# The Dental Home

## Summary from an MCHB Expert Meeting

September 18–19, 2008
Washington, DC

## Overview

For the past several years, both health professionals and the lay community have been using the term "dental home," yet there is no widely accepted definition. To address this issue, the Health Resources and Services Administration's Maternal and Child Health Bureau (MCHB) convened a meeting of experts representing federal, national, state, and local leaders on September 18–19, 2008, in Washington, DC, to

- Assist MCHB in further exploring the concept of the dental home as it relates to the bureau's philosophy and goals.
- Explore relationships between the medical home and dental home concepts.
- Collect information about defining and establishing dental homes, and identifying promising practices and programs for implementing dental homes.

The first day of the meeting, participants made presentations that focused on exploring the historical development of the medical home and dental home concepts, defining the dental home concept, highlighting the challenges in establishing dental homes, as well as identifying promising practices and programs implementing dental homes.

The second day of the meeting, participants identified key components of dental homes. They also focused on examining the roles played by families, health professionals, and community providers; formulating an inclusive model of the dental home as the basis for strategic action; operationalizing the model through action steps; and engaging policies, programs, and players critical to moving forward. The meeting agenda, a participant list, and a draft background paper are included in the appendices of this report.

## Presentations

### *Historical Development of the Medical Home and Dental Home Concepts*

Arthur Nowak, D.M.D.
American Academy of Pediatric Dentistry

Dr. Nowak recalled his frustration, while working as a pediatric dentist during the 1960s, at the profession's inability to address oral disease prevention in infants, young children, and school-age children. He introduced prevention-oriented concepts such as the establishment of a prenatal program in his dental practice and in a community hospital. The prenatal program provided counseling on oral health care to pregnant

women and their spouses, which was expected to reduce the incidence of tooth decay in their children. He noted that the concept and program "hit the profession like a lead balloon," and he learned that building support for the concept of prevention would take time.

In the 1970s, Dr. Nowak began providing preventive oral health care supervision to asymptomatic children under age 3. Other catalysts for prevention efforts were the journal article "Clinical Guideline on Periodicity of Examination, Preventive Dental Services, Anticipatory Guidance, and Oral Treatment for Children,"[1] published in 1991, and the practice guidelines *Bright Futures: Guidelines for Health Supervision for Infants, Children, and Adolescents*[2] published in 1994, both of which received an enthusiastic response from health professionals and families. Ensuing publications expressed support for the concept of early and comprehensive oral health care under the direction of a dentist. The journal article "The Dental Home: A Primary Oral Health Concept,"[3] published in 2002, was the first publication that focused on the dental home concept, and it received tremendous support. The American Dental Association (ADA) lent its support to the dental home concept in 2006, and since that time a number of national and international bodies have also recognized the concept of the dental home.

## Lewis Lampiris, D.D.S., M.P.H.
## American Dental Association

Dr. Lampiris described how the promotion of the concept of the dental home in ADA journal articles written by members and nonmembers led ADA to formally approve a definition of the dental home in 2005. The definition approved by ADA is as follows: "The ongoing relationship between the dentist who is the primary dental care provider and the patient, which includes comprehensive oral health care, beginning no later than age one, pursuant to ADA policy."[4] One result of ADA's adoption of a definition of the dental home was that ADA collaborated with the American Academy of Pediatric Dentistry (AAPD) Foundation to disseminate a brochure to every dentist in the country, with the intent of emphasizing the importance of the dental home.

Dentists today are only beginning to understand dental homes as they apply to age 1 dental visits, Dr. Lampiris pointed out. Considerable thought is being given to determine how to make the age 1 visit a reality for all children. Progress is incremental, but establishing dental homes by age 1 for all children is achievable through provider training, prevention emphasis, and ongoing collaboration among stakeholders.

## Richard Antonelli, M.D., M.S.
## American Academy of Pediatrics

Dr. Antonelli pointed out that medical home and dental home concepts have been established. Rather than "selling" their importance, which was a struggle during the development and early promulgation of the models, steps should be taken to develop an appropriate model of the dental home to achieve consensus among stakeholders and take advantage of available funding.

Dr. Antonelli stated that weaknesses inherent in the medical home and dental home concepts include lack of access to Early and Periodic Screening, Diagnosis and Treatment services; poorly defined care coordination; and disparities that disproportionately

affect children with special health care needs (CSHCN) from certain racial and ethnic minorities, and from families with low incomes.

Today, opportunities exist to promote medical homes and dental homes (e.g., fostering collaboration and connectivity among professionals and professional organizations, empowering families). Health care systems that seek feedback from families about their needs are more likely to be successful than systems that treat patients as commodities, Dr. Antonelli said. Efforts must be made to change this corporate-minded mentality.

## *Defining the Dental Home Concept*

### Betsy Anderson
### Family Voices

Ms. Anderson described the dental home concept as a relatively new idea for families of CSHCN. Families are the first and best advocates when it comes to their children's health and development, and they want all health professionals to keep them informed about their children's general health and oral health needs. In particular, families want better financing for oral health care, better access, and family-centered care. Action steps to address these needs include:

- Seek feedback on families' expectations, desires, and needs by collecting satisfaction and outcome data.
- Develop and provide families with family-friendly information about oral health and oral health care.
- Promote collaboration among families and oral health professionals to establish dental homes.

### Jim Crall, D.D.S., Sc.D.
### American Academy of Pediatric Dentistry

Dr. Crall reported on the oral health care delivery system in the United States and touched upon several definitions of "dental home." AAP's policy statement, "Oral health risk assessment timing and establishment of the dental home,"[5] represents a formal recognition of the need to identify and refer to a dentist, using risk assessment: children at high risk for oral disease, including CSHCN; children of mothers with high rates of tooth decay; children who sleep with a bottle or breastfeed during the night; and children from families with low incomes. Conversely, a population-based oral-health-management model seeks to align available and variable resources with population needs. The goal of the model is to keep children at low risk in the low-risk category through the provision of preventive services and education, and to eliminate or reduce factors that place children at high risk for tooth decay.

## *Challenges in Establishing Dental Homes*

### Sanford Fenton, D.D.S., M.S.D.
### American Academy of Pediatric Dentistry

Dr. Fenton focused on barriers that exist at the patient, parent or other caregiver, and health professional levels for children in general and CSHCN in particular.

A barrier at the patient level is lack of access to oral health care in rural and urban areas. Most dentists' offices are located in suburban areas.

A barrier at the parent or caregiver level is low expectations for their child's oral health care, especially among families with low incomes and among

families of CSHCN. Between 13 and 15 percent of CSHCN live with pain as a result of poor access to oral health care and dentists' inadequate knowledge and skills related to caring for CSHCN. While both primary care health professionals and oral health professionals have shown an interest in learning more about the needs of CSHCN, many have never had the opportunity to do so.

A barrier at the health professional level is lack of education and training. Until the passage of a 2004 ADA resolution to improve access to comprehensive oral health services for CSHCN, education and training for dental students on serving this population was not universal. The ADA resolution pushed the Commission on Dental Accreditation to impose hands-on standards for CSHCN for every dental and dental hygiene school in the nation.

### *Frontline Approaches to Implementing Dental Homes*

#### Brian Souza, M.S.W.
#### Catalyst Institute

Mr. Souza described Healthy Teeth for Tots, a Boston-based program in health centers developed to conduct oral health risk assessments on infants and children from birth through age 3 and provide anticipatory guidance to their parents. Program goals are for pediatricians to integrate oral health into well-child visits and to emphasize oral health—including the importance of every child having routine dental visits—into these visits.

The Catalyst Institute manages a quality-improvement project based at Children's Hospital Boston, MA, and at St. Joseph Hospital for Specialty Care, Providence, RI. The project uses intense case management to reduce the cost burden on hospital operating rooms that provide oral health care to children with severe disease. The first 6 months of data demonstrated that the project was meeting its three primary objectives:

- 20 percent reduction in hospital operating room use
- 33 percent reduction in new cavitation
- 50 percent reduction in patient-reported oral pain

#### Larry Hill, D.D.S., M.P.H.
#### American Association for Community Dental Programs

Dr. Hill discussed a number of nontraditional approaches to providing a dental home for children from families with low incomes living in urban areas. The three approaches described were shuttle dentistry (bringing children to dentists), the Dental Road Crew (bringing dentists to children), and the Growing Well Cincinnati Collaborative (integrating oral health care into community health settings). These approaches have resulted in oral health care being provided to nearly 90 percent of children in an urban school system serving primarily children from families with low incomes. Although these approaches do not equate to an ideal dental home, this might be the best the current system of care can offer these children.

## Key Components of Dental Homes

### Access to Care

Dental homes must be attuned to the impact that family education level, income, and health insurance status have on access to care. Inextricably tied to access to care is the cost of care. Inability to pay for oral health care is a major deterrent for families attempting to establish a dental home.

