



## Correspondence

## Trends in the number of indoor tanning facilities and tanning beds licensed in North Carolina

## ARTICLE INFO

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## 1. Introduction

Indoor tanning increases the risks of skin cancers, including melanoma (Schulman and Fisher, 2009). In the U.S., 20% of young white females report tanning bed use in the past year (Guy et al., 2017). However, tanning bed use has recently declined among this group, as well as all American adults (Guy et al., 2017). Factors contributing to these declines may include youth access restrictions, taxation, educational campaigns, and changes in social norms (Holman et al., 2013). Additionally, research in other health areas suggests that availability may influence indoor tanning use. For example, greater density of tobacco retailers is associated with increased youth smoking (Henriksen et al., 2008). Similar to other harmful products, changes in the retail environment that affect the availability of tanning beds may influence tanning behaviors. We sought to examine trends in the number of tanning facilities and tanning beds licensed in North Carolina.

## 2. Methods

The North Carolina Department of Health and Human Services provided data on the number of licensed tanning facilities and number of tanning beds in each facility for the years 2012–2019 (all years available) in North Carolina. We used simple linear regression with bootstrapped standard errors (100 replications) to estimate the average change in total number of tanning facilities and number of tanning beds (dependent variables) per year (independent variable).

## 3. Results

The total number of licensed tanning facilities declined 45%, from 1379 in 2012 to 757 in 2019. The average decline was 93 facilities per year (95% CI = -101, -84,  $p < 0.001$ , Fig. 1). Similarly, the total number of licensed tanning beds in North Carolina also declined during the study period, from 6758 to 4057 (40% decline). The average decline was 413 tanning beds per year (95% CI = -452, -373;  $p < 0.001$ , Fig. 1).

## 4. Discussion

The total number of tanning facilities and tanning beds licensed in North Carolina significantly declined between 2012 and 2019. These findings are consistent with recent national data showing significant declines in indoor tanning prevalence (Guy et al., 2017). Furthermore, data from the North Carolina Youth Risk Behavior Survey show that past-year tanning bed use significantly declined between 2013 and 2017 among high schoolers (North Carolina High School Survey Trend Analysis Report, 2018). Future research is needed to assess the relationship between availability and use, as well as how policies (e.g., youth access restrictions, taxation) affect availability.

This study is the first to our knowledge to use licensing data to assess trends in tanning facilities and tanning beds. A previous study using business and marketing directories reported a decline in indoor tanning facilities in Ontario, Canada between 2001 and 2017 (McWhirter et al., 2018).

Our findings should be interpreted in light of several limitations. First, the time period for which data were available precludes evaluation of the impact of policy interventions (e.g., federal tanning tax) on the availability of indoor tanning facilities. Further, in the absence of a national database of tanning facilities, our study used data from a single state. Other states may wish to replicate our approach, given that regional trends may differ.

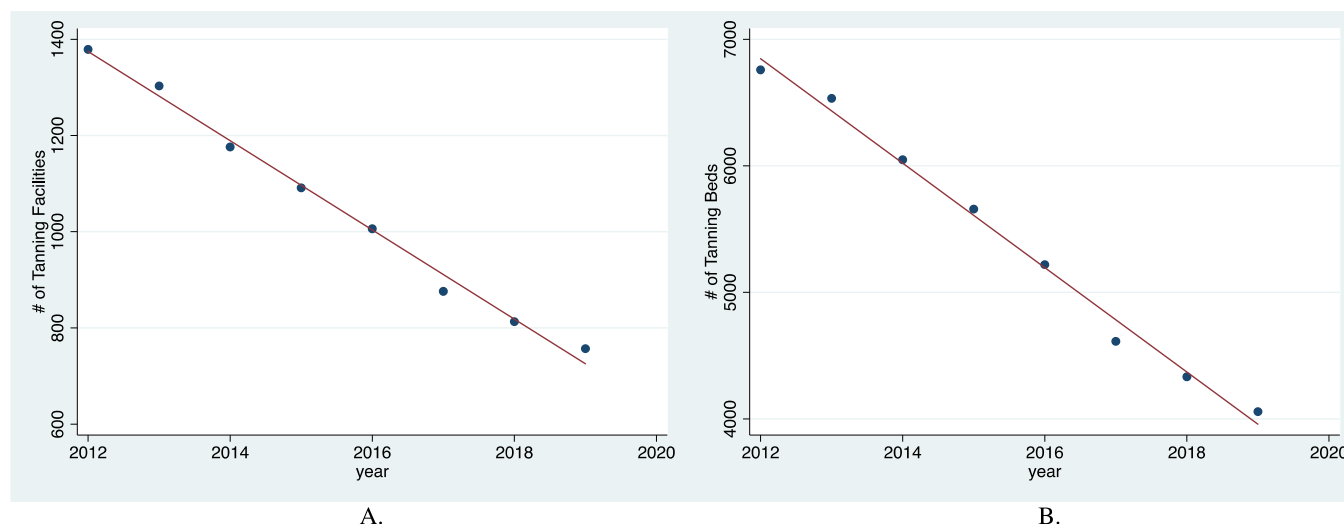
Consistent with declining national and statewide trends in tanning prevalence, the number of indoor tanning facilities and tanning beds in North Carolina has significantly declined in recent years. Thus, the availability of an important and avoidable cause of cancer has been diminishing. Similar to other carcinogenic products like tobacco and alcohol (Henriksen et al., 2008; Single et al., 1988), tanning bed availability may affect indoor tanning behaviors. Continued retail surveillance is needed to monitor changes in the indoor tanning industry and to evaluate the impact of those changes on indoor tanning behaviors.

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**Fig. 1.** Scatter plots with lines of best fit for the annual number of tanning facilities (Panel A) and tanning beds (Panel B) licensed in North Carolina between 2012 and 2019. Coefficient of determination ( $R^2$ ) values for Panel A and Panel B were 0.992 and 0.992, respectively.

## 5. IRB approval status

No human subjects were involved in the study.

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## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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