THE INTERFACE BETWEEN MEDICINE AND DENTISTRY IN MEETING THE ORAL HEALTH NEEDS OF YOUNG CHILDREN

Developed by
the Children's Dental Health Project
for the American Academy of Pediatric Dentistry's
Filling the Gaps Project

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FILLING GAPS

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--A White Paper--

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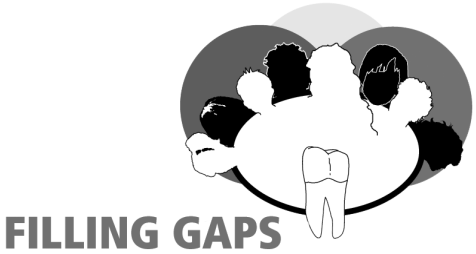

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EXECUTIVE SUMMARY

Based on six specially commissioned papers and a review of relevant literature, this white paper examines issues concerning the integration of primary care medicine and dentistry in preventing oral disease and promoting oral health among American children under the age of 5 years.[1] Its purpose is not to make specific recommendations, but to identify and delineate issues for discussion.

There are a variety of reasons why the interface between medicine and dentistry should be a matter of concern for those committed to improving the oral health of children under age five, particularly that of low-income and minority children, among whom the greatest amount of childhood dental disease is concentrated. There is a recognized maldistribution of general practice dentists and a shortage of pediatric dentists; both of these factors contribute to children's lack of access to needed dental care. There is growing recognition of the importance of a dental exam for children by their first birthday as a means of assessing dental risk and preventing dental disease, which can have lifelong negative sequelae. Unlike the number of dentists, the number of primary care physicians, and particularly pediatricians and family practitioners who concentrate on child health, is growing relative to population. Because such primary care physicians routinely examine children according to a specified schedule for well-child visits and often see children in the course of treating childhood illnesses, they have an important opportunity for intervening to protect a child's oral health which many dental practitioners lack. Yet most of these physicians lack even basic knowledge about oral health and are unable to assess the need for dental intervention.

A number of related factors warrant consideration. While dental caries is a demonstrably preventable disease and enormous strides have been made in promoting the oral health of most American children, caries of epidemic proportions persists in certain low-income and minority populations. About 80 percent of dental caries is concentrated in 25 percent of the pediatric population, generally those who already confront the greatest health and socioeconomic difficulties. The extent of dental uninsurance, almost triple the rate of medical uninsurance, also poses a major barrier to access, complicated by the relative weakness of the dental safety net. Medicaid and the State Children's Health Insurance Program (SCHIP) are notorious for their underpayment of dental practitioners and the resultant low participation of dentists in each program. Extensive nonfluoridation of municipal and private water supplies as well as inequities in access to newer dental technologies such as sealants and varnishes only compound the risks faced by young children, especially those on the lower rungs of the socioeconomic ladder.

To some extent, opportunities for effective integration of primary medicine and dentistry for young children under age 5 confront the obstacles posed by the traditional chasm which has separated medical practice from dental practice. As has been well documented most recently in Surgeon General David Satcher's landmark report on oral health issued in May 2000, the health of the mouth and oral cavity has historically been seen as something separate and apart from the health of the rest of the body in the United States. The result has been an historic separation of medical and dental practice. This has had deleterious effects for Americans of all ages, but has especially jeopardized the oral health of the most vulnerable population groups, including young children.

Interprofessional jealousies and sense of turf have also posed obstacles to integrating and coordinating medical and dental services. The profession of pediatric dentistry has traditionally viewed the oral health of young children as its exclusive preserve, and has proven resistant to the idea of medical inter-

[1] For purposes of this white paper, primary care services to children include those offered by pediatricians, family practitioners, nurse practitioners, physician assistants, and obstetrician/ gynecologists, the latter group contributing primarily during the prenatal phase of development.

vention in this area. Even many general dentists are hesitant about treating young children, and thus would look askance at the intervention of physicians in pediatric oral health. On the other hand, many primary care physicians already report feeling overburdened by the scope of their professional responsibilities, and express discomfort about assuming yet another professional responsibility, much less learning a new field. Moreover, some professional educators in both medicine and dentistry are likely to object to further intrusions of a "new subject area" into their curricula.