## Quality of Care

The notion that oral health professionals choose to make care available is not necessarily an indication that quality care will be provided. Consequently, it is important to distinguish between "one-star" and "five-star" dental homes.

## Coordination of Care

Care coordination for children within dental homes is a service that connects children and their families to comprehensive care and community resources. A key element of care coordination is the identification of a lead coordinator, who might be a dentist, a mid-level oral health provider (e.g., dental hygienist, dental therapist), primary care health professional, or a family member. In all cases, a coordinator must be able to navigate the health care system.

### *Example of Coordination of Care: I-Smile*

On May 12, 2005, the Iowa legislature passed a Medicaid reform initiative, which created the I-Smile program. The program provides timely oral health care for children enrolled in Medicaid. Components of the program include improving the oral health support system for families, improving the dental Medicaid program, implementing recruitment and retention strategies for dentists working in underserved areas, and integrating oral health services into rural and critical access hospitals.

I-Smile is a conceptual dental home that offers a team approach to managing oral disease. Centered in Iowa's existing public health network, the program focuses on primary prevention and care coordination. Dental hygienists, serving as I-Smile oral health coordinators, are implementing the program within Iowa's 23 Title V child health agencies. These coordinators are developing partnerships, establishing referral systems, providing education and training for health professionals, ensuring completion of oral screenings and risk assessments, working within their agencies to develop oral health protocols, ensuring care coordination, and providing gap-filling preventive services.

## Preventive Care

It is important to eradicate the treatment-only concept of the dental home and to instead create a concept of the dental home as also providing preventive care. Under such a model, dental homes would provide outreach, risk assessment, preventive care, and education, among other services.

### *Example of Preventive Care: Infant Oral Health Education Program*

The Infant Oral Health Education Program at the University of Tennessee provides 20 minutes of prevention counseling to mothers of newborns within 24 hours after the mothers give birth. The program has demonstrated a reduction in tooth decay in 3- and 4-year-old children.

## Conceptualizing Dental Homes

During the meeting, participants discussed how the roles of dental hygienists, primary care health professionals, community-based health providers, and families—as well as the key role played by the dentist—related to the concept of the dental home, to emphasize a team approach.

### Dental Hygienists

Dental hygienists can provide preventive, therapeutic, and restorative services within their scope of practice as defined by state law. As of 2008, the American Dental Hygienists' Association (ADHA) reported that 15 state Medicaid programs allowed dental hygienists to seek reimbursement for some care.

### Primary Care Health Professionals

Using primary care health professionals (e.g., physicians, nurse practitioners) to provide oral health preventive care and education on oral disease prevention is an excellent way to take advantage of existing resources to broaden the reach of the oral health

delivery system by linking medical homes and dental homes.

### Community-Based Health Providers

Community-based health providers can play a crucial role in providing education on oral disease prevention.

## Families

Families must be partners in care, and in an ideal family-centered model, families serve as the focal point of medical homes and dental homes. A child's ability to enter a system of care is dependent to a large extent on the family's support, and the family is the most appropriate entity to individually tailor and coordinate care to fit a child's needs. Therefore, enlisting family support through outreach, education, and consistent communication is integral to promoting dental homes.

# Models

## *Which Models Best Reflect the Dental Home Concept?*

Meeting participants worked to articulate the model that best embodied the dental home concept. Participants began by posing questions such as, "Does the dental home concept apply more to a private practice or a community setting?" They discussed a number of existing models that might work for dental homes, as follows:

### Health Home Model

Several participants expressed frustration that the most commonly used dental home definition does not include key components of care (i.e., access to care, quality care, coordination of care) or adhere to a model of prevention-oriented disease management. Stand-alone dental homes cannot adequately incorporate these components without drawing from elements of the medical home concept. A combined medical home-dental model, the "health home," would avoid a "silo approach" to health care and competition between medical and dental entities.

### Vertical (High-Rise) Model

In this model, the highest-level, most complicated care would be provided by a dentist, and lower levels of care would be provided by a dental hygienist.

### Dispersion (Low-Rise) Model

In this model, the entire community serves as the dental home, and community resources are integrated to serve the population's oral health needs. For example, children receive preventive care (dental sealants and fluoride varnish) at school, risk assessment and education from their primary care health professional, and needed restorative treatment at a private dental practice or safety net dental clinic. A number of participants believed that the dispersion model was the optimal dental home model.

### Two-Tiered Model

As both the vertical and dispersion models seek to deliver better oral health services in an integrated way, participants agreed to combine the models into a flexible two-tiered structure. Participants also agreed that some children might be better served by a two-tiered model.

# Operationalizing Dental Homes

## *Accumulate an Evidence Base*

Participants agreed that establishing a science base for the concept of the dental home was integral to moving forward. Evidence is necessary to convey to stakeholders, including funders and policymakers, the importance of operationalizing dental homes. The first step toward gathering evidence might be to design a Return on Investment (ROI) model for pediatric dentistry. This would prove daunting, because formulating a "positive" ROI model for either the medical home or the dental home is more challenging than doing so for an adult-centered, chronic care model. Funding is available from the Agency for Healthcare Research and Quality and the Commonwealth Fund to develop a research agenda for an adult-centered medical home, and participants hoped that funding could be available for a child-centered dental home.

## *Change the Construct to Include Prevention*

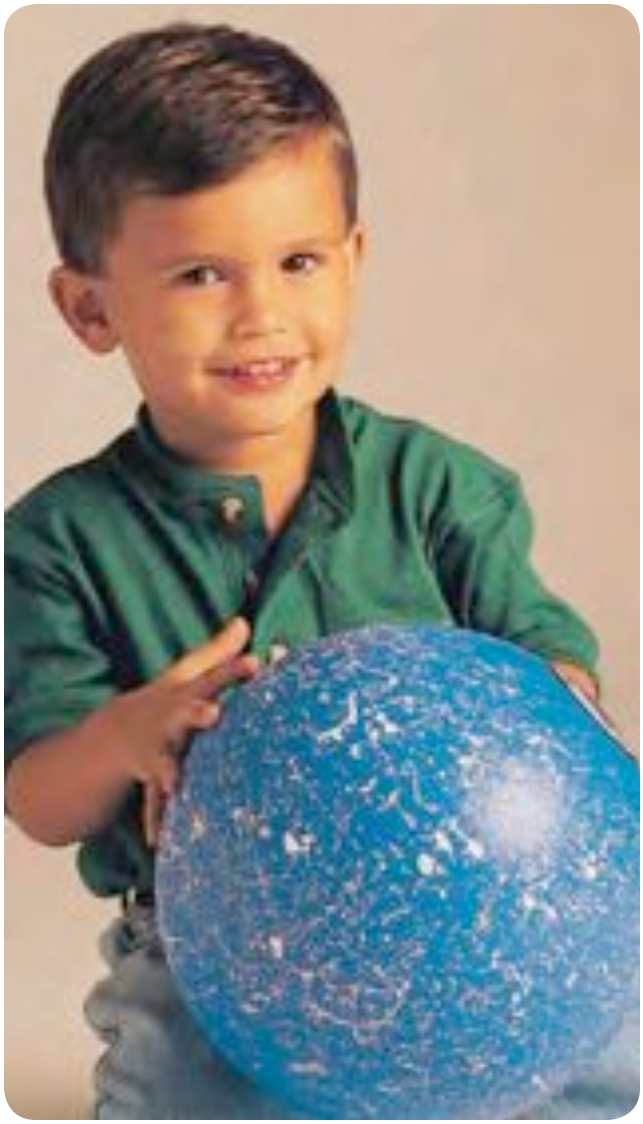
Prevention and disease management are the foundations of good oral health, and any effort to operationalize dental homes must include both aspects. However, current efforts to operationalize dental homes tend to focus on providing services after oral disease is present. Meeting participants favored initiating education on oral disease prevention before a child is born. Given the need for emphasis on early prevention, the first task must be to raise public awareness, beginning with integrating oral health messages into prenatal care for pregnant women.

## *Replicate or Adapt Models of Prevention*

Iowa's Title V program has active local agencies that target education on oral disease prevention messages to pregnant women and mothers. Dental

hygienists employ strategies from the oral health risk assessment model to identify and prioritize children at high risk for tooth decay and match them with dentists in the community. This streamlined referral pathway has proved successful in identifying children who are most in need of treatment and ensuring that they receive treatment as soon as possible. The program is also developing a health information technology (HIT) system to collect outcome data.

The federally funded Special Supplemental Nutrition Program for Women, Infants and Children (WIC) provides an opportunity to further enhance existing education on oral disease prevention efforts. In addition, a federal policy intervention could mandate that mothers and young children enrolled in WIC have a dental home within 90 days of enrolling in WIC.



