Environmental Factors in Implementing the Dental Home for All Young Children

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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.

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.

[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)

- *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 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

[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.

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 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.

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

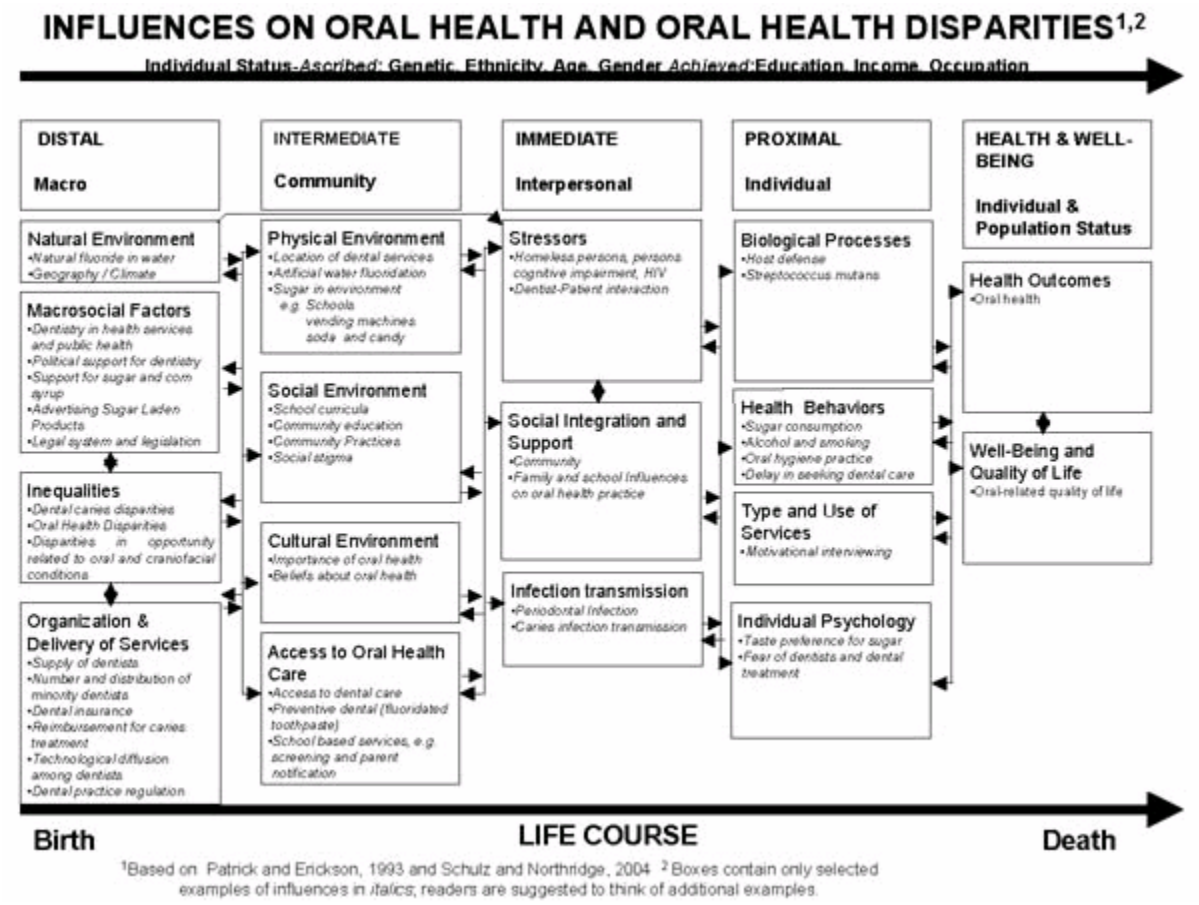


Figure 2: **Influence on children's oral health status.**
From Fisher-Owen SA, Gansky SA, Platt LJ, Weintraub JA, Soobader M-J, Bramlett MD, Newacheck PW. Influences on children's oral health: a conceptual model. Pediatrics 2007;120:e510-e520.

