

### Introduction

Dental caries remains the most common chronic disease among children aged 6–19, despite being largely preventable.<sup>14</sup> Community water fluoridation is one of the most effective and equitable public health interventions for reducing dental decay and has been recognized as one of the ten greatest public health achievements of the 20th century.<sup>5</sup> Since its implementation in 1945 in the United States and adoption in approximately 25 countries, fluoridation has reduced cavities by about 25%; however, dental caries continues to disproportionately affect lower socioeconomic populations.<sup>10,16</sup>

At the optimal fluoridation level of 0.7 ppm, there is a 35% reduction in decayed, missing, and filled primary teeth and a 26% reduction in permanent teeth.<sup>11</sup> In New York City, water is sourced from the Catskills/Delaware system, disinfected with chlorine and UV light, and fluoridated.<sup>22</sup> However, older homes—particularly those built before 1961—may still have lead pipes, contributing to ongoing safety concerns.<sup>22</sup>

Despite the benefits of fluoridation, bottled water consumption has increased. In one study, 69% of parents reported providing bottled water to their children either exclusively or in combination with tap water.<sup>14</sup> Lower-income households are more likely to express concerns about tap water safety, often citing fear of contaminants, taste, and convenience as reasons for choosing bottled water.<sup>14, 25</sup> This perception of bottled water as “safer” may overlook the oral health consequences of reduced fluoride exposure.

Parental perceptions are further shaped by increasing misinformation, particularly through social media, while healthcare providers remain a trusted source of information.<sup>3,4</sup> Expanding oral health education through dental and primary care providers is especially important for lower socioeconomic communities, where barriers to care and access to accurate information persist.<sup>10</sup>

Given the continued importance of community water fluoridation and the rising reliance on non-fluoridated bottled water, it is critical to examine how water source preferences influence fluoride exposure and dental caries risk. Understanding these perceptions can inform targeted public health messaging and interventions aimed at improving oral health outcomes in children.

### Objectives

This study aims to understand how parents perceive the safety, quality, and oral health implications of various drinking water sources (tap: filtered/unfiltered or bottled.) It also aims to analyze if parental perceptions correlate with attitudes toward fluoride and oral health outcomes.

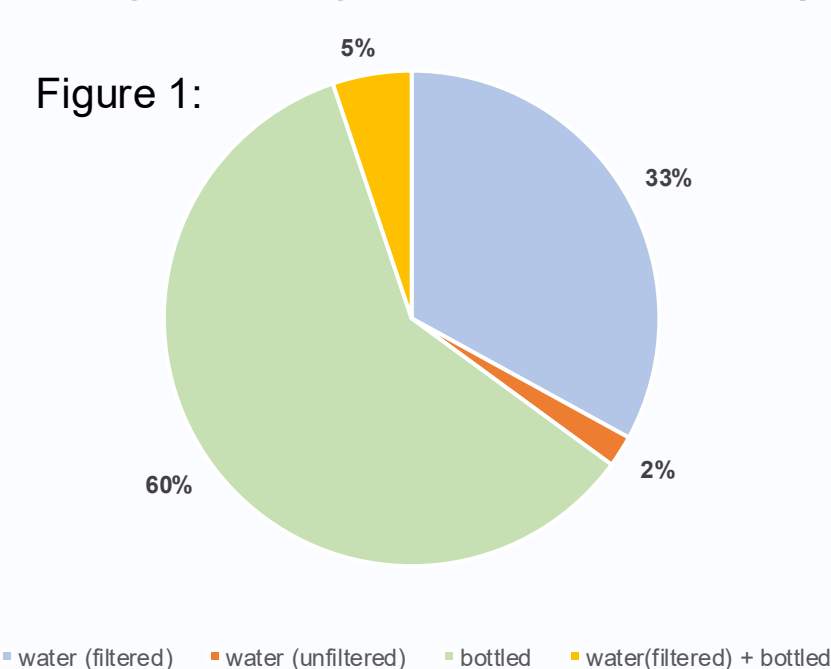
### Study Design and Methods

This cross-sectional observational study used a 16-question printed survey completed by caregivers. The survey included four sections: demographics, water consumption habits, perceptions of water quality and safety, and oral health practices. Responses were collected using Likert scales for quantitative analysis and open-ended questions for qualitative insights into factors influencing water choices. All data were de-identified prior to analysis to ensure confidentiality and compliance with HIPAA regulations. Surveys were available in English and Spanish.

