

Solving the Problem of Early Childhood Caries

A Challenge for Us All

THE REPORT BY MILGROM ET AL¹ ON A RANDOMIZED clinical trial of topical xylitol to prevent dental caries in infants and toddlers highlights the pressing need to eliminate an overwhelmingly preventable disease that remains rampant among our children. Early childhood caries (ECC) is well understood by microbiologists and research dentists—if not by the general public and their health care providers—as ordinary tooth decay run amok. It most commonly manifests as extensive tooth destruction and associated pain, with or without infection, by age 22 months and sometimes much earlier.

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The Centers for Disease Control and Prevention reports that more than one-quarter of all US toddlers and preschoolers (28%) are affected.² Nearly half of all children have experienced cavities before entering kindergarten.² Children of social disadvantage—poor children, minority children, children of parents with lesser education, and especially Native American and Pacific Islander children—are disproportionately affected. The caries process that causes cavities is infectious, transmissible, diet dependent, and fluoride mediated. It is highly prevalent, disparately distributed, and consequential in both the short term and long term. It is largely predictable, preventable, and suppressible once established. Yet once established, its manifestation as cavities is most commonly treated surgically with restorative dental treatments that repair the damage but fail profoundly to address the underlying disease process. Common preventive dentistry mainstays, including twice-annual dental cleaning, topical fluoride application, and admonition against frequent sugar consumption, are too often one-size-fits-all approaches that are rarely adjusted in intensity and follow-up to match individual children's levels of risk and disease activity.

Early childhood caries has been the longstanding focus of Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) and Early Head Start interventions, Maternal and Child Health Bureau conferences and programs, National Institutes of Health research, Indian Health Service treatment programs, and Medicaid demonstrations. Its prevention, identification, and treatment are featured in the Children's Health Insurance Program (CHIP) bill signed into law by President Obama on February 4, 2009. The US Surgeon General has highlighted it through a report,³ workshop, and conference, and *Healthy People 2010* calls for its reduction.⁴ However, it persists and has increased in relative prevalence by 15% in the last 2 decades.

Policy statements—including the recommendation that children have their first preventive dental visit before age 1 year and that primary medical care providers conduct risk assessment, counseling, fluoride application, and den-

tal referral—have been issued by dental (American Dental Association, American Academy of Pediatric Dentistry, American Dental Hygienists' Association), medical (American Academy of Pediatrics, American Academy of Family Physicians), and public health (American Public Health Association, Clinicians for the Underserved, Bright Futures Coalition) organizations. An international effort, the Global Child Dental Health Taskforce, has been organized to promote options for ECC elimination. Yet, the important idea of a dental visit for an infant is largely unknown to the public, not promoted by rank-and-file health care providers, and so variable in content when it does occur as to be hit and miss. Consumer information on the Web has been described as “readily available and accessible but not authoritative.”⁵

Insurers are anxious to see the eradication of ECC because it is the best predictor of lifelong caries experience. The lack of evidence-based protocols for its identification and control has restrained their willingness to pay substantially for “soft” interventions that include motivational interviewing, dietary counseling, promotion of nonnutritive sugar substitutes (including xylitol), application of antimicrobials (other than fluoride varnish), parental education, and behavioral modification.

Early childhood caries persists because of the following: (1) parents of at-risk children are either unaware of its etiology or accept its existence as normal; (2) dentists are either inaccessible or consumed with treating its signs and symptoms rather than its underlying causative process—or have become frustrated in trying to modify parental behaviors that seem intransigent; (3) public and private insurers reward repair over disease management, largely because disease management remains undefined or unaccountable; (4) most primary care medical providers for infants and toddlers have little training in oral health care and do not yet actively counsel, assess, or prescribe for ECC or refer young at-risk children to early dental care; and (5) effective interventions depend on behavioral, dietary, and pharmacologic compliance factors that are difficult to implement.

Many bright spots illuminate efforts to solve this problem through research, policies, and programs. Notable among efforts to engage primary medical providers in attending to young children's oral health are American Academy of Pediatrics programs including its online Oral Health Risk Assessment Training for Pediatricians and Other Child Health Professionals, preceptorship program, and constellation of community activities. However, although recent progress has been made in awareness of the need for oral health training,⁶ the 2004 finding by pediatrician-educator David M. Krol, MD, that “the level of oral health training for pediatricians at the undergraduate, graduate, and continuing medical education levels is inadequate to provide pediatricians with the competencies required for the provision of quality oral health care to children”⁷ remains valid.

Too often missing from efforts to address ECC at both the population and individual levels are pharmacobehavioral disease management approaches that consider interventions within the contexts of family, community, and society. Multifactorial conceptual and research models⁸⁻¹⁰ beg the development of protocol-driven, evidence-based, multipronged interventions. Developing effective interventions for ECC, as with childhood asthma, will require significant input not only from biomedical scientists but also from social workers, health educators, nutritionists, health behaviorists, social marketers, and social psychologists. Significant roles need to be developed for the following: (1) information technology used to refine and standardize risk assessment, tailored interventions, health behavior modification, and compliance monitoring; (2) development of social approaches including peer counseling, cultural considerations, and supportive social environments; and (3) systems development including training, payment, and networking that supports early identification, effective anticipatory guidance, meaningful primary prevention, and ongoing disease management by all who serve the interests of young children.

Findings reported herein by Milgrom and colleagues that xylitol application holds strong promise to significantly dampen ECC occurrence are encouraging and suggest the addition of this approach to pharmacologic management in public health and individual care settings. Xylitol application, like fluoride varnish application, will likely become a routine element of ECC control. The finding, however, that ECC prevalence remained at 24% to 41% among treated children at the close of the trial in a high-carries-experience population

reminds us that no single “silver bullet” is going to solve the problem of ECC.

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Poorer Health

The Persistent and Protean Connections Between Poverty, Social Inequality, and Child Well-being

POVERTY IS BAD FOR CHILDREN. THIS UNAS-sailable reality is hardly a news flash: beginning in the early 1800s with the studies by Louis-René Villermé in France and William Farr in England, investigations have firmly established the strong connection between poverty and the overall population mortality rate and, more dramatically, infant mortality rates.¹⁻³ New evidence accumulated during the past several decades has refined our understanding, showing not only the association between an individual child's absolute or relative exposure to poverty and a greater risk of myriad diseases and conditions but also a similar association between ill health and the degree of nonuniform distribution of income across an entire population or society.^{4,5}

While these associations are evident in the United States and around the world, what is far from clear—and hotly disputed—are the precise reasons these associations ex-

ist.⁶ Said differently, we do not know the specific mechanisms by which the low socioeconomic status (SES) of individuals—or, anticipating a point we will make shortly, a greater degree of income inequality within a society—exerts its harmful effects. Seeking to understand exactly how poverty hurts children is not an idle academic pursuit: identifying the most important mechanisms and understanding how they interact and modify each other will have crucial implications for the design of effective policy response and help to better frame the social and political debates about how to improve the well-being and outcomes of all children across the SES gradient.

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Against this backdrop, the importance of the study by Wang et al⁷ resides less in yet another discovery of an association between SES and poor health outcomes for