Based on recent policy discussions and analyses, however, it would seem that a schema for integrating primary care and dental services for young children could be developed without the need for a major investment of resources. The American Academy of Pediatric Dentistry's Filling Gaps Work Group has delineated a proposed division of pediatric oral health responsibilities between the medical and dental professions which could serve as a basis for further discussions.[2] A number of model collaborative programs are underway across the nation, which could point the way, based on experience, for fleshing out the AAPD group's table. The Bright Futures program represents a noteworthy attempt to address these issues and other issues of integrating health services to children.

Based on analyses of state laws that govern scope of medical and dental practice, it would appear that in most states, there are few legal obstacles to improved integration of medical and dental services. However, such laws do pose an obstacle in many states to the expanded use of allied dental professionals in the prevention of oral disease among young children, a potential untapped resource given both access problems and the evidence of extensive caries among children residing in underserved areas across the country.

To some extent, any discussion of improved integration must reflect the realities of recent developments in both medicine and dentistry. A major force in health care has been the expansion of managed care and the incorporation of managed care principles into daily practice. There is growing recognition of the important role played by primary care physicians in coordinating the medical care for all Americans (and especially those who belong to vulnerable populations), and in making and monitoring needed referrals to other practitioners. A central feature of this model is the notion of a "medical home" that provides assurance of continuity of care, knowledge of an individual's and a family's medical history, and coordination of diverse medical services. A similar concept of a "dental home" has emerged, and a central issue in integrating the two fields is how the medical home and the dental home interrelate. A related issue is how physicians and dentists can function together as part of a health services team.

Other issues that deserve further exploration are the nature of physician referrals to dentists and how professional communications between the two disciplines should take place. Some lessons can be learned from the relationships between primary care physicians and medical specialists on the one hand, and between primary physicians and medical auxiliaries (such as opticians, nutritionists, and podiatrists) on the other. Yet the potential integration of medical and dental services for young children is different from relationships within the field of medicine or between medicine and auxiliary medical fields, too.

Similarly, issues related to interprofessional education and training need to be addressed. While considerable attention has been given to how physicians might be trained in oral health and the nature of their involvement in that field, comparatively little attention has been given to the reciprocal training and role of dentists in promoting children's general health.

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[2] Burton L. Edelstein, "Dental Care Considerations for Young Children," *Spec Care Dentist* 22(3) S11-S25, 2002 developed for a conference convened April 2001 by the Health Resources and Services Administration, (USDHHS)

Critical Policy Issues Related to Interfaces

Perhaps the key issue in determining how best to integrate medicine and dentistry for young children is where to draw the line between the two professions. Moreover, although integrating physicians and other medical professionals into oral health delivery certainly seems to be part of the potential solution to oral health disparities among US children, it is no panacea for children's manifold oral health problems or their access to comprehensive dental care. Among related issues and questions are the following:

1. **Access augmentation through physicians as an issue per se (advantages/limits):** Given the serious barriers to access by young children to needed oral health care, including those related to the shortage of pediatric dentists, the uneven distribution of practicing dentists, poor dental insurance coverage (both public and private), etc., is integrating physicians and other health professionals into the delivery of children's oral health services an appropriate step? Will it result in positive effects with respect to access, prevention, and education about needed oral health services? Or will it further segment care and waste scarce resources?

2. **Age of first dental visit and its association with risk:** What is the appropriate age for a young child's first dental visit? At what age and by whom is preventive intervention best begun? Do science and technology enlighten the policy debate on this subject and provide definitive answers?