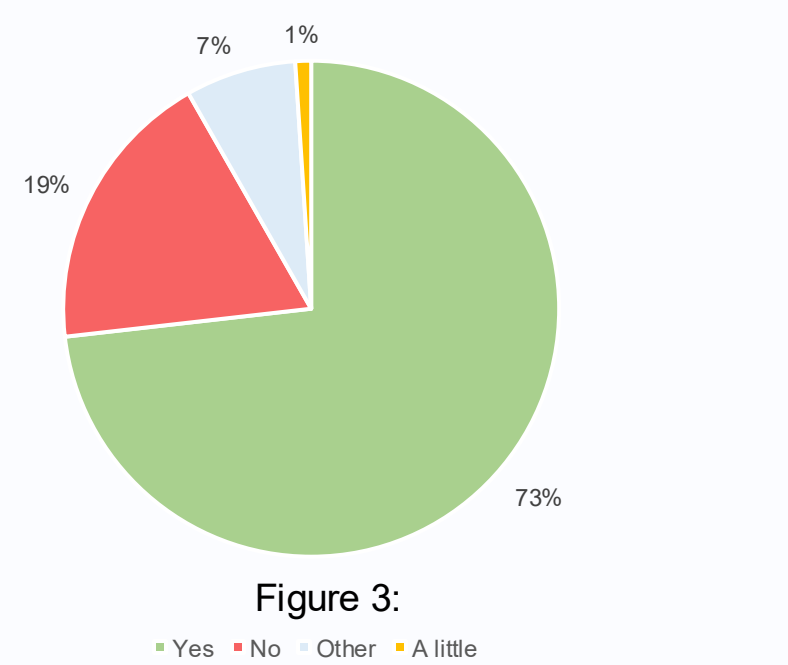
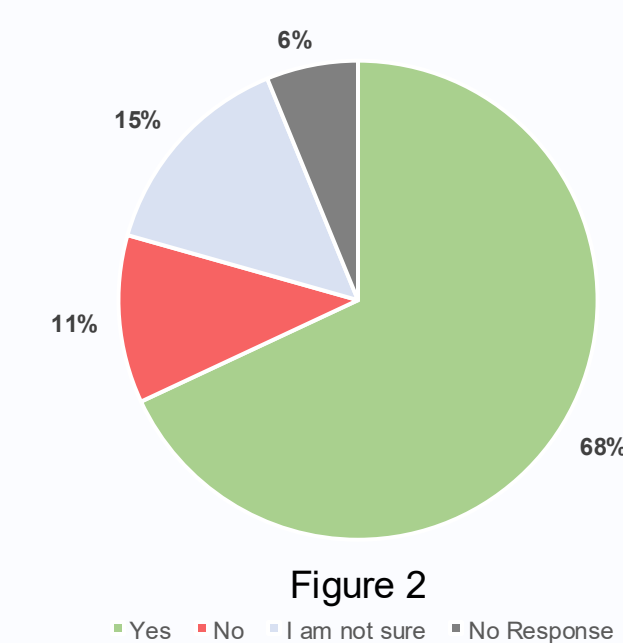
### Results

A total of 97 caregivers participated in the questionnaire. (n=97)

What is your primary water source for drinking?



Would you like your doctor or dentist to provide more information regarding the most appropriate choice of water?



