
Laurie Barker, MSPH
Mathematical Statistician
Presenting for Mei Lin, MD, MPH, MS, Epidemiologist
Surveillance, Investigation and Research Team
Division of Oral Health

A significant increase in prevalence of dental caries among U.S. children aged 2-5 years from 1988-1994 to 1999-2004 (24.2% vs. 27.9%) has been reported by using data from the National Health and Nutrition Examination Survey (NHANES).

This increase contrasts with the decline in prevalence of dental caries in permanent teeth and has not been fully analyzed by a combination of socio-demographic groups to identify disparities.
Study Objective

- To describe changes in prevalence and severity of caries
- from 1988-1994 to 1999-2004
- for specific combinations of race/ethnicity and family poverty status
- among children aged 2-5 years
## Data Source and Study Sample

- **Data source:** NHANES 1988-1994 and 1999-2004
- **Study sample:** 5,735 (3,759 from 1988-1994 and 1,976 from 1999-2004) children aged 2-5 years with reported:
  - Race/ethnicity
    - Non-Hispanic White (NHW)
    - Non-Hispanic Black (NHB) or
    - Mexican-American (MA)
  - Family poverty status (FPL)
    - \( \leq 100\% \) FPL
    - 101\%-200\% FPL or
    - >200\% FPL
  - And completed oral health exam

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>NHW ( \leq 100% ) FPL</th>
<th>NHW 101%-200%</th>
<th>NHW &gt;200% FPL</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHW ≤100% FPL</td>
<td>NHW 101%-200%</td>
<td>NHW &gt;200% FPL</td>
<td></td>
</tr>
<tr>
<td>NHB ≤100% FPL</td>
<td>NHB 101%-200%</td>
<td>NHB &gt;200% FPL</td>
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</tr>
<tr>
<td>MA ≤100% FPL</td>
<td>MA 101%-200%</td>
<td>MA &gt;200% FPL</td>
<td></td>
</tr>
</tbody>
</table>
Study Outcomes

- **Dental caries outcomes**
  - **Prevalence**
    - Prevalence of caries experience: having $\geq 1$ decayed or filled teeth (dft)
    - Prevalence of untreated tooth decay: having $\geq 1$ untreated decayed teeth (dt)
  - **Severity:**
    - Mean dft
    - Mean dt
    - Mean ft
Statistical Analysis Methods

- **What**: Predicted marginal probabilities and means to estimate adjusted absolute changes (AAC) in each caries outcome from 1988-1994 to 1999-2004 controlling for medical insurance status
- **Whom**: Each of nine groups defined by race/ethnicity and poverty status
- **How**: t-test to examine statistical significance of the changes
- Analyses accounted for the complex sampling design of NHANES (SUDAAN v11)
### Study Sample of Children Aged 2-5 Years by Race/Ethnicity, Poverty Status and Time

**Chi square tests of independence**

- Income by time $p=0.88$
- Race/ethnicity by time $p=0.03$
- Race/ethnicity and income combined by time $p=0.04$

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>1988-1994 Income as % FPL</th>
<th>1999-2004 Income as % FPL</th>
<th>Row Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≤100</td>
<td>101-199</td>
<td>≥200</td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>11.4</td>
<td>18.2</td>
<td>41.9</td>
</tr>
<tr>
<td></td>
<td>177</td>
<td>318</td>
<td>665</td>
</tr>
<tr>
<td>Non-Hispanic Black</td>
<td>9.2</td>
<td>4.8</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>677</td>
<td>337</td>
<td>251</td>
</tr>
<tr>
<td>Mexican American</td>
<td>5.3</td>
<td>3.3</td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td>724</td>
<td>380</td>
<td>230</td>
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<tr>
<td>Column Total</td>
<td>25.8</td>
<td>26.4</td>
<td>47.8</td>
</tr>
<tr>
<td></td>
<td>1578</td>
<td>1035</td>
<td>1146</td>
</tr>
</tbody>
</table>