The Head Start program serves as an ideal mechanism for introducing and continuing to provide education on oral disease prevention to parents and young children. The Office of Head Start and AAPD are working in collaboration to identify and link children enrolled in Head Start with a dentist to ensure that all participants have dental homes. One participant suggested revising the Head Start Program Performance Standards through federal incentives to ensure that all participants have dental homes.

## *Implement Prevention-Focused Curricula*

The impetus for shifting from disease orientation can occur through the revision of professional school curricula, including the curricula of dental, dental hygiene, and primary care health professional programs. Participants suggested revitalizing undergraduate curricula in public health as a first step toward realizing appropriate, prevention-oriented medical and dental school program curricula. Emphasizing public health at all levels of higher education can provide an opportunity to reemphasize the public service mission of dental training programs. Despite incorporating oral health care into medical school curricula, participants recognized that without financing or adequate integration by administering bodies, the prospect of successfully revising curricula was not promising.

Participants highlighted the importance of families assisting in revising professional school curricula to be prevention-focused and family-centered.

## *Construct a System of Coordinated Care*

The combination of outreach, risk assessment, preventive care, education, and treatment services equates with the provision of comprehensive care but must be coordinated to be meaningful. Stakeholders at all levels must maintain constant and dynamic communication. Awareness of other stakeholders' priorities and recommendations will aid in advancing children's oral health care needs. HIT is a powerful tool in coordinating systems of care. A Web-based dental home communication system accessible by

families and health professionals could empower families while reducing health professionals' burden of tracking and documenting children's status within a system of care.

## Identify Funding and Implement Pilot Programs

- State funding.
- Federal funding.
  - Medicaid (e.g., dental home pilot program focusing on community collaboration to operationalize dental homes and establish a science base with funding similar to the Medicaid Transformation grants).
  - MCHB (e.g., pediatric residency training, oral health initiatives).
  - State Children's Health Insurance Program (e.g., administrative set-aside that allows the use of up to 10 percent of funds for children from families with low incomes).
- Partnerships between professional medical and dental associations such as ADA, ADHA, AAP, AAPD, and the Association of Maternal and Child Health Programs.
- Philanthropic organizations and traditional funders of oral health (e.g., Pew Research, Robert Wood Johnson Foundation).
- Professional organizations (e.g., AAP's Pediatric Research in Office Settings Network).

## Support the Adoption of the Dental Home Concept

Those who want to see quantifiable improvements in children's oral health and have the capacity and influence to support such improvements are poised to do so. Funders of oral health promotion and disease management are contemplating how to infuse resources to match the level of current need.

Stakeholders must find ways to activate the political mechanism that controls funding, because without increased reimbursement rates and injections of resources, the dental home concept will not take hold in a comprehensive way. ■

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# Appendix A: Agenda

## *The Dental Home: Summary from an MCHB Expert Meeting*

### September 18–19, 2008
### Washington, DC

### Meeting Purpose

- Assist MCHB in further exploring the concept of the dental home as it relates to the bureau's philosophy and goals.
- Explore relationships between the medical home and dental home concepts.
- Collect information about defining and establishing dental homes, and identifying promising practices and programs for implementing dental homes.

### Day One

12:30–12:45 **Welcome**
*Remarks by:* John Rossetti, D.D.S., M.P.H.

12:45–1:00 **Introductions**
*Facilitator:* John Rossetti, D.D.S., M.P.H.

1:00–2:30 **Historical Development of the Medical Home and Dental Home Concepts**
*Facilitator:* Bonnie Strickland, Ph.D.

*Discussion Initiated by*
Art Nowak, D.M.D., American Academy of Pediatric Dentistry
Lewis Lampiris, D.D.S., M.P.H., American Dental Association
Richard Antonelli, M.D., M.S.; Robert Hall, J.D., M.P.A.; and Renée Jenkins, M.D.; American Academy of Pediatrics
Betsy Anderson, Family Voices

*Discussion Questions*
- How did the medical home and dental home concepts arise?
- How do medical home and dental home definitions and criteria compare?
- What challenges exist for linking medical homes and dental homes?
- What do parents want from dental homes and/or experience as dental homes?

2:30–2:45 **Break**

2:45–4:00 **Implementing the Dental Home Concept for Different Populations**
*Facilitator:* Ann Drum, D.D.S., M.P.H.

*Discussion Initiated by*
Jim Crall, D.D.S., Sc.D., American Academy of Pediatric Dentistry
Sanford Fenton, D.D.S., M.S.D., American Academy of Pediatric Dentistry
Brian Sousa, M.S.W., Catalyst Institute

*Discussion Questions*

- How do age, health status, disability, and socioeconomic status affect implementation of the dental home concept?
- What are the implications of different levels of risk for tooth decay on the implementation of dental homes?
- What services should dental homes coordinate?
- What is the role of dental homes in coordinating oral health services with other types of health care services?

4:00 – 5:00 **Achieving the Objectives of Dental Homes**
*Facilitator:* John Rossetti, D.D.S., M.P.H.

*Discussion Initiated by*
Jim Crall, D.D.S., Sc.D., American Academy of Pediatric Dentistry
Larry Hill, D.D.S., M.P.H., American Association for Community Dental Programs

*Discussion Focus*
Program Approaches Used to Establish a Dental Home

## Day Two

9:00 – 10:30 **Where Do We Go from Here?**
*Facilitator:* Burton Edelstein, D.D.S., M.P.H.

10:30 – 10:45 **Break**

10:45 – 12:30 **Dental Home for Children with Limited Access to Care**
*Facilitator:* Burton Edelstein, D.D.S., M.P.H.

*Discussion Questions*

- What is currently the default dental home for children with no access to care?
- What is the role of Head Start or other programs in creating dental homes?
- What is realistic for children enrolled in Medicaid or the State Children's Health Insurance Program and for children with special health care needs?

12:30 – 2:00 **Lunch**

2:00 – 3:30 **Moving Forward: Policy, Programs, and Players**
*Facilitator:* Burton Edelstein, D.D.S., M.P.H.

*Discussion Questions*

- What are the implications of different dental home concepts and criteria for MCHB?
- How can MCHB's past work on the medical home concept be applied to the dental home concept?
- What is the role for various interested stakeholders (e.g., MCHB, foundations, providers)?
- How can the dental home concept impact public policy? How is it impacted by public policy?

3:30 – 4:30 **Final Remarks**
*Facilitator:* John Rossetti, D.D.S., M.P.H.

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# Appendix C

## Environmental Factors in Implementing the Dental Home for All Young Children

### Draft Background Paper for MCHB Dental Home Meeting 9/17/08

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**Abstract**
While the dental home concept is clearly articulated by organized dentistry and accepted as policy, its widespread adoption and implementation will require consideration of environmental factors that include: (1) the advent of social medicine, (2) expanding knowledge of caries risk and its management; (3) trends in oral health disparities and the demography that drives those disparities; (4) parents' perceived needs for, and barriers to, dental care; (5) dentistry's relationship to medicine as a profession; and (6) dental services capacity. Issues of cost and effectiveness will impact implementation decisions regarding how the most vulnerable children will benefit and how the medical and dental homes will coordinate.

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The dental home concept is clear and succinct in its definition by the American Academy of Pediatric Dentistry. That definition states, "the dental home is the ongoing relationship between the dentist and the patient, inclusive of all aspects of oral health care delivered in a comprehensive, continuously accessible, coordinated, and family-centered way."[1] This concept is intimately linked to a cluster of additional progressive policies currently being advanced by pediatric dentistry including the age one dental visit, outreach to Head Start populations, updating state Medicaid periodicity schedules, and refining clinical care through risk assessment and risk-based interventions.

Benefits of the dental home are substantial and intuitive, although not yet substantiated by research,[2] and include an increasing emphasis on prevention and disease management, advancements in tailoring care to meet individual needs, and better health outcomes at lower costs.

As background to the Maternal and Child Health Bureau's September 2008 meeting on the dental home, this paper serves to explore literature relevant to the implementation of the dental home by providing information on critical environmental forces that will impact the widespread adoption of this concept.

Forces explored are:

1. the advent of "social medicine"
2. expanding knowledge of early childhood caries risk and disease management
3. trends in oral health and dental care disparities and the forces that propel them

4. perceived needs for dental services and other barriers to dental home utilization
5. dentistry as an independent health profession
6. dental system capacity for all children., including those with special needs.

As with most published reports on the dental home, this discussion is tied closely to consideration of early preventive care characterized by the age-one dental visit.

This paper concludes with a review of cost considerations and an overview of opportunities for interaction between the medical and dental homes.

**1. Advent of "social medicine" in pediatric healthcare**

The dental home concept is part of a larger evolutionary movement in pediatric healthcare to promote health in ways that integrate with children's overall lives. Only a few decades ago, healthcare for children focused on relieving symptoms of acute disease. Medical care for children functioned substantially to manage infectious "common childhood diseases" most of which today are prevented through vaccination. Dental care functioned substantially to relieve pain and infection "with the application of cold steel," removing teeth which today are retained through routine dental repair.