### Results

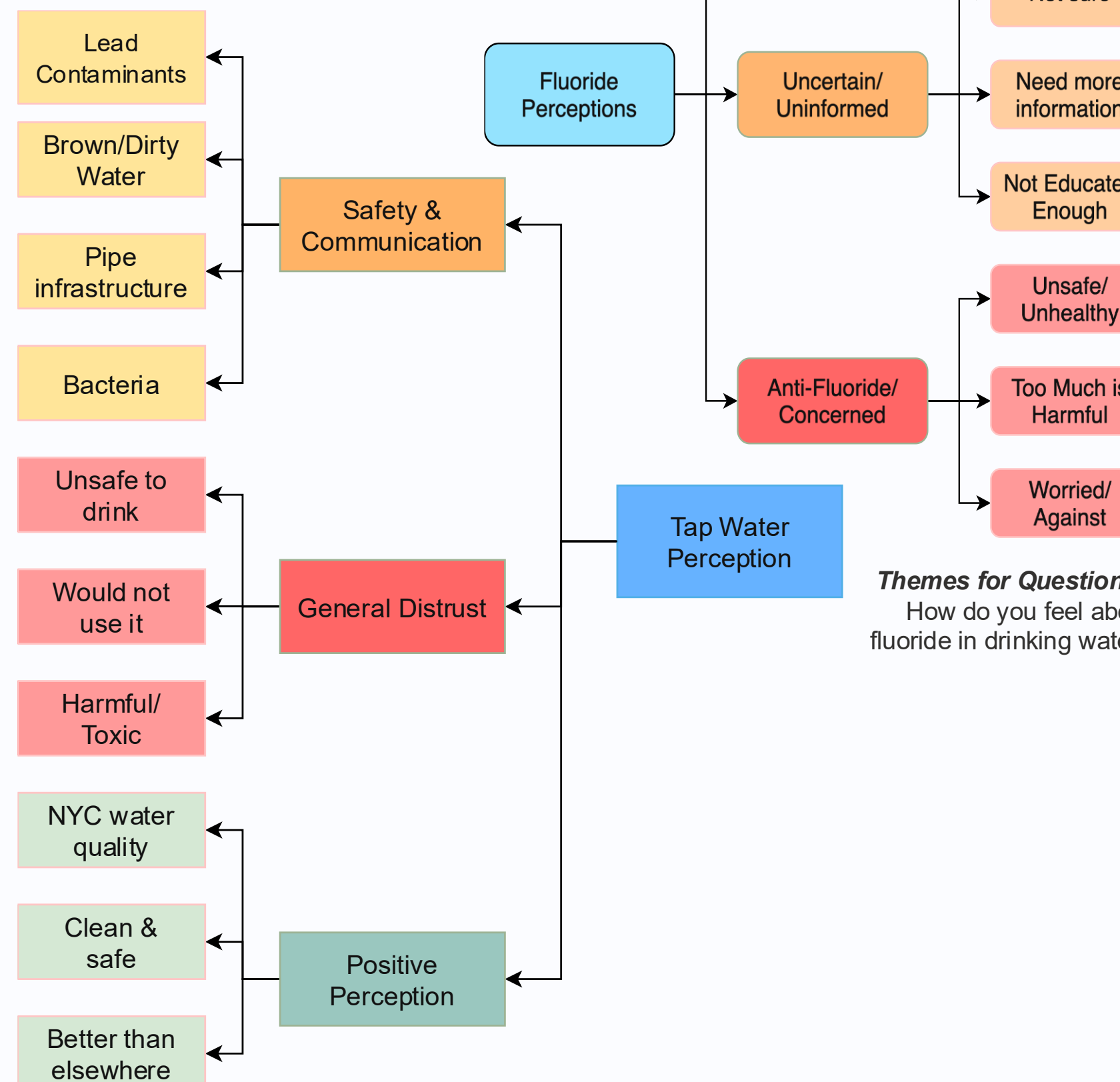
Characteristics	Bachelor's Degree N = 17 <sup>1</sup>	Graduate Degree N = 13	Some College N = 22	high school diploma N = 28	less than high school N = 13	p-value <sup>2</sup>
"Fluoride in tap water is beneficial for my child's teeth"						0.010
strongly agree	2 (13%)	6 (50%)	2 (11%)	4 (19%)	2 (17%)	
agree	1 (6.3%)	4 (33%)	2 (11%)	2 (9.5%)	0 (0%)	
neutral	9 (56%)	1 (8.3%)	9 (47%)	8 (38%)	3 (25%)	
disagree	3 (19%)	0 (0%)	5 (26%)	1 (4.8%)	3 (25%)	
strongly disagree	1 (6.3%)	1 (8.3%)	1 (5.3%)	6 (29%)	4 (33%)	

<sup>1</sup>n (%)

