

## Original Contributions

# Fluoridation advocacy in referenda where media coverage is balanced yet biased



Supplemental material  
is available online.

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## ABSTRACT

**Background.** Despite supporting scientific evidence, community water fluoridation (CWF) often fails in public referenda. To understand why, the authors quantitatively analyzed text from news media coverage of CWF referenda.

**Methods.** The authors analyzed text from 234 articles covering 11 CWF referenda conducted in 3 US cities from 1956 through 2013. The authors used cluster analysis to identify each article's core rhetoric and classified it according to sentiment and tone. The authors used multilevel count regression models to measure the use of positive and negative words regarding CWF.

**Results.** Media coverage more closely resembled core rhetoric used by fluoridation opponents than the rhetoric used by fluoridation proponents. Despite the scientific evidence, the media reports were balanced in tone and sentiment for and against CWF. However, in articles emphasizing children, greater negative sentiment was associated with CWF rejection.

**Conclusions.** Media coverage depicted an artificial balance of evidence and tone in favor of and against CWF. The focus on children was associated with more negative tone in cities where voters rejected CWF.

**Practical Implications.** When speaking to the media, advocates for CWF should emphasize benefits for children and use positive terms about dental health rather than negative terms about dental disease.

**Key Words.** Fluoridation; public health and community dentistry; drinking water; health promotion; public opinion.

JADA 2018; ■(■): ■-■

<https://doi.org/10.1016/j.adaj.2017.10.016>

The dental profession and the scientific community are united in their advocacy of community water fluoridation (CWF). The Centers for Disease Control and Prevention named CWF among the 10 great public health achievements of the 20th century.<sup>1</sup> Despite this widespread endorsement, the US general population has remained skeptical, frequently failing to support CWF in local municipal referenda.<sup>2</sup>

Supporters and opponents of CWF make opposing claims about the health benefits and safety of CWF. Whereas advocates, such as the American Dental Association (ADA), cite its safety and effectiveness in preventing caries, opponents, such as the Fluoride Action Network (FAN), cast fluoride as a dangerous chemical added to the water supply. For many people, their source of information about CWF is local media reports in the weeks preceding a referendum. Local media generally balance the arguments for and against government actions, known as the *balance bias* and *indexing*,<sup>3</sup> in which opposing views about contentious and emotional topics are given equal standing, as opposed to interpreting the sides and reporting which is more credible. This leaves readers to decide credibility for themselves.

We performed a quantitative analysis of text to determine whether there is bias. Does media coverage about CWF convey bias toward 1 of the opposing sides of the debate? Furthermore, how does local media cover emotional topics, such as children's health, during CWF referenda?

In this study, we examined both historic and contemporary rhetoric concerning fluoridation that appeared before a CWF referendum. We did this for 3 cities: Portland, Oregon; Wichita,

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Kansas; and San Antonio, Texas. We drew on text from newspaper coverage of CWF referenda conducted over 6 decades, from 1956 through 2013. We conducted clustered terms and sentiment analyses of news coverage by comparing media reports with text in documents produced by the ADA and FAN. A comparison of the clustered terms covered in the news relative to the ADA and FAN offers insight as to how the media frames CWF content relative to these opposing organizations. We used the sentiment analysis to determine what drives positive and negative coverage of CWF.

## METHODS

We analyzed 234 documents from newspapers in wide circulation in San Antonio, Portland, and Wichita (articles and editorials) covering 11 CWF referenda appearing on ballots from 1956 through 2013 ([supplemental table](#), available online at the end of this article). There were 44 articles from the 2000 San Antonio referendum and 16 articles from the 1978 Portland referendum when CWF was supported ([supplemental table](#)). The remaining 174 articles were from referenda when CWF was rejected.

For the most recent elections (Portland, 2013; Wichita, 2012; San Antonio, 2000), we collected documents from news sources located through searches of Google, LexisNexis, and NewsBank databases by using the key word terms *fluoride* or *fluoridation* and the city's name and year of the election. For the elections that took place before 2000, we contacted local libraries to obtain newspaper documents. For the 1966 and 1985 San Antonio elections, the San Antonio Public Library sent scanned copies of newspaper articles from the *San Antonio Express-News*, *San Antonio Light*, and *San Antonio Register* that featured the topic of fluoride in the relevant election years. To obtain newspaper articles for the 1956, 1962, 1978, and 1980 Portland elections, we identified articles of interest published in *The Oregonian* and *Oregon Journal* from the online University of Oregon newspaper index by using the same search terms, and we requested copies. For the 1964 and 1978 Wichita elections, we received copies of *The Wichita Eagle* newspaper on nonindexed microfilm housed at Wichita State University Libraries. To collect newspaper articles, we manually examined the microfilm and scanned articles that mentioned water fluoridation in the months before and during the election and the month during which the referendum was added to the ballot.

