative effort between the Wisconsin CCC Program and the Wisconsin Environmental Public Health Tracking Program. The Wisconsin Environmental Public Health Tracking Program houses and analyzes data on nearly a dozen environmental public health topics. Subscribe to the Wisconsin Tracking newsletter and visit their webpage to get the latest news and data updates.

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