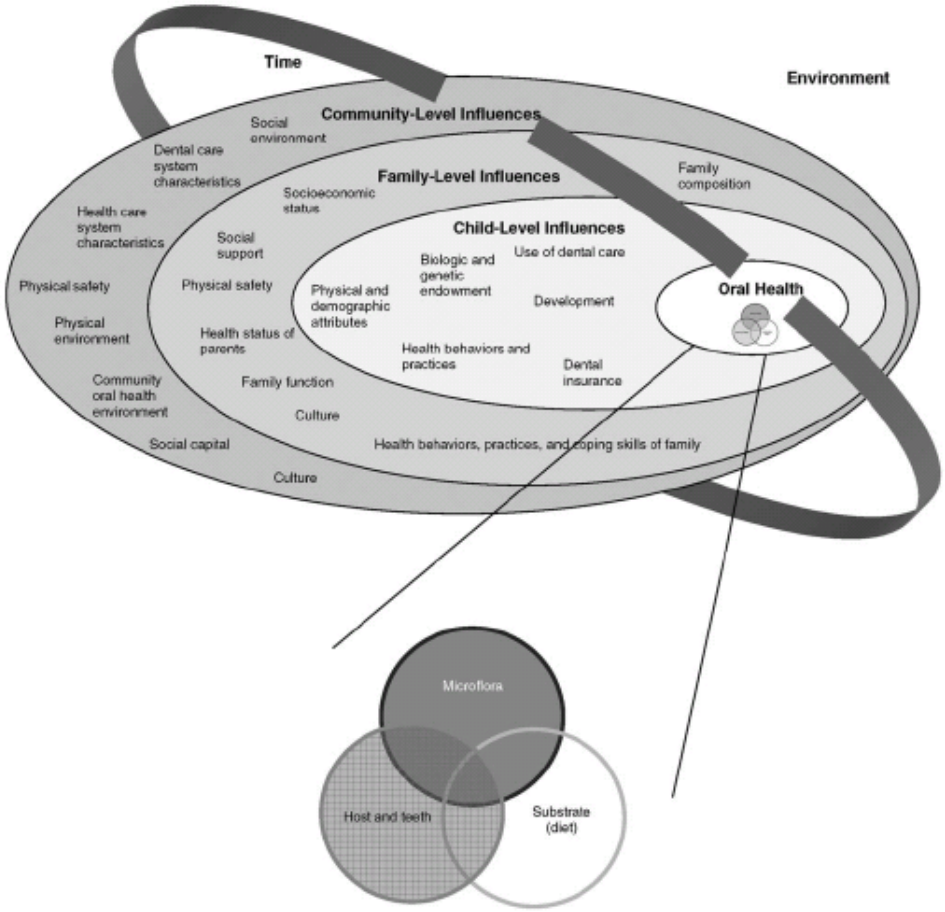


FIGURE 1
Child, family, and community influences on oral health outcomes of children. The triad was adapted from Keyes PH. *Int Dent J*. 1962;12:443–464; and the concentric oval design was adapted from the National Committee on Vital and Health Statistics. *Shaping a Health Statistics Vision for the 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.