Ever expanding understanding of childhood health determinants and rethinking about the interfaces between children, their families, and their healthcare providers has stimulated progressive change in pediatric healthcare – away from acute care and toward well child supervision. Such shifts in thinking are often hallmarked by changes in terminology. Examples include the displacement of "crippled children" to "children with special healthcare needs (CSHCN)," reference to the targeted entity from "patient" to "child and family," and distinction between "health" and "health care."

The idea of ongoing comprehensive health care, including dental care, starting at birth is not new but is gaining increasing traction and implementation in the professions. It was codified in public policy as early as 1967 with the enactment of a special child-focused Medicaid program whose very name explains the concept: "Early and Periodic Screening, Diagnostic, and Treatment" program. However, since that time research has supported a growing understanding that health care alone, no matter how regular and complete, cannot ensure that children obtain and maintain positive health outcomes. Health is now understood to result from a combination of factors including genetics, environment, health behaviors *and* health care. This understanding has stimulated fields as diverse as genomics, environmental pediatrics, and "social medicine."

Social medicine concepts important to both the medical and dental home that have gained increasing currency in recent years include:

- *wellness*, with its reliance on anticipatory guidance and primary prevention[3] ;
- "life course modeling" with its appreciation of differential health trajectories that begin in childhood and continue well into adulthood and even into senescence,[4]
- *social determinants of health* with its understanding of non-biologic factors that regulate health status and outcomes,[5]
- *family pediatrics* with its approach to managing situations in which "a family's distress finds its voice in a child's symptoms"[6] and
- *quality of life measurement* with its implicit recognition that broad physical and emotional functionality is an integral outcome of quality healthcare.

These concepts are reflected in a variety of efforts to envision future systems of pediatric care delivery within the larger frameworks of family, community, and society. Table 1 contrasts past with future characteristics of pediatric health care and calls for an approach that honors the understanding that "health is not endowed at birth but instead develops over time." [7] This new approach also recognizes the importance of early life in establishing a "scaffolding for physical, cognitive, and socio-emotional health."

In envisioning "the future pediatrician," the Commonwealth Fund calls for well defined "outcomes to which [practitioners] should be expected to contribute;" outcomes that ensure a positive impact from ongoing individualized preventive supervision.[8] Its vision of a "high-performing system for well-child care" rejects the current "one-size-fits-all approach" to child healthcare delivery and its financing and calls instead for a more individualized, risk-based, sensitive approach that recognizes complexity and multiple health determinants.[9]

There is a nascent pediatric dental literature that similarly explores the bio-psycho-socio-behavior determinants of *oral* health. Examples include modeling at the population level with an aim of reducing oral health disparities[10] (Figure 1), modeling at a subpopulation level to explain high prevalence of childhood caries in a particular subgroup,[11] modeling at the individual child level with an aim of better understanding children's oral health determinants[12] (Figure 2), and modeling at the disease level with an aim of better understanding early childhood caries development[13] (Figure 3). At every level, these models distinguish oral health from dental care and seek to assign the relative value of dental care to overall oral health attainment and maintenance. Additional studies consider direct and indirect factors other than dental care that impact individual children's oral health, ranging from community water fluoridation to brushing with fluoridated toothpastes[14] to participating in the WIC nutritional program at an early age.[15]

This social approach to understanding and treating pediatric oral disease is also well reflected in research currently underway at NIH-sponsored Centers for Research to Reduce Oral Health Disparities. Titles of recent publications from these Centers substantiate the adoption of social medicine constructs relevant to the dental home including "familial and cultural perceptions," [16] [17] "community based approaches," [18] "behavioral and sociodemographic factors" in ECC, [19] "role of family"[20] and "environment"[21] in children's oral health, and "patient-centered approaches to health promotion." [22]

**Implications for dental home**

The social medicine approach to pediatric health supervision clarifies that opportunities for children to obtain and maintain oral health are established by factors beyond the mouth and beyond the dental chair. This has direct implications for oral health supervision in the dental home as reported by Nowak and Casamassimo who call for a dental home (1) that "is characterized by [its] community;" (2) that recognizes that "newer models of caries initiation …extend into the family and community;" and (3) that a community-based dental home "should be able to provide focused prevention better than a haphazard or one-size-fits-all approach."[23]

**2. Expanding knowledge of early childhood caries risk and management**

In recent years, pediatric dentistry has increasingly adopted approaches to pediatric medical care that include anticipatory guidance, primary prevention, risk-assessment, triage-based individualized care, and disease management. Examples from a variety of perspectives and endeavors are manifold:

- *Clinical recommendations:* AAPD's promotion of the age-one dental visit, risk assessment using the Caries Risk Assessment Tool, and the dental home itself;[24]
- *Health supervision recommendations:* Bright Future's development of age-specific and developmental stage-specific anticipatory guidance for oral health supervision;[25]
- *Care coordination recommendations:* AAP's reconsideration of the appropriate age for referral to dental age (i.e. age one for children determined to be at-risk for early childhood caries);[26]
- *Prevention recommendations:* CDC's promotion of risk-based fluoride recommendations;[27]
- *Disease management demonstration:* Catalyst Institute's early childhood caries management demonstration at Boston Children's Hospital and St. Joseph's Hospital, Providence[28] and

- *Public policy:* Children's Dental Health Project's success securing federal legislative language requiring oral health counseling at birth for Medicaid and SCHIP families.[29]

Yet dentistry's primary clinical focus centers on surgical dental repair which, without concomitant effective disease management,[30] results in high rates of disease progression as children age[31] and disease recurrence after treatment.[32] Dentistry's modest adoption of medical management for pediatric caries may reflect self selection into the profession, the dental educational process, perceived constraints of financing through dental insurance, or simply habit and tradition. As a result, dental prevention strategies are typically one-size-fits-all and are commonly provided as semiannual prophylaxis and topical fluoride application.

A 2006 AAPD Conference[33] has explored opportunities for "rethinking prevention" to be more efficient and cost-effective as have two major NIH conferences. [34] [35] Through its research support, the National Institute for Dental and Craniofacial Research has further encouraged a medical approach to caries that fits well within the concept of the dental home. Recent research includes, by example, tests of counseling effectiveness,[i] risk-classification,[ii] [iii] parental acceptance of preventive treatments,[iv] and interruption of intergenerational caries transmission.[v]

**Implications for dental home**

As the science of caries risk identification, primary prevention, and disease management continues to develop, the dental home will be ideally situated to develop and implement science-based/evidence-based medical approaches to caries prevention and control. There is strong potential for expanded roles for dental hygienists as well as nutritionists, health educators, and social workers in becoming effective disease managers.

### 3. Oral health and dental care disparities and their drivers

Demographic trends are perpetuation and worsening disparities in oral health status and access to dental care among US children. Children who will benefit most from a comprehensive and individualized dental home, including minority, poor and low-income, and special needs children, are those who currently experience the highest levels of disease and lowest levels of care.

- *Oral health disparities*

CDC's most recent pediatric caries prevalence reports indicate an upturn in both caries experience and unfilled cavities among young children.[36] Current estimates are that 28% of children ages two through five have visible cavities and that 73% of these children are in need of dental repair. Rough estimates within this age group reflect the progressive nature of this disease and point to the need for the earliest

[i] The *Mother and Youth Access Program* which tests the effectiveness of an approach involving pro-active counseling for mothers and oral health preventative services for pregnant women, mothers, and babies, to prevent or manage dental decay in infants and toddlers (Franciso Ramos-Gomez PI)

[ii] The *Assessing and Predicting ECC Risk Disparities* project which seeks to develop, test, and refine an ECC risk association model based on individual, family, and community characteristics (Stuart Gansky PI).

[iii] The *Evaluation of Severe ECC Screening Methods* study which seeks to test each element of CAT for its sensitivity and specificity and develop a simplified risk ECC risk assessment protocol (Burton Edelstein and Richard Yoon, Co-PIs)

[iv] The *Acceptability Study of Preventive Interventions for Reducing ECC* research which analyzes parental acceptance of and preferences for preventive dental treatments in young children (Sally Adams PI)

[v] The Caries Transmission Prevention in Alaska Native Infants investigation which studies the use of maternal chlorhexidine mouth rinses and chewing of xylitol gum in reducing maternal-child transmission of cariogenic organisms (David Grossman PI)

possible intervention as 11% of two year olds, 21% of three year olds, 34% of four year olds, and 44% of five year olds have visible cavities.[37] Earlier signs of caries activity, including white spot lesions and pathognomonic plaque accumulation are not included in these conservative estimates.