We conducted 3 analyses to gauge the clustered terms, tone, and sentiment of news coverage in the 3 cities. We gauged the competing clustered terms that formed the core rhetoric in news coverage against the official positions of the ADA and FAN. Both organizations had news coverage and press releases about their activities and positions. The documents from both organizations reflected their unfiltered positions. We downloaded all 50 articles that the ADA<sup>4</sup> posted, the 50 most recent articles from FAN,<sup>5</sup> and the primary documents on both websites detailing their position on fluoridation.<sup>6,7</sup>

We conducted a hierarchical cluster analysis of the text contents and depicted the results graphically by using dendrograms. The process involved calculating the scaled Euclidean distance between nonspaced and mostly stemmed words, grouping terms into the most parsimonious clusters according to similarity.<sup>8</sup> Dendrograms depicted the core words from which other words were derived. Dendrograms also showed the extent of dissimilarity of the core clusters and their ordering in relation to one another. Clusters of words branched off from one another, with words higher in the diagram being more influential and dissimilar.

We likewise analyzed text from news coverage where CWF was rejected and where CWF passed. Although cluster analysis does not involve use of statistical significance tests for definitive conclusions,<sup>8</sup> the more similar news coverage terms were to the ADA's terms or to FAN's terms, the more in favor the topic coverage was to that organization.

We then measured the general tone of news coverage by using generic positive and negative word dictionaries.<sup>9</sup> The positive dictionary included 2,006 words, and the negative dictionary included 4,783 words. We also determined the sentiment of text through a manually created dictionary of pro-CWF and anti-CWF words derived from ADA and FAN publications, respectively. The process involved recording words that conveyed bias to 1 side over the other and then comparing the results with the dictionaries established in 2 previous fluoride sentiment studies.<sup>10,11</sup> For example, profluoride words spoke of the benefits of fluoride in preventing decay, whereas antifuoride words spoke of fluoride's alleged adverse medical effects and costs. Our

## ABBREVIATION KEY

- ADA:** American Dental Association.  
**CWF:** Community water fluoridation.  
**FAN:** Fluoride Action Network.

primary departure from a study on article coverage for Portland's CWF referendum<sup>10</sup> is the removal of words such as *children* that anti-fluoride activists use in the context of fluoride being harmful to children.

Using news coverage of the referenda, we modeled tone and sentiment (that is, number of positive words, negative words, pro-fluoridation words, and anti-fluoridation words) by using 4 multilevel regression models for count data, each with random effects for city, year, and media type. When the data were overdispersed, we used a negative binomial regression model and otherwise a multilevel Poisson regression model (supplemental figure, available online at the end of this article). The first main independent variable of interest was a dichotomous indicator for CWF passage (coded 1) versus rejection (coded 0). A second independent variable measured the article's number of references to *children*, an emotional topic. Given that most of the epidemiologic evidence showing the benefits of CWF comes from studies of caries in children and that FAN espouses alleged side effects of fluoride on children, we expected to see an increase in nonneutral words. We also created an interaction term between references to children and CWF victory to determine whether coverage of children differed concerning the positive and negative and the pro- and anti-words. Random intercepts in the model were indicator variables for news type (article, editorial, advertisement), year, and city.

We used parameter estimates from the regression models and their 95% confidence intervals to test for differences in CWF election coverage. Specifically, we tested whether CWF rejection was associated with topics more similar to FAN, more negative tone, and anti-fluoride sentiment. We also tested whether references to children were associated with more nonneutral words in news coverage. We expected that more references to children would be associated with less negative and anti-CWF words in San Antonio in 2000 and more with positive and pro-CWF words.