3. **Value and nature of a referral for dental care:** When a physician or other medical professional refers a child for preventive or curative/reparative oral health services, is such a referral substantively different from referrals that physicians make for non-primary care services such as psychiatric and other mental health services, surgical intervention, vision or hearing correction, etc.? What value does a referral from a medical professional add to a simple word-of-mouth referral from family or friends? What sort of obligation for follow-through do medical professionals incur in making dental referrals? What ultimately constitutes an effective referral? Is it ever appropriate for a medical professional who detects oral health problems *not* to refer a child for dental care, for example, when there is a shortage of dentists who will treat children?

4. **Dental home/medical home concepts:** How do the concepts of "medical home" and "dental home" for young children interrelate? Is a dental home best conceptualized as part and parcel of the medical home, or something separate and distinct from a medical home? To some extent, the answers to such questions depend on the nature of the interface between medicine and dentistry generally.

5. **Team care:** How can the practice of dentistry be integrated into a system of care that facilitates access to other needed services for children, including medical care, income support, nutrition, child care, education, and related services? For children with special health care needs, whose needs are demonstrably the most complex and multi-faceted, how can such integration of professional services be effected? Will simple collocation (e.g., in safety net facilities) suffice? Given the important role played by hospitals in meeting both the emergent oral health needs of some children and the secondary or tertiary backup roles for some children with the most severe oral health needs, how can the nexus between hospitals and dental practitioners be strengthened?

6. **Interprofessional communications:** How can communications between dental practitioners and primary care medical practitioners be improved, so that members of each profession are as fully informed about a child and his or her medical/dental case history as necessary?

7. **Dentists' role in overall pediatric health supervision:** If the integration between medicine and dentistry were improved, what would be the nature of dentistry's contribution? In addition to assisting in health education about such matters as periodic requirements for inoculations, what role can dentists play in promoting children's general health?

8. **Interprofessional education and training:** To foster better integration between the two professions, what specific elements of pediatric oral health do pediatricians, family practitioners, and other medical professionals engaged in primary care need to know? What elements of pediatric medicine do dentists need to know? When are the best opportunities for such cross-training? What role can professional associations play in promoting cross-training? How can interprofessional training be incorporated in continuing medical and dental education programs?

9. **Current curricula for primary care practitioners:** What facets of dental science need to be addressed in primary medical care curricula? When and where should they optimally be inserted in primary care education? How much information do physicians need to know about oral health in terms of semester hours or other measures?

10. **Public safety/patient protection:** If primary care practitioners are going to assume a larger role in assuring young children's oral health and preventing dental disease, how is the public to be assured that they are sufficiently trained and competent in the oral health functions they assume? Would additional licensure or certification be necessary? Does the literature on the quality assurance movement provide guidance?

11. **Basic science:** What are the implications of conceptualizing and addressing caries as a disease process, as opposed to the surgical repair of manifestation of dental disease, in terms of new opportunities for interventions by nondental medical professionals? (This implies that physicians and other medical practitioners might intervene in those aspects of dental care ranging from risk identification to disease suppression, including reducing strep mutans[3] counts.) In addition to potential roles for medical professionals, are there possible roles for other professionals who frequently interact with children (e.g. educators, social workers, counselors, nutritionists, and dieticians) to promote oral health?

12. **The chasm between dentistry and medicine:** What are the unintended consequences of having two separate medical and dental delivery systems? What sort of actions and technologies are available and feasible to repair the historic, long-term breach? How should this broader issue be addressed in integrating the services for young children provided by primary care practitioners and dentists?

13. **Dental finance/reimbursement issues:** The breadth of dental uninsurance and the degree of poor dental reimbursement and resultant nonparticipation of dentists in public programs like Medicaid and SCHIP pose major barriers to the access of Americans of all ages to needed dental services. These barriers to access are compounded by a documented tendency to minimize the need for dental attention relative to medical attention, particularly the need for attending to the primary teeth of young children. Medical and dental plan coverage for oral health services are often overlapping and confusing for the insured. How do finance and reimbursement issues for both medical and dental services affect appropriate care delivery?

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[3] Strep Mutans is the naturally occurring bacterium that causes dental caries.