Data reported for 2-11 year olds validate ongoing disparities by race and income with 55% of Mexican Americans, 44% of African Americans, and 39% of Caucasian children demonstrating cavities. Confounding these racial-ethnic disparities are equally profound disparities by family income as 54% of children in poverty, 49% of children in low-income families, and 32% of children in middle and higher income families have cavities. Most striking are disparities in disease extent and in untreated disease. Children ages 2-11 from poor and low-income families have three times the numbers of decayed primary teeth and are twice as likely to have untreated teeth as are children from higher income families (33% of poor children, 28% of low-income children, and 15% of higher income children have untreated cavities).

**Implications for dental home**

Children who will benefit most from early and ongoing care in a dental home are those who are from poor and low-income families and are racial and ethnic minorities.

◦ *Dental care disparities*

Federal Medical Panel Expenditure Panel Survey data[38] reveal that the majority of US children do not access dental care in a year. In 2004 55% of US residents under age 21 had no dental visit. Stepwise disparities in dental utilization by income are evident as 69% of poor children, 66% of low-income children, 53% of middle income children, and 48% of higher income children are not receiving care. Similar findings were reported by race/ethnicity and level of parental education. Two-thirds of black and Hispanic children did not have a dental visit in 2004 compared to less than half of white children (47%). Children whose parents attained less than high school education were nearly twice as likely to have no dental visit as children whose parents are college graduates (75% versus 46%). Two-thirds or more of children in Medicaid went without dental care each year since at least 1999 according to state reports to the federal Medicaid agency. [39] Despite greater disease burden and unmet need for dental care, poor and low-income children who do access dental treatment experience fewer visits and fewer treatments than do more affluent children who have lesser disease. A recent study of children who fail to utilize dental services even when care is freely available[40] attributes disparities in dental utilization to “differences between educational levels, ethnicities, and rural/urban location” and suggests that programs “need to target the social setting in which financial burdens exist.”

**Implications for dental home**

Children who currently do not have a dental home are primarily those who are from poor and low-income families and are racial/ethnic minorities.

◦ *US childhood demography*

Demographic forces shape epidemiologic projections and thereby determine current and future needs for children’s oral health care. More children were born in 2007 (4.3 million) than at the peak of the Baby Boom.[41] The National Center for Health Statistics projects that additional growth will be concentrated among minority children, a disproportionate portion of whom are from poor and low-income families and

are children of single parents. 2006 saw a rebound in birth to teenage mothers for the first time since 1991. Births to single mothers increased to 37%, disproportionately among minority women (African American women 71%; Hispanic women 50%).[42] The proportion of Hispanic children, a group with higher disease rates, was 14% in 1995 and is projected to increase to 24% by 2020.[43] Child poverty rates are now 17% overall and higher for young children (20% under age six), minority children (33% African American, 27% Hispanic), and children living in single female parent households (42%).

**Implications for dental home**

The dental home will need to be particularly accommodating and sensitive to opportunities and constraints for oral health among the disproportionately growing numbers of young children who live in poverty and single parent households. The sheer numbers of such children will test the capacity of dental systems to accommodate them in traditional dental offices.

◦ *US demography of special needs*

Children with special healthcare needs (CSHCN) are of particular interest to the evolution of the medical and dental home concepts. Since 1998, the Maternal and Child Health Bureau has defined CSHCN as "those who have or are at increased risk for a chronic physical, developmental, behavioral, or emotional conditions and who also require health and related services of a type or amount beyond that required by children generally."[44] The American Academy of Pediatrics (AAP)[45] notes that about 14% of children (10.2 million) meet this definition, that children with these needs reside in more than one-fifth of all US households, and that 16% of them are reported to have unmet needs for services. The leading such unmet need is for dental care (Figure 1) with nearly 9% of families of CSHCN reporting unmet need for preventive or reparative dental care.

This unmet need is consequential as reported by special care dentistry expert, Paul Glassman's statement that "the combination of inadequate attention to prevention, greater disease burden, scarce treatment resources, and more difficulty in performing treatment results in pain, suffering, and social stigma in these populations beyond that found in other segments of society."[46]

**Implications for dental home**

The medical home concept, first built around CSHCN, emphasizes the complexity of care required by these children and the need for specialty-level care providers. Similarly, the dental home concept will be particularly germane and beneficial to these children and their families and will require the disproportionate engagement of dentists who specialize in pediatric dentistry as they have additional expertise in managing care for CSHCN.

**4. Perceived needs for dental services and other barriers to dental home utilization**

Surveys of parents report the same disparities in oral health and dental care as are revealed by the epidemiologic and health services studies reported above.[47] For example, 17% of high income parents, 25% of middle income parents, 40% of low-income parents, and fully 51% of poor parents rate their children's oral health as only fair or poor. A higher percentage of parents of children with special needs report fair or poor oral health than parents of children who do not have special needs. Poor parents are also aware of the inadequacy of dental care provided to their children: 42% of poor parents report that their children did not receive dental care in a year compared to 34% of low-income parents, 23% of middle income parents, and 18% of higher income parents. These findings from national surveys of parents suggests that external barriers, such as financial constraints, unavailability of willing providers,

and logistic constraints of time, transportation, and child care arrangements, more likely explain lack of utilization by socially and medically vulnerable children than do lack of parental awareness or interest. This is further evidenced by the finding that 61% of parents reported cost as a barrier to care and 23% reported either that they "could not get a dental appointment" or that they could not find a dentist who accepts their insurance (most commonly Medicaid and SCHIP).

**Implications for dental home**

The dental home concept calls for outreach to children at greatest risk of disease and continuing active professional involvement in solving barriers to both oral health attainment and to dental care.

**5. Dentistry as an independent health profession**

The historical separation of medicine and dentistry dates to the establishment of the first dental school in Baltimore in 1840. Since that time, dentistry has established parallel but independent structures resulting in different education and training systems, finance systems, workforce formulations, mores and values, and delivery systems. Dentistry arose as a surgical specialty with relatively lesser attention to medical management of common oral diseases and early established a very fixed and regulated "one-size-fits-all" approach to care. The semiannual dental visit (often attributed to a Pepsident toothpaste commercial) has become codified through public acceptance and dental insurance to now persists despite growing efforts to individualize care. Little in dental education or practice prepares or encourages the dentist or hygienist to meaningfully adopt management stratagems based on theories of health behavioral change, differential diagnoses of caries status, consideration of extraoral forces on oral health attainment and maintenance, or individualized care management plans. Because dentistry in the US was never compartmentalized within medicine, primary oral health supervision for children cannot be readily or easily assigned to physicians and nurses without additional training. The assumption of responsibility for the oral cavity by the dental professions is reflected in the minimal education that physicians and nurses, including pediatricians,[48] [49] family physicians,[50] and pediatric nurse practitioners, obtain in their education and training.

**Implications for dental home**

This separation of the health professions helps explain why a child may require more than one "home."

**6. Dental and medical system adoption and capacity to accommodate all children in dental homes**

Despite enthusiasm for the concept, little is yet known about dentists and physician's willingness to adopt the age one dental visit. A recent Virginia study[51] suggests that adoption may be demanding as only 12% of responding general dentists and 5% of pediatricians report recommending the first dental visit at age. Fully a quarter (27%) of Virginia's pediatric dentists do not recommend the age one dental visit. Anecdotal evidence from around the country suggests that parents often confront difficulty finding a dentist who accepts a well child without a dental complaint at that age.

While the numbers of pediatric dentists have increased markedly in recent years to reach 4,568 active private practitioners by 2005[52] and the number of additional active general dentist approaches 125,000 there is a considerable mismatch between dental service capacity and the numbers of children in need of a dental home. The 2000 US Surgeon General's report on oral health recognized this deficit by stating concerns about the decreasing numbers of dentists relative to a growing population, the "inequitable"

distribution of dental personnel, and the paucity of minority dental personnel. A subsequent dental workforce analysis[53] reported the need to correct "a growing disconnect between the dominant pattern of practice…and the oral health needs of the nation," noting that the dental workforce is overwhelmingly in private practice, graying, working fewer hours, becoming more female, and increasingly engaging in part-time practice. AAPD reports similarly that pediatric dentists are aging with more than half (59.3%) over the age of 50[54] and becoming more female, reaching 41% women members in 2008. Pediatric dentists see a relatively larger proportion of patients enrolled in Medicaid and SCHIP at 18.6% of patients in 2002 compared with 5.6% of general dentists' patients. Yet their relatively small numbers translate into only a small percentage of children in Medicaid who access dental services. General dentists are increasingly engaged in caring for an aging population that is retaining teeth longer than any prior generation and in providing elective, cosmetic, services that limit their availability for primary pediatric care. Evidencing the need to further prepare even the most recent graduates for care of children is the finding that 12% of 2006 graduates describe themselves as being inadequately prepared in pediatric dentistry, 16% report being inadequately prepared to adjust care for low income individuals, and 31% report being inadequately prepared to care for people with disabilities.[55]

If the dental home were to be fully implemented as a single dental visit for all 4.3 million children born in 2007 alone, assuming that three-quarters of infants would be seen by general dentists and one-quarter by pediatric dentists, each general dentist in the country would need to see 26 infants each year of which 5 would be children in poverty and each pediatric dentist would need to see 215 infants each year, of which 43 would be children in poverty. While this is logistically possible (assuming equitable access for poor and low-income children in Medicaid and SCHIP), the numbers become daunting when preschoolers ages 2-5 are added with the recommended two annual dental visits as each general dentist would need to provide care for nearly 300 dental visits of which about 50 would be for children in poverty and each pediatric dentist would need to provide over 2000 dental visits of which over 400 would be for children in poverty. These calculations do not include any dental care for the remaining 54 million children and teens under the age of 21 or any visits for restorative care or other pediatric dental services (e.g. habits, orthodontics, mouth guards, sealants etc).[vi] Similar calculations for children with special needs and for those in need of acute dental repair for ECC further highlight the challenges of arranging for a dental home as currently defined.