## RESULTS

Analysis of news coverage and text attributed to the ADA and FAN is presented in dendrograms (Figure 1). All 4 dendrograms reflect the core overarching cluster of fluoride, with the subclusters more similar than dissimilar. The words that appear in all 4 dendrograms are *fluoride*, *water*, *health*, and *dental*. Between FAN (Figure 1A) and the ADA (Figure 1B), 6 words are shared, with the addition of *public* and *effect*. A key substantive difference is that the word *children* is its own cluster for FAN, whereas the ADA focuses instead on *decay* and *health*. This difference fits in with anti-fluoride activist rhetoric of serious fluoride-induced diseases in children (such as autism), whereas the ADA focuses more on the benefits of fluoride preventing caries. These results do not mean that the ADA ignores children but rather that the ADA mentions children as a subcomponent of the other clusters.

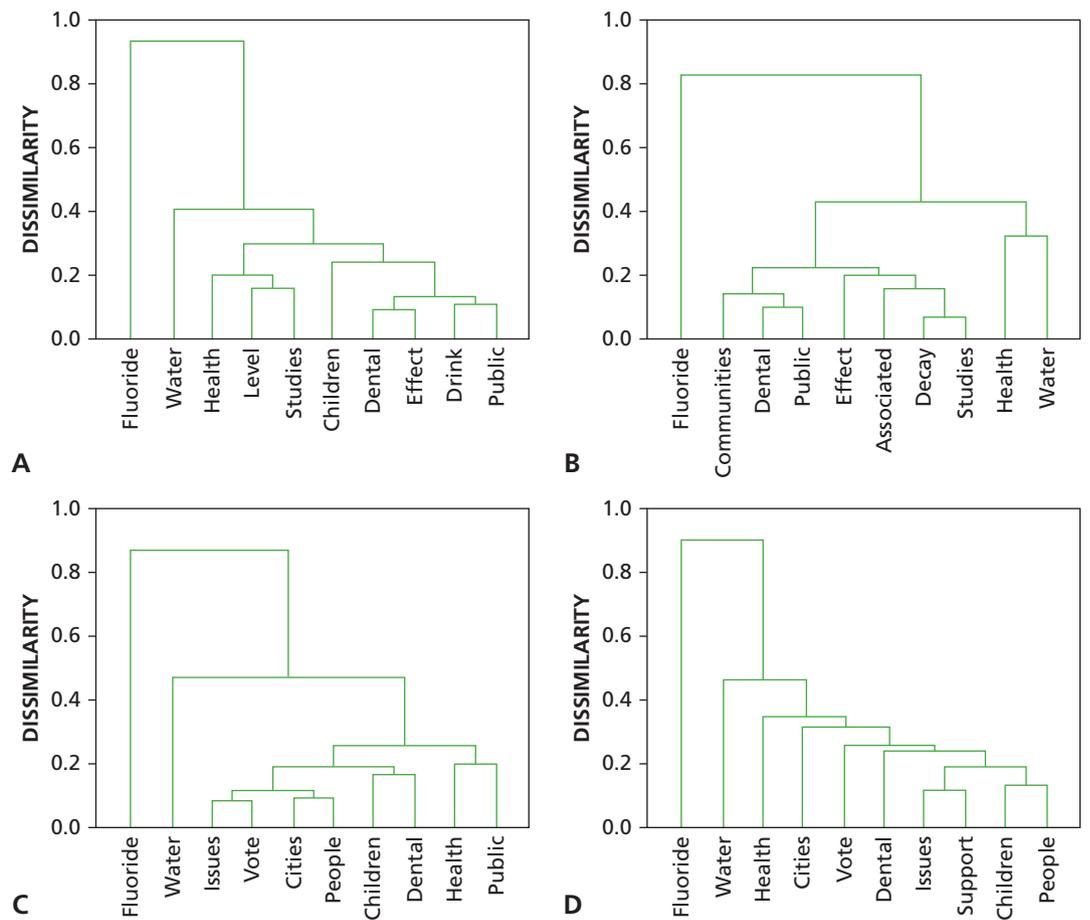
The news article coverage expectedly contained election-related clusters, such as *vote*, *issu-*, *peopl-*, and *citi-*. This is true for where CWF lost and where CWF won. News articles where CWF lost (Figure 1C) share 6 clusters with FAN and only 5 with the ADA. The FAN cluster present in news coverage where CWF lost is *children*. News coverage where CWF won (Figure 1D) also has *children* as a cluster, though replaces the cluster *public* with *support*.