14. **Family issues:** Expectations of young children's parents vary for physicians and dentists and for somatic and oral issues. Cultural and behavioral determinants influence health and health care. These include family structure, family support capacity, place or residence, migrant or immigrant status, primary language, and other family characteristics. How do underlying family characteristics, particularly those of families in poverty, influence decisions about best integration of medical and dental services?

Introduction

It is generally recognized that while tremendous strides have been made in advancing children's oral health in the past half century—many of them linked to use of fluoridated toothpastes, fluoridation of water supplies, and other preventive interventions—there remains a sizable residual population of children among whom dental caries is epidemic and whose general oral health status is unacceptable. This phenomenon has especially serious implications for children under the age of five, for whom unattended caries and other oral health problems can have lifelong negative consequences.

The root causes of this phenomenon are both numerous and difficult to resolve. They include a dental uninsurance rate that is almost three times the medical uninsurance rate, and public programs—principally Medicaid and the State Children's Health Insurance Program (SCHIP)—that have historically paid dental providers so poorly that few are willing to treat more than a handful of publicly covered patients. Lack of dental access is closely correlated with low family income and membership in racial minority groups (except for Asian Americans). Shortages of dentists have been documented in some 1,200 dental health professional shortage areas (DHPSAs) across the country, with many other shortage areas not yet designated because of the cumbersome, expensive process involved. There is a scarcity of pediatric dentists, and an aging dental workforce whose retiring members are not being replaced by sufficient numbers of newly trained dentists to maintain current dentist-to-population ratios.

Obviously, none of these problems offers hope of expeditious or easy resolution. Each of them would seem to necessitate sizable investments of public and private resources—typically over a lengthy period of time. Thus, if options were available that would offer some hope of less expensive investments and more rapid rates of return, policy makers should generally be willing to consider and perhaps embrace them.

This white paper explores one such option—improved integration of medical and dental services for children. Generally speaking, when this possibility is discussed, the conversation is predicated on an assumption that primary care physicians and other medical practitioners will take on a larger role in preserving children's oral health and preventing them from experiencing dental disease. (Although far less attention has been given to the reciprocal possibilities of utilizing dentists to promote children's general physical health, there is no reason why that aspect of integration should not also be considered.) Possibilities for medical intervention in children's oral health encompass alternatives ranging from risk assessment, screening, and referral, at one end of the spectrum, to more direct preventive interventions such as the application of fluoride varnishes or sealants to children's teeth, at the other end.

While this white paper focuses on the option of improved integration, it does not necessarily endorse it or advocate its implementation. Rather, the paper attempts to explore the potential pros and cons of improved integration of medicine and dentistry for children under the age of 5. It recognizes that such an approach is not a panacea, even under the best of circumstances, and that improved integration of these two broad health care professions is only one of a number of strategies that should be pursued simultaneously to improve the oral health of young children.

Goal and Genesis of the Interfaces Project

The *goal* of the Interfaces Project is to establish a framework for policy advancement that will improve children's oral health through appropriate actions on the part of government, professional organizations, advocates, health care administrators, third party payers, program managers, and others.

Clarifying and describing opportunities and constraints that govern the potential for medicine and dentistry to work in concert to advance children's oral health should make it possible to develop and promote policies that are cooperative, efficient, and effective.

The structured *process* used to identify and explore relevant policy issues has involved:

- Inviting experts from dentistry, pediatrics, and health law to develop expository background papers on six topics related to the interface between medicine and dentistry:
    - Professional education;
    - Legal constraints and opportunities;
    - Epidemiology and prevention of dental caries;
    - Children with special health care needs;
    - Professional policies and position statements; and
    - Financing and delivery of dental care;
- Asking these authors to review and comment on each other's expositions;
- Using these papers and other evidence from the health policy literature to develop a draft "white paper" that identifies and differentiates among specific issues germane to:
    - Public policy (i.e., governmental action)
    - Private policy (i.e., professional association and advocacy action), and
    - Clinical policy (i.e., action related to the hands-on provision of clinical services);
- Inviting nine experts from three disciplines -- dentistry, medicine, and health policy -- to write response papers critiquing and expanding concepts advanced in the draft white paper;
- Reworking the draft white paper into a final document that is vetted by 50 stakeholder organizations and individuals with interest in this topic and developing a companion document that reflects their comments.