**Implications for dental home**

Because the total numbers of dentists are inadequate to provide a dental home for the total numbers of children, priority should be given to children at greatest risk for dental disease, including those with earliest signs of ECC, children from high-risk subpopulations, and children with special healthcare needs.

## Cost considerations for early establishment of the dental home

- *Cost effectiveness of early intervention in a dental home*

Quantifying the cost effectiveness of the medical or dental home is fraught with methodological challenges as such studies seek to quantify health improvements that cannot be related directly to health care. To date, there are no studies quantifying the cost effectiveness for early intervention relevant to a dental home but there are a variety of suggestive studies. Perhaps the most oft-quoted is by the University of North Carolina group which thoughtfully conclude that "Our results should be interpreted cautiously, because of the potential for selection bias; however, we concluded that preschool-aged, [5-year continuously] Medicaid-enrolled children who had an early preventive dental visit were more likely to use subsequent preventive services and experience lower dentally related costs."[56] Regarding the

[vi] All calculations assume 4.3 million children per cohort of preschoolers; 80 million total children under age 21; 125000 active general dentists; and 5000 active pediatric dentists.

problem of disparities, the group addresses both racial and systems constraints noting that "children from racial minority groups had significantly more difficulty in finding access to dental care as did those in [North Carolina] counties with fewer dentists per population." In a subsequent publication, the authors further stressed the likely impact of selection bias, noting that "it is possible that those children who were seen by age 1 were the children of parents who were the most motivated to provide the best possible oral health care for their children. This parental behavior would be expected to carry over to home care, diet, and nutrition – all factors that would lead to improved oral health."[57]

Attempts to model cost impact of early intervention in a dental office to reduce ECC in the US include one approach that predicted both cost effectiveness and cost savings when using a microbiological test to assess risk early in life[58] and another that demonstrated cost effectiveness but no cost savings[59] despite the very high costs of restorative care for young children who require treatment under general anesthesia.[60] The Washington State ABCD (Access to Baby and Child Dentistry) program[61] and a cost effectiveness simulation of pediatricians' application of fluoride varnish to Medicaid enrolled children[62] similarly showed effectiveness but not cost savings.

- *Opportunity costs for dentists and physicians*

Dentists who elect to provide infant oral health visits and establish an ongoing dental home for children will confront lost opportunity costs. Exchanging these low-reimbursement prevention visits for high-reimbursement restorative, prosthetic, and esthetic services would result in a net decrease in practice income and profitability despite their low delivery costs. Inherent incentives therefore run contrary to widespread adoption of infant oral health and health supervision visits for children. Contrarily, pediatricians and other primary care pediatric providers who add oral health services to their routine well child care will find a direct financial incentive to such screening, counseling, application of fluoride varnish, and referral because these services, when independently reimbursed as a supplemental payment to well child care payment, can be provided at only a small increase in marginal costs. Therefore, it can be anticipated that medical providers, unlike dental providers, will eagerly incorporate these services in their care mix.

- *Opportunity costs for populations*

CDC economists in 2001 modeled the impact of lowering the recommended age for the first dental visit from age three to age one and found a potential societal downside to increasing care for young children. They report that under current capacity constraints, the "worst case scenario" would result in increased utilization by young children who are not in Medicaid that would crowd out nearly 2 million children who are in Medicaid. Nearly three quarters of a million decayed teeth in 2-7 year olds that currently are repaired would not receive treatment. However, if there were adequate system capacity and sufficient financial reward for seeing Medicaid patients, a "best-case" scenario would result in "utilization among Medicaid toddlers increases by 358,059 (offset by an equivalent decrease in private utilization) resulting in treatment of 1,378 additional one-year-olds with decay and treatment of an additional 104,939 decayed teeth among two-year-olds."[63] A subsequent effort to estimate the societal impact of engaging pediatricians in selective referral of young children deemed to be at high risk for ECC after engaging pediatricians in risk assessment and oral health screening found that implementing this approach "will decrease untreated decay under most plausible scenarios" while universal adoption of the dental home for young children "will increase the burden of disease if Medicaid dental capacity is limited."[64]

Considering these cost issues and evidence regarding timing of the first dental visit, Nainar concludes that "the Year One dental visit should be performed for all children of low socioeconomic status. However, it should be regarded as an elective procedure for infants of middle-to-high socioeconomic status, except for certain selected high dental caries risk subgroups"[65] which, according to AAPD's Caries Risk Assessment Tool, include CSHCN. Commentary papers published with the Nainar contribution support the concept while calling for cost effectiveness studies,[66] the addition of a prenatal visit in anticipation of a visit by age 1,[67] linking oral health promotion to parental inquiries to medical providers about their children's teething and expanding the roles for dental therapists.[68] Most germane to implementation of the dental home in the US is a commentary by Australian pediatric dentist Richard Widmer who stated, "There is little doubt amongst the specialist pediatric dental community on the value of early, appropriate,

dental visits to inculcate the ideal of thorough preventive practices at home and appropriate future dental behaviors. However for public dental services in particular, the need to target and refine this approach based on up to date dental and social criteria is welcomed. Resources are limited and the problems [of childhood oral health] … can be addressed…to achieve better outcomes, centered on an evidence-based approach."

**Medical-Dental Home Interface**

Interfaces issues between medicine and dentistry in integrating care to prevent disease and promote oral health among young children are manifold and complex – ranging from differences in delivery and financing systems to differences in education, turf issues, legal issues emanating from state practice acts, and issues in inter-professional communications.[69] The goal of such integration is to develop systems of care that maximize the contribution of both professions and maximize health outcomes for all children, particularly those who suffer social and/or health vulnerabilities.

Because primary care medicine and dentistry both seek to promote wellness, both promote key attributes of continuous accessibility, comprehensiveness, continuity, compassion, care coordination, and family-centeredness. Echoing the medical home concept, Nowak and Casamassimo highlight the particular needs of children with social and health vulnerabilities and call for seven steps in implementing the dental home:

(1) "developing a practice philosophy or set of goals that support the concepts;"
(2) "educating the provider and staff in care for the very young child;"
(3) creating a physical setting in which care can be delivered to very young children and their families, including those with special needs;
(4) "establishing relationships with other health professionals" including physicians, psychologists, speech therapists, and physical and occupational therapists;
(5) gaining familiarity and ability to deal appropriately with "a wide range of patients" including those of varying cultural and socioeconomic conditions;
(6) assuming responsibility for advocacy and becoming familiar with public health programs; and
(7) assuming responsibility for "facilitation in delivering care" for "minorities, the poor, and those with special health care needs"… "either by assisting the patient and family in overcoming obstacles or arranging for care in other venues if appropriate."

Their proposal for creating a dental home further builds on the social medicine trends described above. As primary justifications for the dental home, they specifically cite "a changing healthcare system, increasing in complexity and access challenges," "better understanding of health disparities and the cultural, ethnic, and systemic influences responsible for them," "changes in parenting," "the increasing numbers of children with special needs," and the ongoing "epidemic" of early childhood caries in socially disadvantaged populations.

AAPD's policy on the dental home[70] similarly echoes AAP's[71], albeit appropriately more narrow in scope and requirements. Six of its nine requirements explicate the content of primary oral health care and relate to AAP's requirement that a home provide for primary care: "comprehensive oral health care including acute care and preventive services", "comprehensive assessment for oral diseases and conditions", "individualized preventive dental health program based upon risk assessment", "anticipatory guidance about growth and development issues", "information about proper care of the child's teeth and gingiva", and "dietary counseling."

AAPD also calls for a "plan for acute dental trauma" "referrals to dental specialists when care cannot directly be provided within the dental home," and "transfer of care to adult dental service providers. These three requirement reflect the medical home requirements for continuously available care for acute illness, identification of the need for consultation and appropriate referral, and care continuity including "transitions [that are] planned and organized with the child and family."