Although we cannot draw strong conclusions from these dendrograms alone, they suggest that news coverage slightly favored anti-fluoride topics. FAN's focus on children made its way into news coverage. This finding demonstrates that an emotional topic, which tends to induce extreme risk aversion<sup>12</sup> among readers, was a core part of CWF coverage.

### Tone and sentiment analysis

Table 1 presents the 6 most common words for the tone and sentiment analysis of the 234 news articles, showing some overlap between the tone and sentiment terms. However, where the tone will leave readers with a general feeling after reading a given article, the sentiment conveys the position that an article takes on the merits of CWF.

There are 4 combinations according to tone and sentiment: positive and pro-CWF (*benefit*), positive and anti-CWF, negative and pro-CWF (*decay*), and negative and anti-CWF (*problem*). There are no terms that are positive in tone and anti-CWF. Therefore, it is important to keep in mind the potential differences in tone and sentiment and how readers might remember an article given its tone and sentiment.



**Figure 1.** Dendrograms showing analysis of news coverage and text attributed to the American Dental Association (ADA) and the Fluoride Action Network (FAN). A. Text from FAN documents. B. Text from the ADA. C. Text from news coverage of referendums where community water fluoridation was rejected. D. Text from news coverage of referendums where community water fluoridation was supported. Dissimilarity was scaled based on the most dissimilar cluster distance. Where horizontal breaks occur, creating new vertical branches, the length of the branch reflects proportionally how dissimilar the clusters are, along with their importance in the hierarchy of clusters. Words are stemmed when possible in the dendrograms, with the core clustered words as labels.

**Table 1.** Six most frequent terms classified according to tone and sentiment appearing in 234 news articles.\*

TONE, TERM (FREQUENCY)		SENTIMENT, TERM (FREQUENCY)	
Positive	Negative	Pro-CWF <sup>†</sup>	Anti-CWF
<b>Support (n = 124)</b>	Decay (n = 124)	Health (n = 177)	Problem (n = 65)
<b>Benefit (n = 85)</b>	Problem (n = 65)	Dental (n = 167)	Lead (n = 55)
<b>Like (n = 84)</b>	Concern (n = 52)	Decay (n = 124)	Poison (n = 39)
<b>Safe (n = 80)</b>	Harm (n = 49)	Prevent (n = 99)	Bone (n = 33)
<b>Good (n = 74)</b>	Severe (n = 44)	Cost (n = 89)	Dose (n = 30)
<b>Work (n = 71)</b>	Reject (n = 40)	Benefit (n = 85)	Cancer (n = 29)

\* Terms in the tone and sentiment dictionaries were not mutually exclusive. We classified positivity or negativity of tone independently of pro-CWF or anti-CWF sentiment. † CWF: Community water fluoridation.

### Count regression models

Table 2 presents 4 count regression models for the tone and sentiment of news coverage. Model 1 uses negative binomial regression, and models 2 through 4 use Poisson regression. The Appendix (available online at the end of this article) provides justification for the different modeling methods.

**Table 2.** Count regression models of news coverage tone and sentiment.

INDEPENDENT VARIABLE	MODEL 1 POSITIVE WORDS	MODEL 2 NEGATIVE WORDS	MODEL 3 PRO-CWF* WORDS	MODEL 4 ANTI-CWF WORDS
<b>Referendum Outcome</b>				
$\beta^{\dagger}$	0.48	0.62	0.31	0.84
95% CL <sup>‡</sup>	(-0.40, 1.35)	(-0.29, 1.53)	(-0.44, 1.05)	(0.14, 1.55)
<i>P</i> value <sup>§</sup>	.29	.18	.43	.02
<b>No. of Child References</b>				
$\beta$	0.27	0.33	0.32	0.51
95% CL	(0.16, 0.39)	(0.26, 0.40)	(0.23, 0.41)	(0.38, 0.64)
<i>P</i> value <sup>§</sup>	< .01	< .01	< .01	< .01
<b>Interaction: Child References ×</b>				
<b>Referendum Outcome</b>				
$\beta$	-0.18	-0.16	-0.07	-0.21
95% CL	(-0.42, 0.07)	(-0.28, -0.03)	(-0.24, 0.11)	(-0.44, 0.03)
<i>P</i> value <sup>§</sup>	.16	.02	.47	.09
<b>Intercept</b>				
$\beta$	1.51	1.41	0.86	-0.04
95% CL	(1.13, 1.90)	(1.00, 1.82)	(0.52, 1.20)	(-0.58, 0.50)
<i>P</i> value <sup>§</sup>	< .01	< .01	< .01	.89
<b>Observations: No. of News Articles</b>	234	234	234	234
<b>Model Log Likelihood</b>	-675.7	-858.3	-521.06	-446.49