The *purpose* of this white paper is to explicate policy issues that underlie the nexus between primary medical and dental care for young children for the advancement of their oral health, while examining issues related to the scope of dental and medical practice.

Background

In July 2000, U.S. Surgeon General David Satcher released the first report on oral health issued by his office.[i] The report was intended to serve many purposes, but one of the principal hopes was that it would teach the American public the basic facts about oral health and heighten their awareness of dental disease and how it can be prevented and treated. Among the central messages of the report were the following:

- The mouth reflects general health and well-being.
- Oral diseases and conditions are associated with other health problems.
- Oral diseases and disorders in and of themselves affect health and well-being throughout life.
- Safe and effective measures exist to prevent the most common dental diseases—dental caries and periodontal diseases.

In keeping with these findings, a central component of the associated action plan has an integrative thrust, calling on policy makers to:

- Build an effective health infrastructure that meets the oral health needs of all Americans and integrates oral health into overall health.

Medicine and Dentistry—Shall the Twain Ever Meet?

Despite the central messages of the Surgeon General's report about the integration of oral health into general health and the importance of considering the health of the mouth in the context of that of the entire body, an historic chasm has divided medicine and dentistry. The two fields have been and remain very much distinct disciplines and separate professions. Except for their basic science curricula, medical and dental schools are typically separate entities in their clinical training, and even when operated under the aegis of the same academic institution, little attempt is made to cross-train students of each profession clinically. Once a dentist, physician, or nurse is graduated, the foundations of the separation laid in professional school are seldom overcome in practice or through continuing professional education.

Taken by itself, American dentistry constitutes an entire "oral health care system" with its own characteristic educational, organizational, financing, regulatory, accountability, research, care-delivery, and social components. Dental care for very young children is typically viewed by the dental profession as the responsibility of pediatric dentists and interested general dentists, who work in close concert with dental hygienists and assistants and establish a "dental home" for each child who accesses care. Reflecting the perceived independence of dentistry is a slogan used by the American Dental Association claiming that "dentistry is health care that works." This orientation promotes the idea that "dentistry is different." In this view, dentistry is a separate and distinct—yet vitally important—component of American health care.

This stance implies that it is the responsibility of consumers to negotiate the dental care system independently of their interaction with the medical care system. Each individual who accesses care becomes a patient of both the "medical system" and the "dental system." While the medical and dental professions may interface superficially—through referrals and professional recommendations—there is seemingly no intention of integrating oral health services with general health services.

In sharp contrast, taken by itself, American health care for very young children—including oral health supervision—is generally viewed by the medical profession as falling exclusively within the purview of pediatric and family medicine. This care is provided by primary care physicians, including family practitioners and pediatricians, often with the engagement of nurse practitioners, physician assistants, and nurses. These primary practitioners provide children with a "medical home" that provides comprehensive, preventive oriented, continuous, and coordinated care. The coordinative function includes referral of children for specialized services as necessary. As reflected in "Bright Futures"[ii] and American Academy of Pediatrics policy, this perspective considers oral health as an important, even essential, component of primary care for young children. In keeping with their other responsibilities, the primary physician's role is to assess and manage conditions and to determine when it is necessary to call in more specialized providers who can complement and extend primary care. Unlike other common areas of pediatric health, oral health is a subject in which the primary care physician typically has little training or experience. Physicians tend to regard dental care for young children as a secondary level of care or as specialty care, and consider dentists to be more like specialists than primary care providers.

Many of the policy issues at the interface between dentistry and medicine regarding young children emanate from these profound, fundamental differences in perspective. Resolving many of these issues requires agreement about the very nature of dental care, whether it is indeed primary care in its own right that is independent of the larger health care system, or whether it is secondary care that is called on when needed.

