The Voices for Healthy Kids and State Legislation to Prevent Childhood Obesity: An Update

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Introduction: The purpose of this study is to examine general time trends in childhood obesity legislative activity in all 50 states (overall and by health equity focus) and whether the Voices for Healthy Kids Campaign (Voices) was associated with increased legislative activity.

Methods: LexisNexis State Capital was used to identify bills related to childhood obesity from 2012 to 2016. Linear and linear probability models were used to assess general time trends and regression-based difference-in-difference models to assess whether time trends differed for states that received a Voices grant. The data were analyzed in 2017.

Results: A total of 989 bills were introduced (Year 1=304, Year 2=364; Year 3=321), and a total of 93 bills were enacted (Year 1=34, Year 2=24, Year 3=35) after baseline. The mean number of bills introduced (baseline=4.3, Year 1=6.6, Year 2=7.3, Year 3=7.0, p=0.007), and the average state enactment rate (baseline=11%, Year 1=16%, Year 2=8%, Year 3=27%, p-trend=0.02) increased significantly. States with Voices grantees introduced 2.1 more bills than non-grantee states (p=0.04). The estimated difference over time in bill enactment and health equity focus did not differ by Voices grantee status.

Conclusions: Childhood obesity bill introduction and enactment increased between 2013 and 2016. The evidence-based advocacy supported by Voices appears to be significantly associated with greater increases in state-level bill introduction, but not enactment of legislation to address childhood obesity.

INTRODUCTION

The authors recently completed a short-term evaluation of the Voices for Healthy Kids campaign (Voices)—an evidence-based advocacy campaign jointly sponsored by the Robert Wood Johnson Foundation and the American Heart Association that aims to reverse childhood obesity. Those results suggest that the initiative appears to be contributing to the introduction and enactment of state-level legislation to address childhood obesity,1 as well as promoting policies to improve health equity (i.e., legislation targeted toward or likely to benefit vulnerable populations).2 This brief updates this earlier analysis by examining general time trends in childhood obesity legislative activity from November 2012 to December 2016, overall and by health equity focus.

METHODS

The methods for identifying, extracting, and classifying childhood obesity legislative activity are detailed elsewhere.1 Briefly, LexisNexis State Capital was used to identify bills and resolutions related to childhood obesity in the 50 states within the U.S. This paper summarizes activity from the baseline period (November
2012–October 2013), Year 1 (November 2013–October 2014), Year 2 (January 2015–December 2015), and Year 3 (January 2016–December 2016). The specific search terms, based on relevant legislative topic areas, and the screening process for the bills can be found in Appendix A (available online). The total bills identified in each state during each period and the total number meeting the inclusion criteria are shown in Appendix B (available online). The data were analyzed in 2017.

For the baseline, Year 1, Year 2, and Year 3 follow-up periods, the authors tracked, overall and by state, how many childhood obesity bills were introduced, how many were enacted, and what percentage of introduced and enacted bills focused on health equity. The definition of the bill- and state-level variables, as well as the definition of Voices grantees, are found in Appendix C (available online). The priorities specific to the Voices program were not examined, as those shifted over the course of the study period.

To assess whether there were statistically significant linear time trends in each of the bill- and state-level variables described, linear and linear probability models with Wald tests were used to test the significance of "year" modeled as a linear variable. To examine the predicted difference in bill introduction, enactment, and health equity focus, as well as content areas, associated with Voices grantee status, regression-based difference-in-difference models were used. All models used cluster-robust SEs to correct for correlated outcomes over time at the state level.

RESULTS
Table 1 summarizes the state-level legislative activity related to childhood obesity during the baseline and follow-up periods. The mean number of bills related to childhood obesity per state introduced during the baseline period was 4.3. This increased to 6.6 during the Year 1 follow-up, to 7.3 during the Year 2 follow-up, and to 7.0 during the Year 3 follow-up (p-trend=0.007). A majority of states introduced bills related to childhood obesity and this remained relatively flat over time (baseline=41, Year 1=40, Year 2=43, and Year 3=40). The percentage of the total number of bills introduced that were relevant to childhood obesity increased slightly and significantly from 0.2% during the baseline period to 0.3% during each of the follow-up periods (p-trend=0.001). Across all states, 217 bills related to childhood obesity were introduced at baseline, 304 in Year 1, 364 in Year 2, and 321 in Year 3. Across all states, 19 bills related to childhood obesity were enacted at baseline, 34 in Year 1, 24 in Year 2, and 35 in Year 3. The average state enactment rate increased significantly (Baseline=11%, Year 1=16%, Year 2=8%, and Year 3=27%, p-trend=0.02). There was a statistically significant increase in the percentage of childhood obesity-relevant bills introduced that had components related to improving health equity (p-trend=0.02).