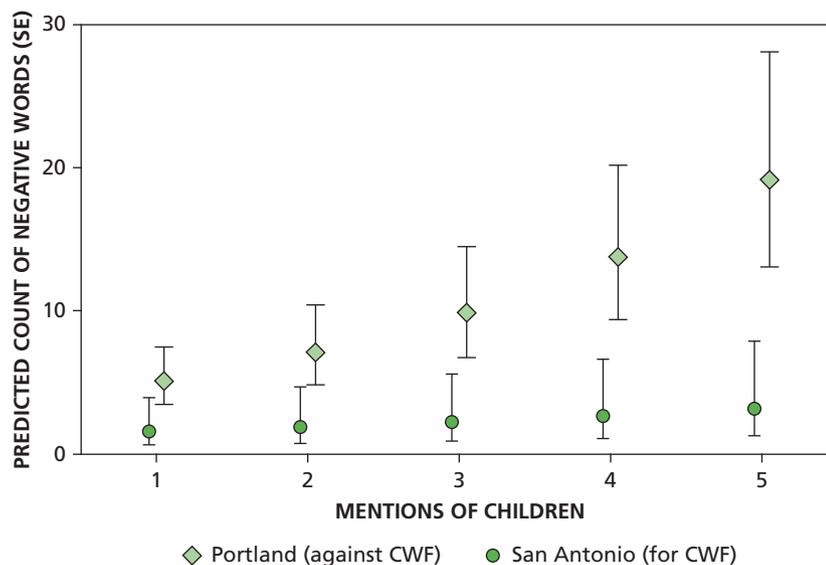
\* CWF: Community water fluoridation. 0 indicates CWF rejection, and a 1 indicates CWF support. †  $\beta$  is the regression parameter estimate. ‡ CL: Confidence limits. § *P* value from test of null hypothesis that  $\beta = 0$ .

In all 4 models, the number of references to children exerts a positive and significant effect ( $P < .01$ ). Results can be interpreted by using exponentiation of the coefficients to find the rate ratio. For model 1, greater reference to children increased the count of positive words on average by a factor of 1.3. The interaction between references to children and CWF victory does not reach significance in model 1. The coefficient for CWF victory is positive, though does not exert a significant effect ( $P = .29$ ). In model 2 analyzing negative terms in news coverage, CWF victory was not a statistically significant effect, although references to children and its interaction with CWF victory were significant ( $P = .02$ ). The expected count of negative words increased by approximately 1.35 in referenda where CWF lost for every additional reference to children. However, this effect reduced to about 1.19 for CWF victory. Figure 2 illustrates the interaction by showing that negative words were associated with CWF rejection only when articles made frequent reference to children.

In model 3, the number of references to children was the only feature that had a significant association with pro-CWF words, and the effect was positive. In model 4, the number of references to children also was associated significantly with more anti-CWF terms. Furthermore, there was a significant ( $P = .02$ ) effect for CWF victory, indicating that where CWF won there were 2.32 times as many anti-CWF terms than where CWF lost. As with model 2, there was a positive interaction between references to children and CWF victory that nearly reached statistical significance ( $P = .09$ ). Despite the interaction effects, there was no significant difference in aggregate tone and sentiment differentiated by whether a city won or lost a CWF referendum.

## DISCUSSION

There were 3 principal findings from the text analysis. First, news coverage of CWF reflected some evidence of a media balance bias. Second, greater reference to children was associated with an increase in nonneutral terms. Third, the extent of negative tone was associated more strongly with CWF defeat as an article's number of references to children increased.



**Figure 2.** Graph showing that negative words were associated with community water fluoridation (CWF) rejection only when articles made frequent mentions of children. SE: Standard error. Predicted counts are from a multilevel Poisson regression model (Model 2, Table 2). Results are plotted for two referendums selected to illustrate the model's statistically significant interaction of referendum outcome and number of references to children: San Antonio in 2000, where fluoridation was supported, and Portland in 2013, where fluoridation was rejected.

