Skin cancer incidence is rising in the United States despite public health efforts encouraging skin cancer prevention\(^1\). Additional public health interventions are needed to combat rising rates of skin cancer and inadequate sun protective behaviors.

### METHODS

- **BACKGROUND**
  - The National Health Information Survey (NHIS) was examined over a ten-year period from 2005 to 2015\(^2\).
  - NHIS conducts representative population-based annual interviewing of the adult US population.
  - Response rates ranged from 70.1% to 80.7% during the examined period\(^2\).
  - Our outcomes of interest were:
    - Use of sun protective measures (including sun avoidance, protective clothing, and sunscreen use).
    - Lifetime history of full body skin examination (FBSE) by a physician.
  - History in the past year of indoor tanning.
  - History in the past year of two or more sunburns.
  - Use of sun protective measures were defined as use always or most of the time when outside for more than one hour on a warm sunny day.
  - Protective clothing included at least one of the following: long pants, hat, or long-sleeved shirt.
  - Individuals that were excluded from analysis included:
    - Individuals who answered the sun protection questions by stating they “don't go out in the sun”\(^3\).
    - Individuals with unknown or missing responses.
  - Multivariable logistic regression analyses were used with adjustment for sex, region, health insurance, alcohol use, smoking status, education, personal and family histories of skin cancer, income, race, and skin reaction to the sun.
  - NHIS imputed data was used due to substantial missing data for income\(^4\).

### OBJECTIVES

- **Analysis of temporal trends of skin-cancer related preventive behaviors to examine for potential areas for improvement**.
- **Primary (concerned with disease prevention) and secondary (concerned with early disease detection) preventive behaviors were examined**.

### RESULTS

#### TABLE 1: Unadjusted and Adjusted Prevalences of Sun Protective Behaviors by Survey Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Unadjusted Prevalence, % (95% CI)</th>
<th>P value*</th>
<th>Adjusted Prevalence value†</th>
<th>Year</th>
<th>Adjusted Prevalence, % (95% CI)</th>
<th>P value†</th>
<th>Adjusted Prevalence value‡</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>Sun Avoidance</td>
<td>31.1 (30.2-32.3)</td>
<td>&lt;0.001</td>
<td>31.7 (30.9-32.6)</td>
<td>2005</td>
<td>Sun Avoidance</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Protective Clothing</td>
<td>35.5 (34.7-36.3)</td>
<td>&lt;0.001</td>
<td>35.9 (35.1-36.7)</td>
<td>2010</td>
<td>Protective Clothing</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Sunscreen Use</td>
<td>30.6 (29.8-31.3)</td>
<td>&lt;0.001</td>
<td>31.5 (30.7-32.2)</td>
<td>2015</td>
<td>Sunscreen Use</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Full Body Skin Exam</td>
<td>18.1 (17.4-18.7)</td>
<td>&lt;0.001</td>
<td>19.1 (18.4-19.6)</td>
<td>2010</td>
<td>Full Body Skin Exam</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Indoor Tanning</td>
<td>14.8 (14.1-15.5)</td>
<td>&lt;0.001</td>
<td>14.1 (13.5-14.8)</td>
<td>2015</td>
<td>Indoor Tanning</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Sunburn</td>
<td>18.7 (18.1-19.3)</td>
<td>&lt;0.001</td>
<td>18.2 (17.7-18.8)</td>
<td>2015</td>
<td>Sunburn</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Table 1: Unadjusted and adjusted prevalence of sun protective behaviors by survey year. Adjusting covariates include sex, census region, health insurance coverage, alcohol use, smoking status, education level, personal history of skin cancer, family history of skin cancer, income, race, and skin reaction to the sun. Bolded adjusted p values represent significant changes in behaviors.

### CONCLUSIONS

- Indoor tanning is substantially decreasing, implying the success of targeted legislative and public health efforts\(^2\).
- Rates of primary and secondary skin protective behaviors remain suboptimal.
- The prevalence of multiple sunburns is rising.
- Rise in sunburns could be due to heightened sun awareness causing increased reporting or inadequate use of sun protection.

### LIMITATIONS

- NHIS survey reflects the United States population making our conclusions less generalizable to individuals in other countries.
- Temporal trends were only analyzed over a 10 year period.
- The influence of climate change was not considered in our analysis.

### FUTURE DIRECTIONS

- Further research needs include:
  - How the prevalence of multiple sunburns is rising.
  - The impact of increased adoption of sun protective behaviors affects skin cancer incidence.
  - Previous success of public health efforts against indoor tanning may provide guidance for future public health efforts aimed at skin cancer prevention.

### REFERENCES

   - Hyattsville, MD: National Center for Health Statistics; 2015.