Appendix 1. Further methodological aspects.

Estimation of the Relative Index of Inequality (RII) and the Slope Index of Inequality (SII)

As a first step to estimate the indices, a weighted score was derived for each SEP measure in all analyses. To derive the score, the categories of education and income were organized hierarchically and then, based on the distribution of people in these categories, values between 1 and 0 were assigned to each category. The score corresponds to this continuous variable with values between 0 (highest SEP) and 1 (lowest SEP). The score was assigned based on the midpoint of the range in the cumulative distribution of participants in the given SEP category. For example, if the first category of education comprises 20% of the population, each person in this category was assigned a value of 0.1 (0.2/2), and if the second category comprises 30% of the population, persons in this category were assigned a value of 0.35 (0.2+[0.3/2]) and so forth. In this study, scores were derived to reflect the distribution of participants in SEP categories in each country. The RII and SII were obtained by regressing the weighted score measure of SEP on the outcome of interest, adjusting for covariates. RII and SII were estimated using robust Poisson and linear regression models respectively. These regression models have been previously used to estimate the indices, especially in analyses of survey data where issues of convergence with log-binomial models are common [1 2].

These indices have a fairly straightforward interpretation. Estimates of the RII are interpreted as the prevalence ratio of the health outcome among persons at the lowest and highest levels of the socioeconomic hierarchy [1 3]. Values of RII larger than 1 indicate inequality with higher prevalence of the outcome among those in lower socioeconomic level. Conversely, an RII value less than 1 indicate that the oral health measure was more likely to be prevalent among those with a higher SEP level. In turn, the SII estimate represents the hypothetical absolute difference in the prevalence of the outcome between bottom and top of the SEP hierarchy. Positive values of the SII indicate that prevalence of the outcome increases with lower levels of SEP. For both RII and SII, larger estimates signify larger inequalities.

Rationale of the choice of covariates

Age, gender, marital status and ethnicity were included as covariates in the study models given their relationship with both oral health and socioeconomic position. As example, age was considered in all analyses because different age distributions between the countries and also differences in the mean ages across the SEP categories could influence findings. Our approach was to include conceptually relevant variables in order to account for the complex and multiple pathways through which oral health inequalities may arise. Therefore, our selection for the explanatory variables was motivated by social epidemiology theory. Since variable selection is motivated by theory, we retained explanatory variables even if

they had statistically insignificant effects on the outcomes, as their omission may result in bias in effects of other explanatory variables.

Survey questions about self-rated oral health and oral impacts

	ADHS 2009	NHANES 2005-08
Self-rated oral health	'Would you say your dental health (mouth, teeth and/or dentures) is...'	'How would you describe the condition of your teeth and gums? Would you say…'
Oral impacts on daily life: Identical questions based on OHIP-14	In the last 12 months, have you had painful aching in your mouth?	
	In the last 12 months, have you found it uncomfortable to eat any foods because of problems with your teeth, mouth or dentures?	
	In the last 12 months, have you been self-conscious or embarrassed because of your teeth, mouth or dentures?	
	In the last 12 months, have you felt that your sense of taste has worsened because of problems with your teeth, mouth or dentures?	
	In the last 12 months, have you had difficulty doing your usual jobs because of problems with your teeth, mouth or dentures?	
	In the last 12 months, have you felt that life in general was less satisfying because of problems with your teeth, mouth or dentures?	

Handling missing data

For analyses by education, all variables had less than 1% missing data. For income, since about 18% of the English sample had missing data on income, we performed a sensitivity analysis to assess the effect of these missing data on our results. For that purpose, the regression models were also estimated with income data imputed using two approaches (Bayesian multiple imputation techniques, and simple regression techniques), and the results were almost identical to those presented in the paper. Therefore, based on these analyses, there is no evidence that missing data was biasing our study results. Results of this and other sensitivity analyses are shown in Appendix 4.

References

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