Our results suggest that the tone in articles is approximately balanced, with a slight favor toward pro-CWF terms than anti-CWF terms. However, the media balanced positive with negative and pro-CWF with anti-CWF in reference to children. These results are consistent with complaints by scientists that journalists force a false balance of arguments and, hence, generate controversy.<sup>13,14</sup> Coverage of CWF largely appears to conform with media desires to appear balanced to the general audience and sell the news.

Among referendum items, CWF is infamous for its level of polarization despite being an established public health good. Opposition to marginal increases in public water fluoridation arose on the inception of CWF, with accusations against fluoride focused on the theme of forced medication,<sup>10</sup> dangerous side effects,<sup>15</sup> and contamination of natural resources.<sup>16,10,15</sup> Because of public contention, water fluoridation is the most competitive type of referendum and receives the lowest level of support in the event of passage.<sup>17</sup> Among the initial reasons given to CWF's poor performance is that CWF opponents "[N]eed only to create doubt about fluoridation; they do not need to convince the electorate of all their points" (italics in the original).<sup>15(p60)</sup> The concept of doubt derailing changes to the status quo has since received wider support in research on issue framing and agenda setting; those who seek to change status quo policy need to refute the opposition and present a positive message to make clear that their alternative is superior.<sup>18,19</sup> When antifluoride activists raise concerns about fluoride-induced cancer, coupled with the frame of the ease of opting in to fluoride via tablets, CWF referenda can fail easily.<sup>10,15,20</sup>

In this study, the media gave similar coverage to antifluoride arguments and scientific evidence, especially in relation to children. Although we do not know how voters interpreted these conflicting views, the balanced yet biased coverage did not aid profluoride activists.

Where CWF won might offer some insight in CWF messaging. Although mention of children drove the contentious balanced coverage, the rate at which negative and anti-CWF terms were mentioned was significantly lower. When people read the news, they read less generally negative and anti-CWF coverage associated with children. Given that people often tend to forget the context of news and associate the tone of coverage with the appeal of the issue in question,<sup>2,12,21</sup> it makes sense that more negative coverage in general might impair passage of CWF. Furthermore, the targeted use of anti-CWF terms in relation to children may have associated fluoride with harm to children. Results of case studies of fluoridation conducted in 1985 indicated that positive messaging and direct outreach greatly aided in the passage of CWF.<sup>22</sup>

Given the importance of doubt in derailing CWF referenda, it is necessary to consider the messaging that voters receive from the media. If doubt is all that is needed to prevent

profluoridation votes, then even a few hints of antifuoride information may be enough to bring down CWF. Fluoride campaigns in California in the 1950s succeeded only in the event of overwhelming support for fluoride without any serious opposition.<sup>15</sup> In 2013 in Portland, Oregon, even purportedly balanced coverage did not prevent a lopsided defeat for CWF.<sup>10</sup> Established models of referendum voting demonstrate that voters vote for a change in the status quo only when they are certain that the change will result in a better outcome.<sup>18</sup> Given that the average person does not understand fluoridation scientifically or the credibility of information sources,<sup>16,23</sup> mixed messages that introduce even some uncertainty should be enough to lead to a rejection at the polls.

There is no easy way forward to overcome reluctance to accept CWF. One step is to start using an easy-to-understand and positive message with direct outreach to voters.<sup>22</sup> Handing out accessible information at dental offices and door-to-door would bypass the media filter and resolve confusion. Although this will require resources and effort, the status quo does not appear to be working.

## CONCLUSIONS

Advocates for CWF should be conscious of the media's tendency for balance bias in which equal weight is assigned to opposing views, regardless of the strength of evidence supporting those views. One way for dentists to avert the bias is by communicating directly with their patients in dental offices and the public at large at community gatherings. When messages are conveyed via the media, it is advisable to prepare accessible and nonspecialized information for journalists in advance of elections. Authors of reviews of scientist-press relations recommend establishing an early rapport with journalists to ensure that reporters do not falsely balance scientific and pseudo-scientific studies.<sup>13,14</sup> A journalist covering an election with a clear understanding of the differing scientific merit of each side will be able to conduct more investigative studies as opposed to reporting on logically fallacious *argumentum ad passiones* arguments against CWF. One specific strategy, suggested by findings from this study, is to recognize and counteract anti-CWF language as it relates to children, such as purported harmful effects of CWF for children's health. For example, fluoride's benefits for children can be depicted using positive terms (improving dental health) instead of negative ones (reducing tooth decay). ■

## SUPPLEMENTAL DATA

Supplemental data related to this article can be found at: <https://doi.org/10.1016/j.ada.2017.10.016>.