In terms of general focus area, the vast majority of introduced and enacted bills during all three periods was focused on diet/nutrition, and the most frequent National Academy of Medicine environment targeted in the primary aim of introduced bills was school and early child care (Appendix D, available online).

Table 2 presents the estimated difference over time in the bill introduction, enactment, and health equity focus associated with presence of Voices grantees. In these models, coefficients are interpreted as the average change in the outcome over time, above and beyond the change over time in the states that did not receive Voices funding. Grantee states introduced 2.1 more bills than non-grantee states (β=2.1, p=0.04). The estimated difference over time in bill enactment and health equity focus did not differ by Voices grantee status.

DISCUSSION
This brief updates trends in state legislative activity related to childhood obesity in the year prior to and the 3 years after the start of Voices. During the study period, the authors observed a significant increase in the average number of childhood obesity measures introduced in state legislatures (from 4.3 at baseline to 7.0 in Year 3), and the average state enactment rate of childhood obesity bills (from 11% at baseline to 27% in Year 3). When comparing states with Voices grantees to states without, the study found that those with Voices grantees introduced significantly more childhood obesity bills (2.1 more bills in states with Voices grantees). Appendix C (available online) provides more discussion of this finding. The authors also did not observe a difference over time in bill enactment and health equity focus among states with Voices grantees compared to states without Voices grantees.

A significant upward trend was observed in the number of bills with a health equity focus, which did not differ by state grantee status. Across the baseline year and the 3 follow-up years, the vast majority of introduced and enacted bills focused on diet/nutrition rather than physical activity. The most frequent National Academy of Medicine environment targeted among introduced bills at baseline and follow-up was school and early child care. These results are similar to a previous short-term evaluation of the Voices campaign, where it was found that the number of introduced bills and enactment rate increased from baseline to Year 1. Appendix C (available online) provides more discussion of this finding.

Limitations
The bills included in this analysis were obtained from a subscription database (LexisNexis State Capital), and the study authors were not involved in populating this database. Therefore, this study may have missed some
Table 1. Summary of State- and Bill-level Legislative Activity: Childhood Obesity Measures, a Baseline, Year 1, Year 2, and Year 3

<table>
<thead>
<tr>
<th>Variable</th>
<th>Baseline</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>p-value for trend b</th>
</tr>
</thead>
<tbody>
<tr>
<td>State-level legislative activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of childhood obesity-related measures introduced in State Legislature, M</td>
<td>4.3</td>
<td>6.6</td>
<td>7.3</td>
<td>7.0</td>
<td>0.007</td>
</tr>
<tr>
<td>No. of states that introduced a bill related to childhood obesity</td>
<td>41</td>
<td>40</td>
<td>43</td>
<td>40</td>
<td>—</td>
</tr>
<tr>
<td>No. of such measures enacted in State Legislature, M</td>
<td>0.5c</td>
<td>0.9d</td>
<td>0.6e</td>
<td>0.9f</td>
<td>0.14</td>
</tr>
<tr>
<td>Childhood obesity measures of total measures introduced in State Legislature, M</td>
<td>0.2g</td>
<td>0.3i</td>
<td>0.3j</td>
<td>0.3j</td>
<td>0.14</td>
</tr>
<tr>
<td>No. of obesity NAM environment areas5 introduced, M</td>
<td>1.6</td>
<td>2.0</td>
<td>2.2</td>
<td>1.9</td>
<td>0.07</td>
</tr>
<tr>
<td>Bill-level legislative activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total no. of bills introduced</td>
<td>217</td>
<td>304</td>
<td>364</td>
<td>321</td>
<td>—</td>
</tr>
<tr>
<td>Average state enactment rate (no. of enacted total for each state X 100)</td>
<td>11</td>
<td>16</td>
<td>8</td>
<td>27</td>
<td>0.02</td>
</tr>
<tr>
<td>Health equity focus among introduced bills, i n (%)</td>
<td>62 (29)</td>
<td>99 (33)</td>
<td>141 (39)</td>
<td>110 (34)</td>
<td>0.02</td>
</tr>
<tr>
<td>Health equity focus among enacted bills, i n (%)</td>
<td>5 (26)</td>
<td>15 (44)</td>
<td>12 (50)</td>
<td>12 (34)</td>
<td>0.74</td>
</tr>
</tbody>
</table>