One AAP requirement that holds particular value in care coordination across the medical-dental divide for children with significant dental concerns is its call for "shared [between pediatricians and pediatric

subspecialists] management plans in partnership with the child and family." Various methods to improve such care coordination include co-location,[72] use of health information technology,[73] and integrated records systems.

Regarding interaction with community resources, AAP's vision (Diagram 5) is considerably more expansive, inclusive, and bi-directional than AAPD's. AAPD, however, recognizes the pressing need to inform communities of interest that ongoing dental care in a dental home is critical to reducing disease burden and improving children's oral health. It therefore calls for "interaction with early intervention programs, schools, early childhood education and child care programs, members of the medical and dental communities, and other public and private community agencies to ensure awareness of age-specific oral health issues."

## Conclusions

1. The dental home, like the medical home, holds strong promise to improve the overall care of all children
2. The dental home, like the medical home, will particularly benefit children whose risk for oral disease is exacerbated by social and/or medical vulnerabilities.
3. Implementation of the dental home concept will benefit from growing understanding of social medicine and scientific approaches to clinical caries prevention and control.
4. Effective dental home implementation will require close attention to epidemiologic, health services, and demographic trends in order to target those at greatest risk for disease.
5. Oral health promotion from an early age in a dental home will require extensive improvements in public awareness and professional engagement and systems-level improvements in care coordination between medicine and dentistry.
6. Current dental system capacity cannot support wholesale implementation of the dental home unless the dental home's functions are shared by other agencies that interact with children where they live, learn, and play.
7. The dental home concept extends to older children as well as infants and toddlers but holds greatest promise for impact if focused on the youngest children.

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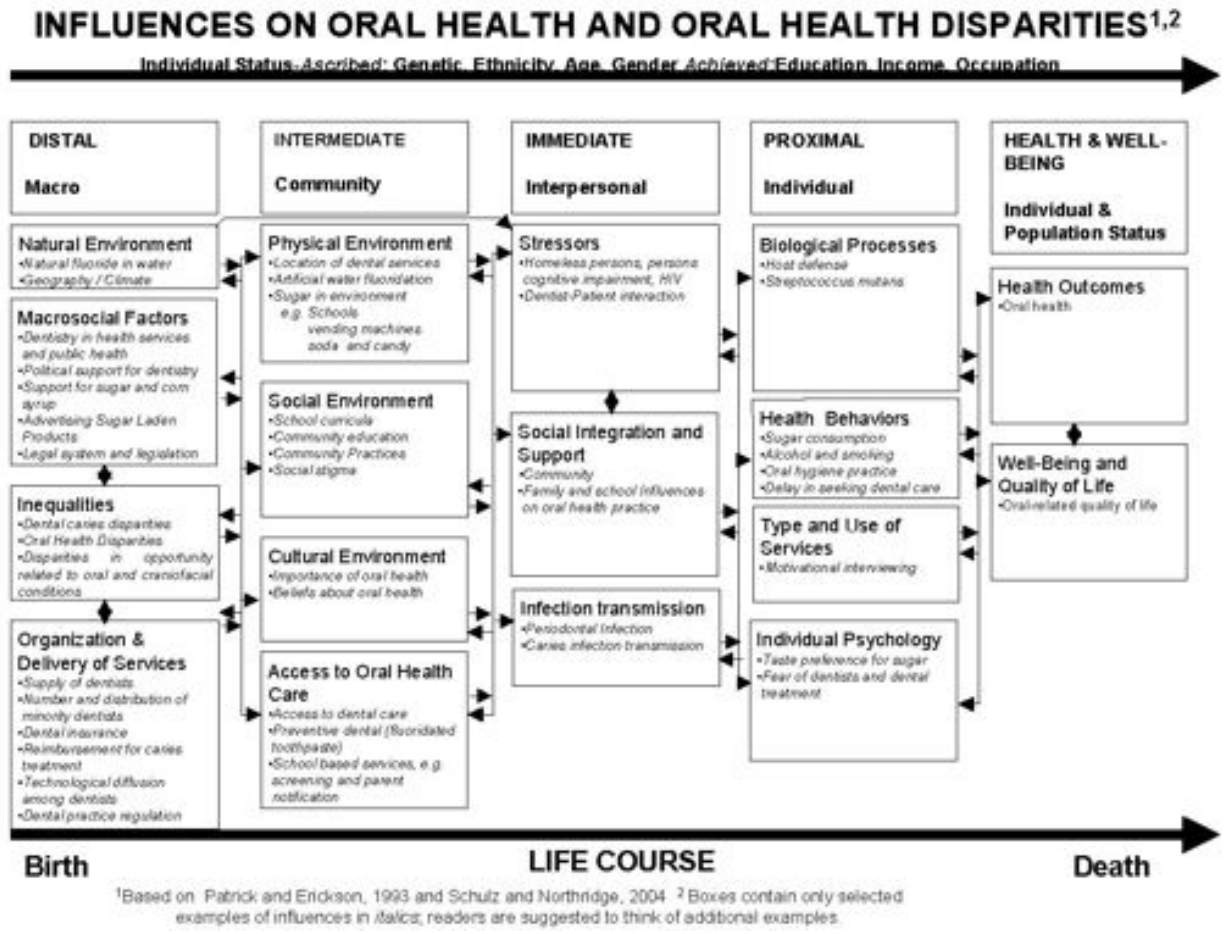
**Table 1**: **Characteristics of the current and proposed child health systems.**
(Source: Halfon N, DuPiessis H, Inkeias M. Transforming the US child health system. Health Affairs 2007;26(2):315-330.)

**EXHIBIT 3**
**Comparison Of Old And New Logic Models For Child Health Systems**

| | Old logic model | New logic model |
|---|---|---|
| Definition of *health* | Absence of disease, disability | Expanded to include the development of positive functional capacities to achieve life's goals |
| Goals of the health system | Prolonging life, health maintenance | Optimal health development |
| Client model (stakeholder) | Individual | Individual, population, and community |
| Causal model | Biomedical | Biopsychosocial dimensions of life-course health development |
| Intervention approach | Diagnosis and treatment | Adds and emphasizes prevention, promotion, and developmental optimization |
| Time frames | Episode of care | Functional capacity across the life course, recognizes critical and sensitive periods of developmental vulnerability |
| Delivery and organizational focus | Vertical hierarchy of primary, secondary (specialty), tertiary care | Distributive care model with care pathways that integrate within (vertical) and across (horizontal) specific sectors, and over time (longitudinal) |
| Financing approach | Episodes of care, with a focus on medical conditions as insurable loss and preventive care as prepaid benefits | Longer time frames, require investments in lifelong health capital, and infrastructure to support population capacity for prevention and promotion |
| Performance improvement | Condition-specific quality improvement | Includes system improvement |

**SOURCE:** Authors' analysis.

**Figure 1**: **Influences on Oral Health and Oral Health Disparities.**
Patrick *et al. BMC Oral Health* 2006 6(Suppl 1):S4 doi:10.1186/1472-6831-6-S1-S4



[1]Based on Patrick and Erickson, 1993 and Schulz and Northridge, 2004 [2] Boxes contain only selected examples of influences in *italics*; readers are suggested to think of additional examples

**Figure 2**: **Influence on children's oral health status.**
From Fisher-Owen SA, Gansky SA, Platt LJ, Weintraub JA, Soobader M-J, Bramlett MD, Newacheck PW. Influences on children's oral health: a conceptual model. Pediatrics 2007;120:e510-e520.