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Research reported in this article was supported by award UH2DE025494 from the National Institute of Dental and Craniofacial Research, National Institutes of Health. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

The underlying data, code, and other materials necessary to reproduce results presented in the article will be preserved and made publicly available online via the University of North Carolina at Chapel Hill Dataverse (<https://dataverse.unc.edu/>) hosted by the Odum Institute data archive at the University of North Carolina at Chapel Hill.

**Disclosure.** None of the authors reported any disclosures.

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## APPENDIX

### Establishing the document term matrices

We conducted the analysis via the document term matrices that we derived from the articles used in this study ([supplemental table](#)). We copied and pasted all articles to text documents for archive and replication purposes. We read the articles as a corpus, where we applied standard transformations. These included removing URLs, punctuation, and whitespace and transforming all words to lowercase. From that point, we analyzed the data and removed uninformative words and replaced synonyms with a common word. These included all synonyms of *fluoride*, *science*, and *children*. We also removed words that referenced locations.

For the creation of the dendrograms, we read in the top 10 most frequently occurring words from the term document matrix and scaled the distance between the words on the basis of Euclidean distance. We then normalized the distances onto a scale from 0 to 1 by dividing the distances by the maximum distance between the words. Once the distances were normalized, we plotted the results on the basis of the average distance.

The tone and sentiment text analysis required the creation of unique cleaning profiles with the respective dictionaries attached. Other cleaning commands were the same as described earlier. After the creation of document term matrices, we summed the data by column (article) and then merged the tone and sentiment counts to a single data frame by their article identifiers.

### Determining count model fit

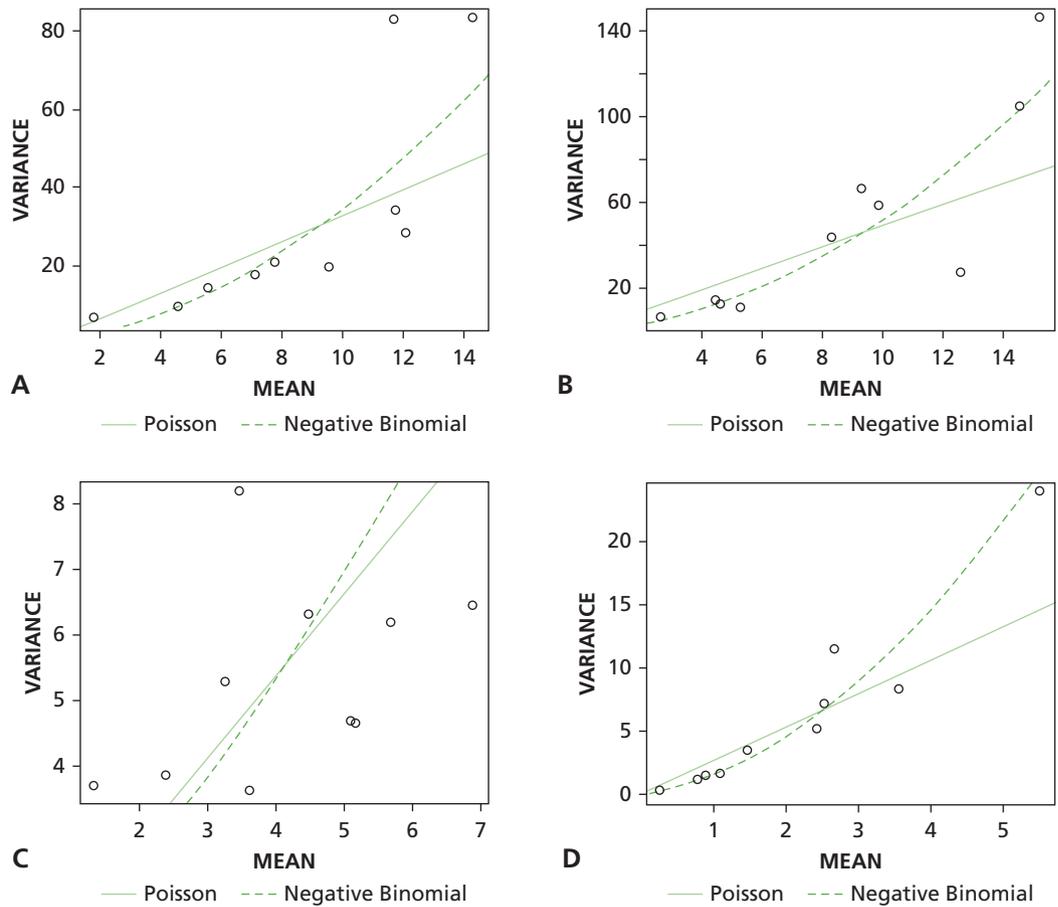
We determined the best model for tone and sentiment on the basis of first, whether the model converged, and second, the presence of overdispersion in the data. Poisson regression involves assuming that the count mean and variance are equivalent.<sup>e1</sup> When this is not true, the results produced generally will be biased. Negative binomial models account for variances greater than the mean and scale the standard errors relative to the level of overdispersion. However, negative binomial models take up more degrees of freedom and can lead to inefficiency. Given that we account for 3 different random effects—city, election date, and media type—there is the risk of nonconvergence as the model becomes impossible to compute.<sup>e2</sup> Unlike single-level models, multilevel models with random effects can reduce the bias that would otherwise afflict Poisson regression models, with observation-level effects eliminating all potential bias.<sup>e3</sup> We therefore seek the best unbiased model that is also computationally possible.