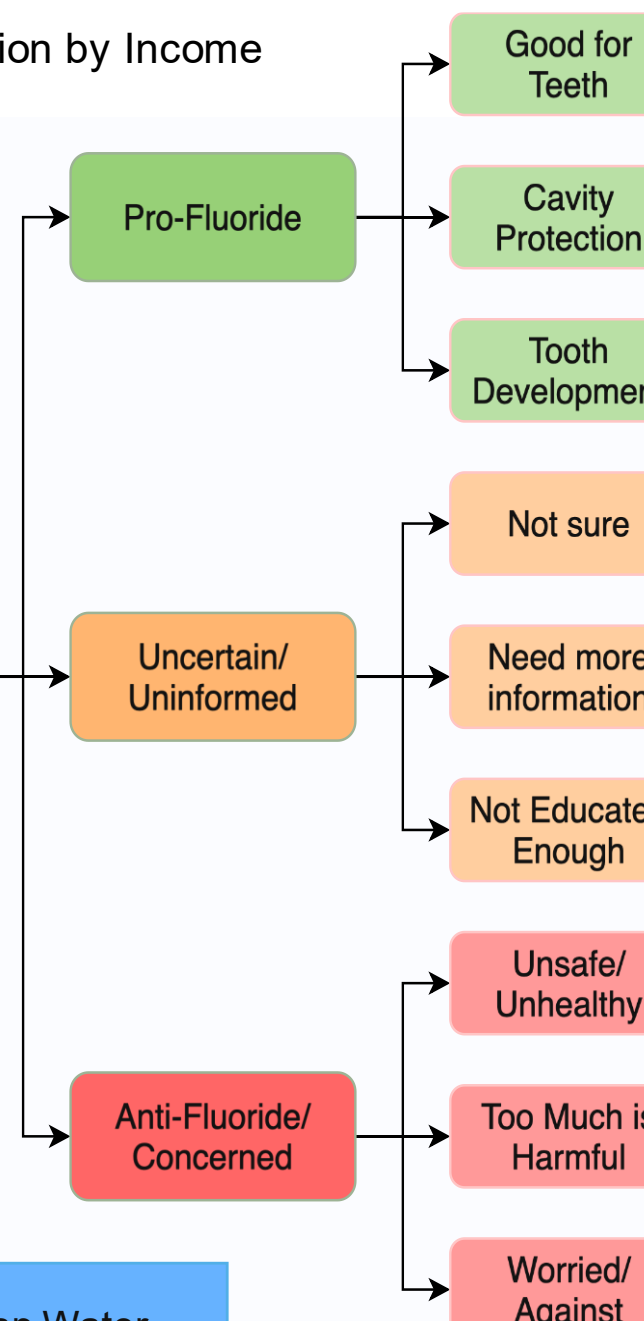
Table 1 : Fluoride Perception by Income

<sup>2</sup>Monte Carlo simulated p-value (based on ~ 10000 replicates)

Themes for Question 1: What comes to mind when you think about tap water in your community?



Themes for Question 2: How do you feel about fluoride in drinking water?



### Discussion and Conclusion

As depicted in Figure 1, one of our key findings was the reliance on bottled water as the primary drinking source (60%, 95% CI: 49%–69%), which may reduce exposure to optimally fluoridated tap water and contribute to disparities in caries prevention. Misconceptions regarding tap water safety appear to play a role in this preference. Attitudes toward tap water and fluoride varied by socioeconomic factors; while concern about lead in tap water showed a borderline association with income (p = 0.068) but was positive amongst a majority of the participants (Figure 3.) Belief in the benefits of fluoride for children's dental health was significantly associated with higher education (p = 0.010). (Table 1) The desire to receive information from a healthcare provider also demonstrated a borderline association with income (p = 0.080), suggesting opportunities for targeted patient education. The use of Monte Carlo simulation (N ≈ 10,000) strengthens the reliability of these findings.

For common themes, tap water was often associated with contamination, poor quality, and safety concerns, while perceptions of fluoride were more mixed, with many expressing uncertainty or limited knowledge, suggesting a gap in knowledge rather than active resistance.

Limitations include the small sample size resulting in reduced statistical power and wider confidence intervals, limiting the ability to detect significant associations and potential lack of generalizability. This study may also be limited by variability in participant comprehension, potentially influenced by differences in language proficiency and health literacy. These factors could have introduced measurement bias, as some respondents may not have fully understood survey items.

Overall, these results highlight the need for targeted, culturally sensitive education to address misconceptions about tap water and fluoride, improve trust in community water systems, and promote equitable oral health outcomes.

### Survey & References



### Acknowledgement

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