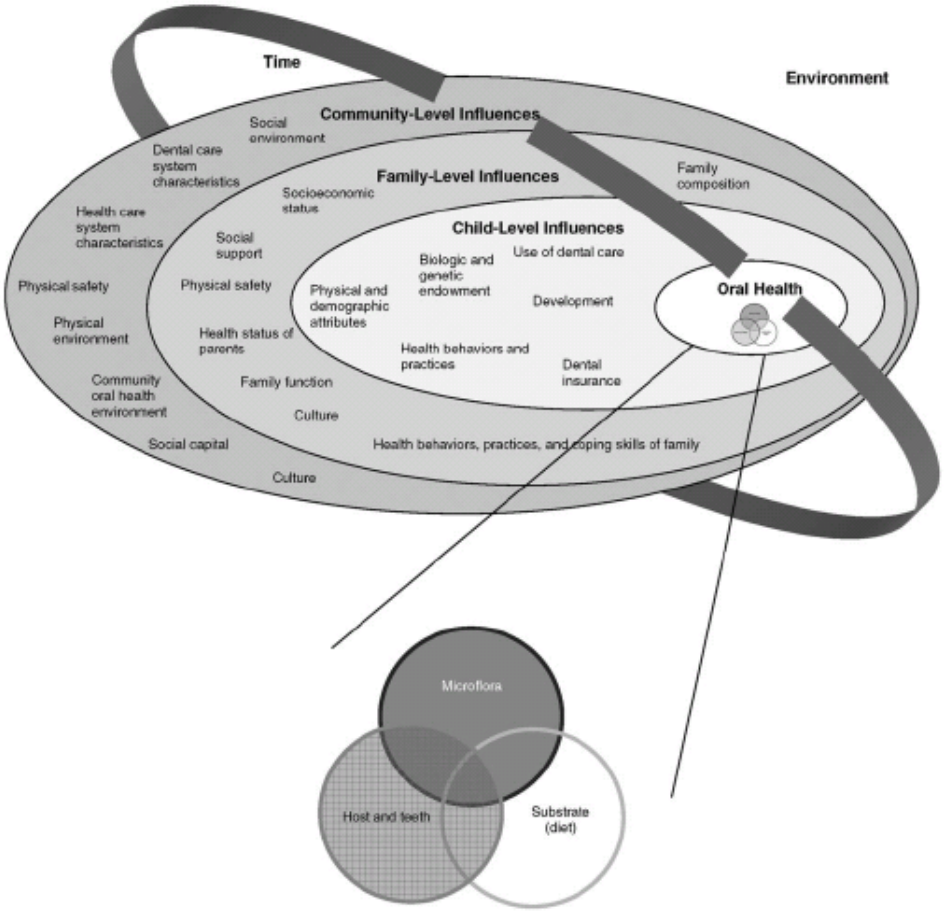
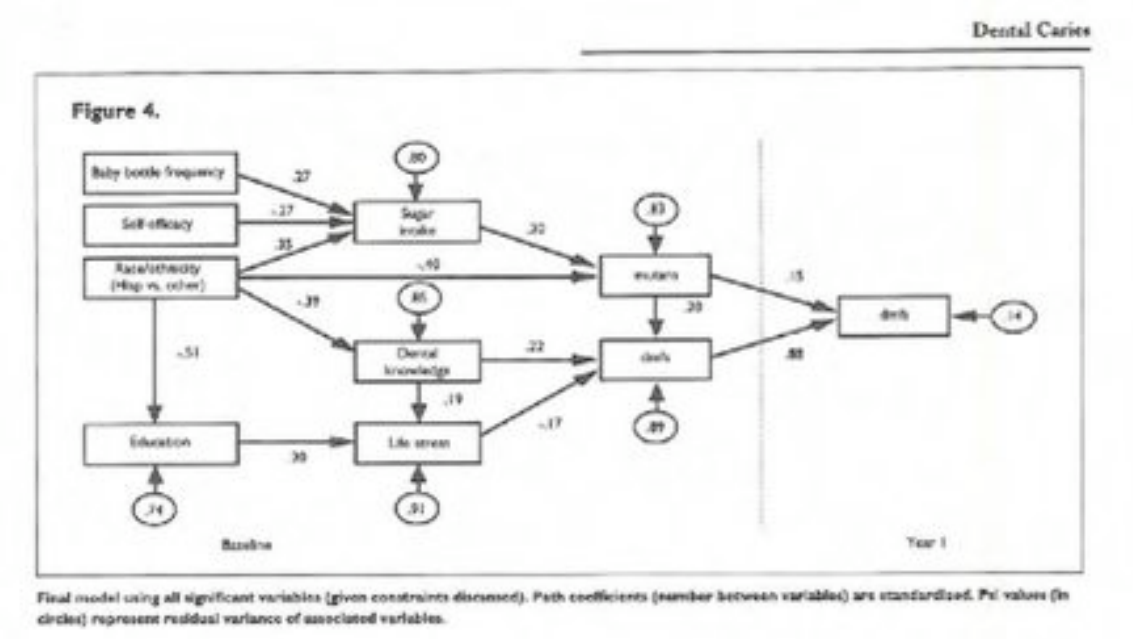



FIGURE 1
Child, family, and community influences on oral health outcomes of children. The triad was adapted from Keyes PH. *Int Dent J*. 1962;12:443–464; and the concentric oval design was adapted from the National Committee on Vital and Health Statistics. *Shaping a Health Statistics Vision for the 21st Century*. Washington, DC: Department of Health and Human Services Data Council, Centers for Disease Control and Prevention, National Center for Health Statistics; 2002:viii.

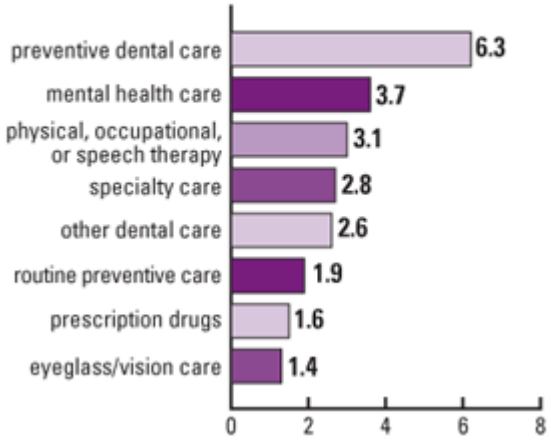
**Figure 3**: **Model of caries prediction in preschool children.**
From: Reisine S, Litt M, Tinanoff N. A biopsychosocial model to predict caries in preschool children. Pediatr Dent 1994;16(6):413-8.




Final model using all significant variables (given constraints discussed). Path coefficients (number between variables) are standardized. Psi values (in circles) represent residual variance of associated variables.

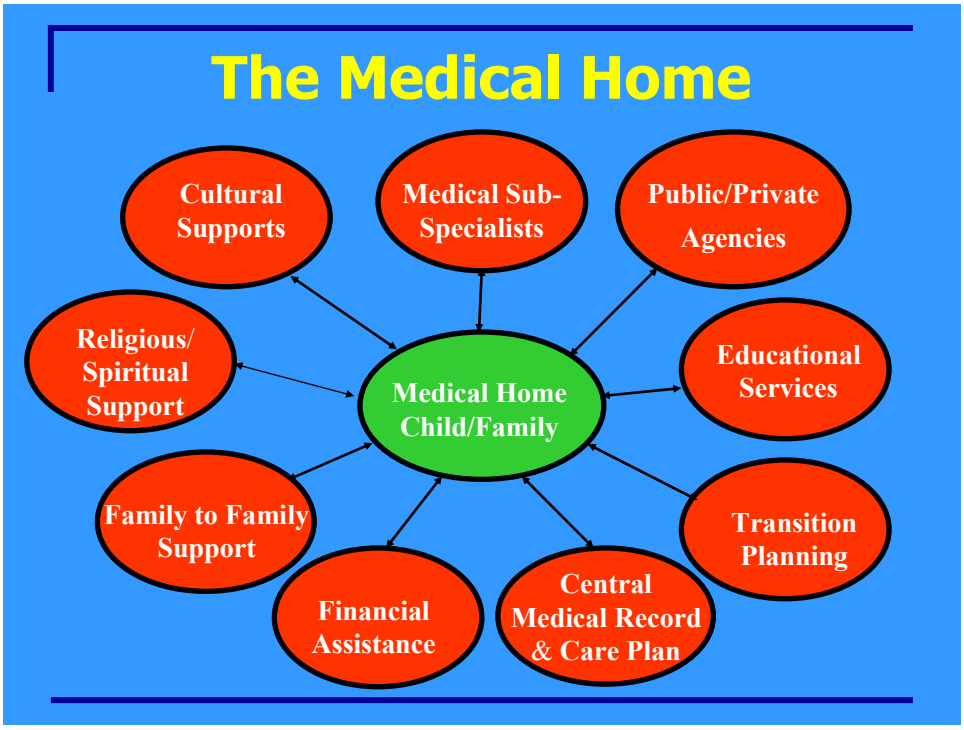
**Figure 4**

**Percent of CSHCN with Reported Health Services Needed but Not Received**




Source: US Department of Health and Human Services, Health Resources and Services Administration. National Survey of Children with Special Health Care Needs 2005-2006 Chartbook. Available at http://mchb.hrsa.gov/cshcn05/NF/4healthcna/services.htm accessed August 17, 2008

**Diagram 5**: Alden ER, Executive Director and CEO, AAP. Power point presentation entitled, "The American Academy of Pediatrics and The Medical Home: A Longstanding Relationship" April 25, 2008.

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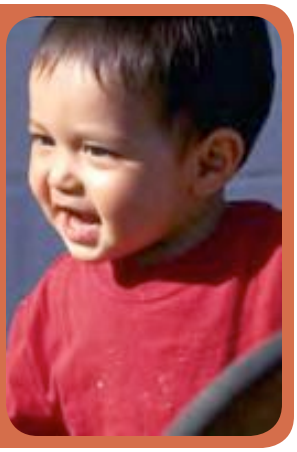

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