**Income as % FPL**

- ≤100
- 101-199
- ≥200

**Row Total**

- 1160
- 1265
- 1334
- 3759
- 1976


* p≤0.05
Overall Mean df, dt, and ft among Children Aged 2-5
Year, 1988-1994 and 1999-2004

* p ≤ 0.05
Mean dft by Race/Ethnicity and Poverty Status, Children Aged 2-5 Years, 1988-1994 and 1999-2004

* p ≤ 0.05
Mean ft by Race/Ethnicity and Poverty Status, Children Aged 2-5 Years, 1988-1994 and 1999-2004

* p ≤ 0.05
† Data suppressed if relative standard error for the caries outcome >30%
## Adjusted Absolute Changes in Caries Outcome from 1988-1994 to 1999-2004 by Race/Ethnicity and Poverty Status Among Children Aged 2-5 Years

<table>
<thead>
<tr>
<th></th>
<th>Prevalence</th>
<th>Mean</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Caries Experience</td>
<td>Untreated Tooth Decay</td>
<td>dft</td>
<td>dt</td>
</tr>
<tr>
<td><strong>Crude Absolute Change</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>5.4%*</td>
<td>2.6%</td>
<td>0.31*</td>
<td>0.1</td>
</tr>
<tr>
<td><strong>Adjusted Absolute Change</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Non-Hispanic White</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤100% FPL</td>
<td>10.3%</td>
<td>4.7%</td>
<td>1.18*</td>
<td>0.49</td>
</tr>
<tr>
<td>101-200% FPL</td>
<td>1.3%</td>
<td>-2.2%</td>
<td>-0.02</td>
<td>†</td>
</tr>
<tr>
<td>&gt;200% FPL</td>
<td>4.7%</td>
<td>4.4%*</td>
<td>0.16</td>
<td>0.11*</td>
</tr>
<tr>
<td><strong>Non-Hispanic Black</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤100% FPL</td>
<td>7.2%</td>
<td>2.8%</td>
<td>0.37</td>
<td>0.09</td>
</tr>
<tr>
<td>101-200% FPL</td>
<td>-6.6%</td>
<td>-5.4%</td>
<td>-0.26</td>
<td>-0.19</td>
</tr>
<tr>
<td>&gt;200% FPL</td>
<td>5.6%</td>
<td>3.2%</td>
<td>0.25</td>
<td>0.11</td>
</tr>
<tr>
<td><strong>Mexican American</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤100% FPL</td>
<td>4.8%</td>
<td>0</td>
<td>0.06</td>
<td>-0.2</td>
</tr>
<tr>
<td>101-200% FPL</td>
<td>-1.7%</td>
<td>-6.2%</td>
<td>-0.06</td>
<td>-0.25</td>
</tr>
<tr>
<td>&gt;200% FPL</td>
<td>2.1%</td>
<td>-0.6%</td>
<td>0.01</td>
<td>-0.13</td>
</tr>
</tbody>
</table>

Adjusted for medical insurance status
* p≤0.05; † Data not reported if relative standard error for the caries outcome >30%
Study Limitations

- Medical insurance:
  - Control for medical insurance may not fully adjust for the effect of SCHIP implementation (1997-2000) on changes in caries over the two time periods
  - The SCHIP implementation time and expansion eligibility varied by states

- Unstable estimates in some groups limit identification of patterns of changes by socio-demographic factors combined

- Primary teeth that were missing due to caries were not recorded in NHANES protocol
Conclusions


Future analysis of changes in dental caries over time will need to consider the combined impact of multiple socio-demographic factors, if estimates are stable.

Both measures of dental caries prevalence and severity including overall, untreated and treated decay, are needed to comprehensively assess changes over time.
Acknowledgements

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Thanks!

Contact:
Mei Lin hru3@cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.
Mean $dt$ by Race/Ethnicity and Poverty Status, Children Aged 2-5 Years, 1988-1994 and 1999-2004

* $p \leq 0.05$ † Data suppressed if relative standard error for the caries outcome >30%