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Community Variation in Adolescent Access to Indoor Tanning Facilities

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Abstract

Melanoma rates among younger women in New Hampshire (NH) are rising. In urban studies, youth proximity to tanning facilities has been linked to indoor tanning, a proven cause of melanoma. Youth access has not been examined in rural settings. To determine on a statewide basis the influence of rurality and community income level on female students' ease of access to tanning facilities, all NH tanning facilities (N = 261) and high schools (N = 77) in 2011 were spatially and statistically analyzed to determine schools with more facilities within 2 miles of the school and greater capacity (fewer female students per facility), for indoor tanning. Schools above the state-wide average for both measures were classified as "Easy Access" to indoor tanning. Among NH high schools, 74 % have 1 or more tanning facility within two miles and 22 % have "Easy Access" to tanning facilities. Ease of access did not differ by rurality. Lower-income school status was an independent predictor of both greater capacity and "Easy Access". While urban and rural teens have similar access to indoor tanning, female students in lower-income communities have easier access. Variations in access by community size and income must be considered in planning interventions to address youth indoor tanning.

Keywords

Recreational tanning; Skin neoplasms; Adolescence; Rural communities

Introduction

Melanoma rates are increasing nationally and in New Hampshire (NH). There is a greater increase among younger females in NH where the prevalence of melanoma among NH white women ages 15-39 is now 38 % higher than the national average [1] Recently a direct

relationship has been shown between tanning bed use by adolescents as young as age 15 and later skin cancers [2]. Despite the known risk, indoor tanning bed use is on the rise, and is most common among young females [3]. Each state is responsible for its own legislation on this subject, and although NH laws require parent [4], indoor tanning remains popular across the state.

The more access a teen has to a facility, the more likely they are to engage in this risky behavior. According to the City 100 study [5], urban adolescents living within two miles of a tanning salon were 40 % more likely to have used indoor tanning, thus demonstrating that proximity to tanning facilities influences use. Additionally, community economic status plays a role in tanning. Within larger cities, lower household median income has been associated with a greater density of tanning [6]. These issues have not been explored outside of urban settings.

This report seeks to expand on earlier work by determining the influence of rurality and community income level on tanning facility accessibility for female high school students for the entire state of New Hampshire.

Methods

Data on school size and location was obtained from the National Center for Education Statistics for 77 NH grade 9–12 schools (public, charter and private) with a minimum enrollment of 100 students. Females were assumed to be 50 % of the students. Schools were classified as lower or higher income schools based on whether they were above or below the statewide mean of 24.8 % for students eligible for free or reduced lunch (families with income <185 % of the Federal poverty level) [7]. Each school was assigned to a two-tiered consolidation of the Rural Urban Commuting Area code based on the school's census tract (urban/suburban vs. small town/rural) [8]. Physical addresses of all tanning facilities registered in 2011 were obtained from the State of New Hampshire (n = 261). In NH all facilities are licensed by the state.

Measures

Using ArcGIS v10 to geocode the tanning facilities within a 2 mile radius of each school, two measures were created: *Exposure* was the count of tanning facilities and *Capacity* was the number of female students per tanning facility.

Schools that had exposure values above the state mean had more nearby facilities and were classified as “High Exposure”. Schools with capacity values below the mean had fewer adolescent females per facility and were classified as “High Capacity”. Schools that are both “High Exposure” and “High Capacity” were classified as having overall “Easy Access”.

Analysis

Bivariate analyses used Chi square and as indicated non-parametric tests (Mann–Whitney) to accommodate the skewed data. The predictive power of both rurality and low-income status on “Easy Access” was determined with an ANOVA test. Statistical analysis was performed using SPSS v. 20.

Results

Seventy-four percent of high schools in New Hampshire have at least one tanning facility within two miles of the school. The average number of tanning facilities within two miles of a high school was 2.4 and the average number of female students per tanning facility within two miles was 147. Among the schools, 25 (32.5 %) were High Exposure, 27 (35.1 %) were

High Capacity, and 17 schools (22.1 %) met both criteria, thus providing Easy Access to indoor tanning. The distribution of these High Exposure, High Capacity and Easy Access schools across the state of New Hampshire is shown in Fig. 1. Schools not meeting any of these criteria are designated as other on the map. Schools with Easy Access are distributed throughout the state, except for in southwestern NH.

Adolescent exposure to and the capacity of tanning establishments did not vary significantly based on rurality. Easy Access also did not vary by rurality. Examination of the differences by school income status showed that low-income schools were more than four times more likely to be High Capacity locations (Table 1). Low income schools averaged one tanning establishment within two miles of the school for every 89 females and non-low income schools had one per 167 female students (Mann–Whitney U test, $p < .01$). In addition, Easy Access to tanning establishments was more than double for low-income schools than non low-income schools.

Examination of the influence of factors, rurality and community income, on Easy Access shows that only community income level was a significant predictor (Anova $\beta = 1.43$, $p = .02$).

Discussion

These results demonstrate that availability of indoor tanning for adolescent females varies not by the size of the community but by community income level. A similar relationship between community income level and tanning facilities as found in the nation's largest cities was present in a state without large cities.

In our study school location was used because home addresses were not available. The assumption was made that proximity to an adolescent's school, where they spend the majority of their time, is as valid as studies examining proximity from home in urban settings with more dense populations. Both methods have similar results. We found 74 % of teens went to school within 2 miles of a tanning facility and in earlier studies of large cities 76 % of teens lived within 2 miles of a tanning facility (City 100, 2008).

Many of the 27 High Capacity schools are located in rural communities with smaller populations where adolescent tanning opportunities might be ignored when only looking at the number of facilities. We have shown that, when addressing teen tanning, it is important to assess the number of teens per nearby facility, particularly in rural settings. Youth in low-income communities with Easy Access to indoor tanning may be particularly vulnerable to indoor tanning and are appropriate to be targeted with education and prevention efforts.

This analysis is limited to only one state, however it provides a model that can be replicated in other settings. A more significant limitation to this study is that, while this study examines factors making access to tanning easier, it does not report on individual use of tanning facilities. Further research is necessary to explore the actual use by adolescents in these communities as tanning behavior data is available on community and school behavioral risk surveys.

In the meantime, however, the easy access to tanning facilities allowed to many teens across the state with parental permission demonstrates the need for primary care counseling [9] public education and stricter state laws in order to stem this behavior increases adolescents' risk of skin cancer.

Conclusion

While tanning establishment locations are convenient for youth, this study demonstrates that two factors of access, proximity to tanning facilities and the student facility ratio, together can further define communities where youth will find it easy to tan indoors. Ease of access should be considered when planning interventions to address teen tanning.

Acknowledgments

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Fig. 1. NH schools with high exposure, high capacity, and easy access in 2011

Table 1
Differences in the three key access variables in 2011 by community income classification

	Low income community (n = 20)	Non low-income community (n = 57)	Total (n = 77)	p value
High exposure	45 % (9/20)	28.1 % (16/57)	32.5 % (25/77)	.164
High capacity	70 % (14/20)	22.9 % (13/57)	35.1 % (27/77)	.000
Easy access	40 % (8/20)	15.8 % (9/57)	22.1 % (17/77)	.025

High exposure = greater than the state average for number of tanning facilities within two miles of the community high school

High capacity = less than the state average of number of female high school students per tanning facility within two miles of the community high school

Easy access = Schools with both high exposure and high capacity status

Lower income community = Schools with greater than the state average of students in the school receiving reduced or free school lunch (<130 % federal poverty level)