

## COVER STORY

# Income inequality in the United States and its potential effect on oral health

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Income inequality in the United States—or the unequal distribution of income across US society—has increased dramatically during the past 4 decades.<sup>1</sup> For instance, the share of total annual income received by the top 1% of earners in the United States more than doubled from 9% in 1976 to 20% in 2011. This increasingly unequal distribution of wealth and income generally has been attributed to public policy decisions—namely, taxation policies, supply-side economic models that favor greater individualization of pay over collective bargaining, and increasing levels of private and inherited wealth.<sup>2</sup>

Although an increase in income inequality has been evident in most Organisation for Economic Co-operation and Development nations during this time, the shift has been particularly pronounced in the United States.<sup>3</sup> The Gini coefficient—a measure of income distribution in which 0 means complete equality and 1 complete inequality<sup>4</sup>—affirms this trend. The United States' Gini coefficient is considerably higher than both the Organisation for Economic Co-operation and Development average and that of all but 3 other Organisation for Economic Co-operation and Development nations: Chile, Mexico,

## ABSTRACT

**Background.** The authors explored the relationship between income inequality and self-reported oral health and oral health-related quality of life.

**Methods.** The authors used an online survey to gather data about US adults' perceptions of their overall oral health and how oral health affected their quality of life. The authors categorized respondents as coming from areas of low, medium, or high income inequality on the basis of a county-level Gini coefficient.

**Results.** Results of  $\chi^2$  tests and an analysis of variance indicated that there was a significant association between income inequality and oral health as measured by using the overall condition of the mouth and teeth, life satisfaction, and frequency of experiencing functional and social problems related to oral health. Generally, adults from areas of lower income inequality reported better oral health and oral health-related quality of life.

**Conclusions.** Income inequality has the potential to affect both functional and social dimensions of oral health, possibly through a psychosocial pathway. Future research is necessary to determine whether any causal link exists.

**Practical Implications.** Our findings may inform oral health policy. Long-term policies designed to improve the oral health of Americans could work best when supported by policies designed to reduce levels of income inequality, and thereby, may reduce oral health inequalities. Further research is needed to examine the effectiveness of such policies.

**Key Words.** Oral health; income inequality; Gini index; survey research.

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and Turkey.<sup>3</sup> The increasing gap between the rich and poor in these societies and its potential effect is an issue of major public concern,<sup>3</sup> and this is especially the case in US political discourse. In 2013, for example, President Barack Obama referred to increasing income inequality as the “defining challenge of our time.”<sup>5</sup>

Particularly concerning is the role of income inequality in perpetuating lower levels of economic growth and



Supplemental material  
is available online.

opportunity, increased levels of poverty, and a breakdown in social cohesion and civic

participation.<sup>6</sup> Societies with higher levels of income inequality also experience poorer population health outcomes, including reduced life expectancy and higher rates of obesity, diabetes, cancer, and heart disease.<sup>6</sup> The strongest evidence for the direct health effects of income inequality at the population level is observed within the US population.<sup>7</sup>

The most germane theories as to how income distribution shapes health outcomes focus on materialist, cultural-behavioral, and psychosocial pathways, all of which influence or constrain a person’s health-modifying behaviors.<sup>8</sup> The materialist approach explains health inequalities through differences in a person’s socioeconomic position and, accordingly, through his or her distinct exposures to environmental factors that may influence his or her health (that is, pollution, working conditions, and so on). The cultural-behavioral pathway emphasizes that cultural influences shape a person’s behavioral choices and, as a result, predisposes people to engage in higher-risk lifestyles that may affect their health, such as smoking, drinking, or adopting an unhealthy diet.

In regard to oral health inequalities, however, the psychosocial pathway is particularly salient in explaining differences in oral health for various populations.<sup>9-12</sup> This approach posits that a person’s emotional well-being, psychological stability, self-esteem, and relationships with others are affected directly by his or her economic and social circumstances. In turn, psychosocial instability can exert physiological pressures on the biological systems that underpin a person’s health status.<sup>11,12</sup> In this regard, societal income distribution can be considered a social determinant of health<sup>13</sup> or a primary factor that establishes and propagates differences in health between social groups.

In this study, we explore the relationship between income inequality and oral health in the United States. Specifically, we examine the relationship between a population’s global ratings of oral health and oral health-related quality of life measures and the level of income inequality within that population by using available data from 2,020 counties throughout the United States.

## METHODS

**Sample.** The American Dental Association’s Health Policy Institute worked with Harris Poll to obtain a sample of

adults 18 years or older across the United States. We randomly selected survey respondents from a group of people who had agreed to participate in Harris Poll surveys to create a large nonprobability sample. The desired sample size was 15,300—specifically, 300 per state and the District of Columbia. We used the 2014 federal poverty guidelines published by the US Department of Health and Human Services to categorize people as low, middle, or high income. Within each state sample, 100 were people of low income, with household incomes at or below 138% of the federal poverty guideline; 100 were people of middle income, with household incomes between 139% and 400% of the federal poverty guideline; and 100 were people of high income, with household incomes at or above 401% of the federal poverty guideline. We structured the sample this way to allow for analysis according to income level within states.

**Survey instrument.** The Health Policy Institute developed a survey in partnership with oral health experts from the American Dental Association’s Practice Institute and Science Institute and outside international experts to measure aspects of oral health such as pain and discomfort, ability to chew and speak, satisfaction with mouth function and esthetics, and any physical, emotional, and psychological effects derived from the condition of the mouth.<sup>14</sup> We adapted survey questions about these aspects of oral health from established surveys<sup>15-17</sup> or generated them in-house; then we consulted international experts on defining and measuring oral health on the basis of self-reported indicators to review the questions. To our knowledge, investigators have not measured these person-specific ratings of various aspects of oral health extensively in routine population-based national surveys in the United States.

We also included questions about insurance status, source of insurance, access to dental services, and oral health care utilization. We adapted these questions from a survey developed by the Health Policy Institute in 2014.<sup>18</sup> We also included standard demographic questions about topics such as age, education, household income, and race or ethnicity. Full details about development of the survey instrument and the full list of survey questions are available elsewhere.<sup>19</sup>

**Data collection.** Harris Poll piloted the survey questions via telephone and online before data collection to gather feedback from respondents, test responses, and make revisions to the survey accordingly. We deployed the final version of the online survey on June 23, 2015. We closed data collection on August 7, 2015, with a total of 14,962 responses across all 50 states and the District of Columbia. We did not reach the quota of 300 responses in 7 states and the District of Columbia.

**Measures for analysis. Global ratings.** Global ratings of oral health included responses to the following questions:

■ How would you describe the condition of your mouth and teeth? (Response options were *poor*, *fair*, *good*, *very good*, and *don’t know*.)

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