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Geography matters: state-level variation in children's oral health care access and oral health status

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ABSTRACT

Objectives: To ascertain differences across states in children's oral health care access and oral health status and the factors that contribute to those differences.
Study design: Observational study using cross-sectional surveys.
Methods: Using the 2007 National Survey of Children's Health, we examined state variation in parents' report of children's oral health care access (absence of a preventive dental visit) and oral health status. We assessed the unadjusted prevalences of these outcomes, then adjusted with child-, family-, and neighbourhood-level variables using logistic regression; these results are presented directly and graphically. Using multilevel analysis, we then calculated the degree to which child-, family-, and community-level variables explained state variation. Finally, we quantified the influence of state-level variables on state variation.
Results: Unadjusted rates of no preventive dental care ranged 9.0–26.8% (mean 17.5%), with little impact of adjusting (10.3–26.7%). Almost 9% of the population had fair/poor oral health; unadjusted range 4.1–14.5%. Adjusting analyses affected fair/poor oral health more than access (5.7–10.7%). Child, family and community factors explained ~¼ of the state

Abbreviations: AHRQ, Agency for Healthcare Research and Quality; CV, coefficient of variation; DHPSA, Dental Health Professional Shortage Area; FPL, federal poverty level; NSCH, National Survey of Children's Health; SD, standard deviation; WIC, supplemental nutrition program for women, infants, and children.

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variation in no preventive visit and ~½ of fair/poor oral health. State-level factors further contributed to explaining up to a third of residual state variation.

Conclusion: Geography matters: where a child lives has a large impact on his or her access to oral health care and oral health status, even after adjusting for child, family, community, and state variables. As state-level variation persists, other factors and richer data are needed to clarify the variation and drive changes for more egalitarian and overall improved oral health.

The oral health of most American populations has improved over the past 20 years; still, dental caries remains the most common chronic condition of childhood, affecting two-thirds of children by the time they turn 19, with worsening rates in recent years for children aged two to five years.[1] Interventions to prevent caries have included those that are self-administered (e.g. fluoride toothpaste), professionally applied (e.g. sealant or fluoride varnish), and community-based (e.g., optimal water fluoridation and health education programs); more recently, there have been increasing opportunities for care delivered outside the dentist's office (e.g., using midlevel providers and alternate sites of care [WIC, Head Start, mobile vans, and paediatric offices]). Caries interventions available may vary by community. However, the influence of geographic variation, including state of residence, on children's oral health is understudied.

Geographic variation in health-care delivery and various health outcomes has been discussed in the medical literature for almost 30 years, for both children and adults. Since Wennberg's seminal paper in 1973,[2] research has demonstrated regional variation (including within- and across-state) for numerous health conditions and medical treatments. In pediatrics, these are as diverse as obesity,[3–5] adolescent pregnancy,[6] emergency department use,[7] hospitalizations,[8] appendicitis rupture,[9] and medical home access[10] or underinsurance[11] for children with special health care needs. Particular attention has been paid to differences seen in urban vs rural locales; the Agency for Healthcare Research and Quality (AHRQ) National Healthcare Disparities Report considers residents of rural areas to be a 'priority population'.[12] They are more likely than urban residents to be in fair or poor physical health,[13] and less likely to have seen a health care provider or to have received preventive services.[14] Health differences even seem to cluster regionally, such as the 'Deep South' having poorer scores on a child's health well-being index.[15] Understanding these disparities can form the basis of targeted interventions and healthcare policies.

Research in children's oral health has included some aspects of geographic variability. There has been work on variation within California, where children's regular dental care can vary by almost 50%, depending on assembly or senate district.[16,17] In regions of the United States, as well, the concentration of dentists varies, from highest rates in Northeast to lowest in the South.[18] The majority of work on geographic variability has focused on urban-rural differences in oral health workforce,[18,19] access,[20–24] and oral health status.[23] Recently, the Pew Center on the States published a comparison of state dental policies for children, which showed broad variation by state and a sobering two-thirds of states that are not adequately providing for basic dental care for children.[25] However, Mandel and colleagues showed that the rates of oral health in states has been improving over the last decade, but state variation persists.[26]

Thus, despite the long-standing history of such analysis in other paediatric conditions, there is a gap in information regarding among-state variation in children's oral health. Therefore, the purpose of this analysis is to ascertain differences across US states in children's oral health care access and oral health status and the factors that contribute to those differences.

Methods

Conceptual foundation

This analysis used the framework of our previously described conceptual model (Fig. 1),[27] a multilevel approach to understanding children's oral health. This model has been tested on 2003 national survey data using parent-reported children's oral health status, although not with a focus on geographic disparities.[28]

Data source

Data were from the 2007 National Survey of Children's Health (NSCH), conducted by the Centers for Disease Control and Prevention, National Center for Health Statistics (CDC/NCHS). The NSCH is a cross-sectional survey stratified by state and the District of Columbia (DC) that provides information at the national level on children's health and well-being, allowing for among-state comparisons. It was conducted by telephone, in English, Spanish and four Asian languages, using random-digit-dialling. In each household, one child under 18 years old was randomly selected as the subject of an in-depth interview with a knowledgeable adult (typically a parent) in the household. A total of 91,642 interviews were conducted in households with children. Interviews were completed in 66.0% of identified households with children. CDC/NCHS sampling weights account for households without land-line telephones; the survey methodology is described in detail elsewhere.[29]

Because many survey items in this analysis encompassed a one-year recall period, we restricted our analyses to children