aMeasures include bills and House/Senate resolutions.
bp-value for trend was estimated from a Wald test of the significance of the linear time trend using linear regression analysis.
cIf a denominator of 50 is used, M=0.36 and SD=0.75.
dIf a denominator of 46 is used, M=0.74 and SD=1.39.
eIf a denominator of 50 is used, M=0.48 and SD=0.89.
fIf a denominator of 46 is used, M=0.74 and SD=1.06.
gSource: Council of State Government survey of legislative agencies and state websites, 2013. Estimated total state measures introduced in 2013 is 124,318. Note that due to variation in state legislative sessions, some of the date ranges do not align with the baseline childhood obesity bill search.
hSource: Council of State Government survey of legislative agencies and state websites, 2014. Calculated using a denominator of 46 (no. of states that introduced a bill related to childhood obesity). Estimated total state measures introduced in 2014 is 118,110. Due to variation in state legislative sessions, some of the date ranges do not align with the 12-month childhood obesity bill search.
iSource: Council of State Government survey of legislative agencies and state websites, 2015. Estimated total state measures introduced in 2015 is 119,942. Note that at the time of this report, data were not available for South Carolina, Tennessee, and New Jersey, so a denominator of 47 was used. Due to variation in state legislative sessions, some of the date ranges do not align with the 12-month childhood obesity bill search.
jSource: Council of State Government survey of legislative agencies and state websites, 2016. Estimated total state measures introduced in 2016 is 106,585. Note that at the time of this report, data were not available for Massachusetts, so a denominator of 45 was used (Montana, Nevada, North Dakota, and Texas were not in session in 2016). Due to variation in state legislative sessions, some of the date ranges do not align with the 12-month childhood obesity bill search.
kThe NAM environmental determinates of obesity are: (1) physical activity, (2) food and beverages, (3) messaging, (4) health care and work, and (5) school and early child care.

This analysis does not track other types of policies, which might be relevant to childhood obesity, such as regulations. Appropriations may be included if an appropriations bill contained language about funding a specific program that met inclusion criteria. Even though the search strategy relied on broad search terms, it is possible that some relevant bills were not captured. Although the focus is on determining whether trends were different for states with and without Voices grantees—and models are used that compare states to themselves over time to control for many of the between state differences that could otherwise confound these results—it is still possible that Voices may not be the only contributing factor, so the authors refrain from inferring that any differences are directly attributable to Voices. This study may slightly underestimate the proportion of bills adopted, because legislation introduced in the follow-up period may have been carried over and enacted in the following year in the 25 states that have 2-year legislative sessions. In addition, the legislatures in four states (Montana, Nevada, North Dakota, and Texas) meet every other year, so information is lacking on these states in the Year 1 and Year 3 follow-up periods.

CONCLUSIONS

The capacity building and evidence-based advocacy supported by Voices may be contributing to the introduction of state-level legislation to address the problem of childhood obesity, particularly focused on diet/nutrition and located in the school and early child care setting.
ACKNOWLEDGMENTS
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SUPPLEMENTAL MATERIAL
Supplemental materials associated with this article can be found in the online version at https://doi.org/10.1016/j.amepre.2018.01.041.

REFERENCES

Table 2. Predicted Difference Over Time in Childhood Obesity Bills and Health Equity Focus Associated With Voices Grantees

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Change over time in percent of bills associated with presence of Voices grantees, β (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduced bills per state, n</td>
<td>2.1 (0.08, 4.09)</td>
<td>0.04</td>
</tr>
<tr>
<td>Enacted bills per state, n</td>
<td>0.31 (–0.4, 1.0)</td>
<td>0.38</td>
</tr>
<tr>
<td>Enactment rate, %</td>
<td>–2.4 (–19, 15)</td>
<td>0.78</td>
</tr>
<tr>
<td>Percent of introduced bills with health equity focus, %</td>
<td>–2.9 (–14, 8.1)</td>
<td>0.59</td>
</tr>
<tr>
<td>Percent of enacted bills with health equity focus, %</td>
<td>–20 (–57, 18)</td>
<td>0.29</td>
</tr>
</tbody>
</table>

Note: Boldface indicates statistical significance (p < 0.05). Regression models include state fixed effects to account for baseline differences among states and year fixed effects to account for time trends in states that did receive any Voices grants. For states that received Voices grants, they were considered to have been exposed to Voices funding for all years after the first Voices grant was received, regardless of whether they received a Voices grant in every year since the first funded grant.

*aCoefficients are interpreted as the average change in the outcome over time, above and beyond the change over time in the states that did not receive Voices funding.

Voices, Voices for Healthy Kids Campaign.