The [eFigure](#) demonstrates the mean relative to the variance for all 4 models, fitting the data to Poisson and negative binomial lines. As the figures show, the Poisson models sufficiently explain the data up to the high mean values. At the higher means, the negative binomial lines adjust more easily to the higher variances and account for potential bias. Therefore, it would be ideal to use negative binomial models. However, besides the positive count data, the models did not converge when we used negative binomial models because the random effects provided too few degrees of freedom. Although unfortunate, given that the higher mean values are few in number, the Poisson multilevel models as used for models 2 through 4 offer the best, albeit imperfect, means to run the analyses.

e1. Long S. *Regression Models for Categorical and Limited Dependent Variables*. Thousand Oaks, CA: SAGE Publications; 1997:217-250.

e2. Bolker BM, Brooks ME, Clark CJ, et al. Generalized linear mixed models: a practical guide for ecology and evolution. *Trends Ecol Evol*. 2009;24(3):127-135.

e3. Harrison XA. Using observation-level random effects to model overdispersion in count data in ecology and evolution. *PeerJ*. 2014;2:e616.



**Figure.** Count model dispersion plots. **A.** Model 1 of the positive word count. **B.** Model 2 of the negative word count. **C.** Model 3 of the pro-community water fluoridation (CWF) word count. **D.** Model 4 of the anti-CWF word count. All plots demonstrate the best fit lines of the multilevel Poisson models compared with the negative binomial models. For all models, the Poisson model explains most of the data up to the high mean values. Higher means are explained better with negative binomial models. However, in the data, the random effects largely are explained by the high mean values, and the lack of degrees of freedom leads to a failure of multilevel negative binomial models to converge. Therefore, the Poisson multilevel models explain the data sufficiently.

eTable. Characteristics of referendums and sources of articles.

CHARACTERISTIC	PORTLAND, OREGON					WICHITA, KANSAS			SAN ANTONIO, TEXAS		
	1956	1962	1978	1980	2013	1964	1978	2012	1966	1985	2000
<b>Referendum Year</b>	1956	1962	1978	1980	2013	1964	1978	2012	1966	1985	2000
<b>Referendum Decision</b>	Against	Against	For	Against	Against	Against	Against	Against	Against	Against	For
<b>Voting in Favor of Fluoridation, %</b>	42	45	51	46	39	37	46	40	32	48	53
<b>Votes Cast, No.</b>	181,140	144,300	139,373	115,408	164,301	50,997	84,139	129,199	38,855	81,373	292,811
<b>Population Size, No.</b>	373,628	372,676	382,619	366,383	733,764	254,698	276,554	356,724	587,718	785,880	1,385,695
<b>News Media Type, No.</b>											
Article	14	13	14	10	12	19	5	23	5	19	26
Editorial	1	2	2	2	12	7	4	2	12	6	18
Advertisement	0	0	0	0	0	1	1	0	4	0	0
<b>Total</b>	15	15	16	12	24	27	10	25	21	25	44