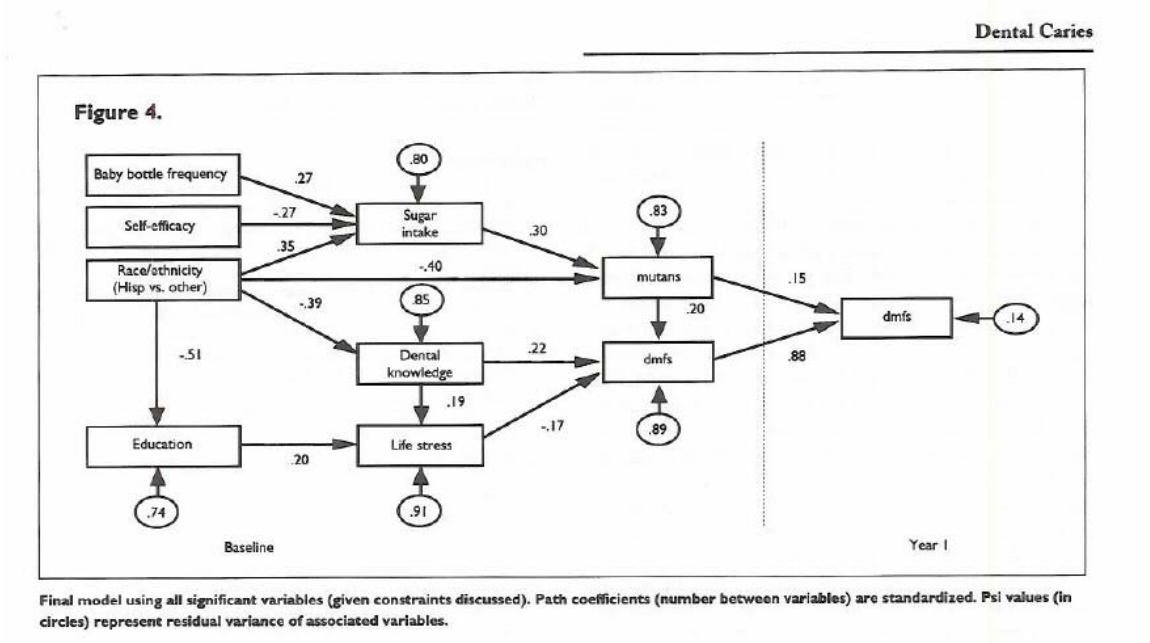
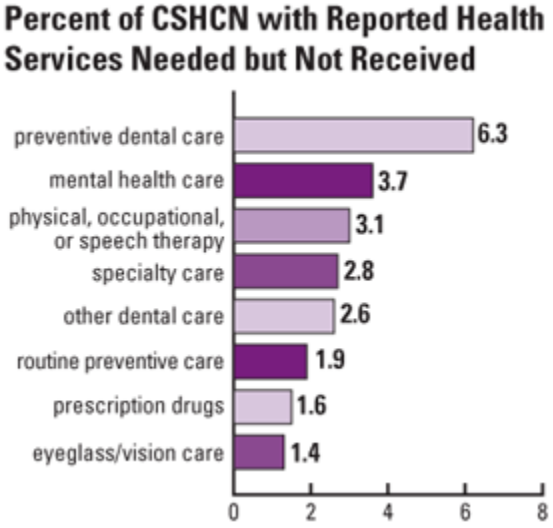
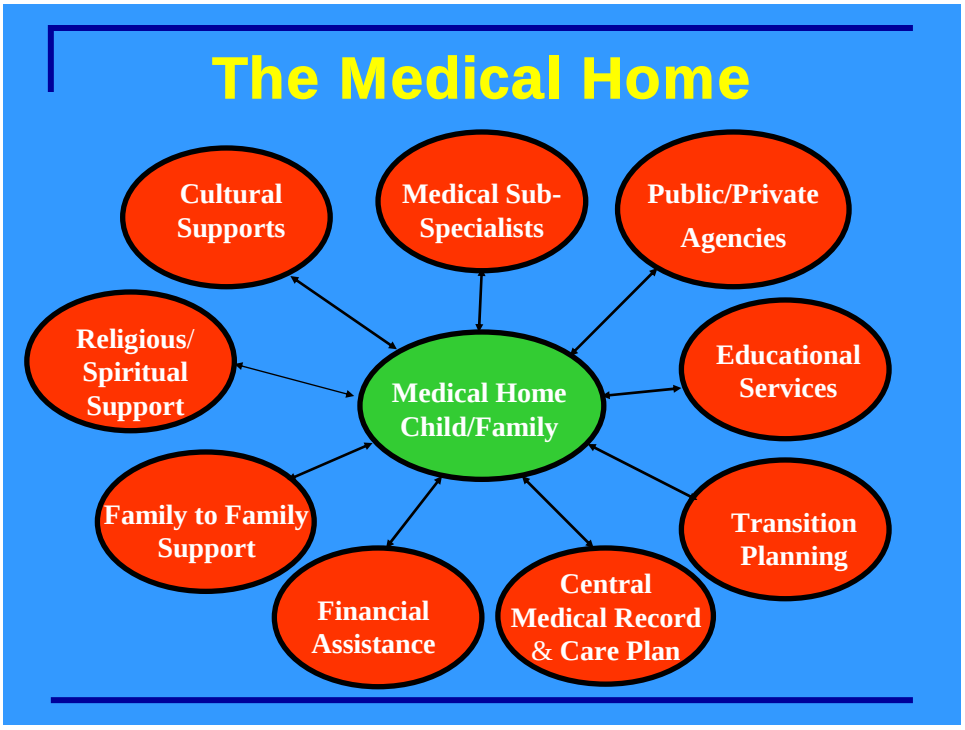


Figure 4



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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This document was produced by the National Oral Health Policy Center at Children's Dental Health Project with the support of a cooperative agreement from the Department of Health and Human Services, Health Resource Services Administration, Maternal and Child Health Bureau