Perhaps this disparity of views is most clear regarding policy about the suggested age of the first dental visit. From the perspective of dentistry as an independent health care system, comprehensive primary dental care requires early assessment and guidance and points to an age one dental visit for all children. From the perspective of primary care medicine, oral assessment and guidance are integral components of well-child care at age one and the dentist needs to be engaged only if a problem beyond the competencies of the physician needs to be addressed.

Similarly, this disparity of views is reflected in dentistry's adoption of the concept of "dental home," although this concept may be unacceptable to many primary care physicians, who would question why any child needs more than one "medical home." In this context, preventive dental services would be viewed as primary care while corrective dental services (which are largely surgical in nature) would be cast as secondary or specialty care. Since primary medical care for young children calls upon physicians to take responsibility for the full range of preventive services, this view would anticipate significant engagement of physicians in preventive dentistry.

Thus, dentistry is either the "locomotive" of oral health care or the "caboose" of overall health care for young children, depending upon the disparate perspectives of the two professions. This tension between these two conceptualizations will be evident throughout the discussion in this paper.

Social Determinants of General Health and Oral Health

Thanks to the pioneering work of a group of public health faculty concentrated primarily at Harvard University, there is growing recognition that the health of any population is influenced as much if not more by socioeconomic forces present in their environment than by medical interventions.[iii] Reviewing recent literature about dental health policy, there is every reason to expect that these same social determinants or socioeconomic forces play a large role in determining a population's oral health status. Given their dependent status and their critical developmental age range, this observation is perhaps more applicable to the oral health of young children than any other population group.

The implication of this "social determinants" literature is not so much that medical and dental interventions are futile as that they should be developed based on a strategy that recognizes the fundamental influences of socioeconomic factors. For example, print media are less likely to be helpful in educating semi-literate low-income families than other media, including direct face-to-face education or counseling by dental and medical professionals attuned to their patients' culture. Financial barriers and family structure are important factors to consider in developing oral health initiatives for such groups.

One observer has commented on the particular relevance of the "social determinants" discussion to the oral health of young children:

> Dental disease compounds many social problems low income and minority children face, including general health, housing, education, community safety, and employment opportunities. The nascent discipline of "social determinants of health" explores the observation that "the infant's health will depend upon the mother's social and economic circumstances, as well as her health-related knowledge and confidence." Viewed from this perspective, dental disease in our society

> may be an essential component, and perhaps a marker, for overall compromising conditions of childhood.[iv]

In a paper prepared for the Surgeon General's Workshop on Children and Oral Health, a second observer remarked about another important aspect of family income and children's oral health:

> To the extent that children's oral health problems are considered in isolation from the rest of children's health and social policy, effective solutions cannot be generated. Oral health, like other areas of children's health, is negatively impacted by environmental factors, poor nutrition, lack of education, diminished access to health care, and inadequate financial resources. These factors are intrinsically interrelated, and contribute to poorer outcomes for children in many areas of health and well-being. For this reason only broad multidisciplinary efforts like the present endeavor can hope to succeed in designing policies and strategies to improve the oral health of children.[v]

The Nature of Young Children

Children under the age of 5 are at a seminal stage vis-à-vis their physical and cognitive development. They are going through a period of life during which decisions about their health, nutrition, education, socialization, and other basic aspects of their existence are likely to have lifelong consequences. Because of this, deferral of investments in their health and welfare made during this period can often have long-term deleterious effects.

Many authorities have commented on the special importance of early childhood in oral health. To cite one source:

> Early childhood is marked by tremendous growth and development of the face, mouth, and dentition, all of which may require the attention of a dental professional. Among the more common oral conditions of early childhood are dental caries (tooth decay), oral mucosal infections, accidental and intentional dental and oral trauma, developmental disturbances associated with teething or tooth formation, and developmental clefts of the lip and/or palate.[vi]

In an interdisciplinary article on oral health policy published in the *Journal of the American Medical Association* in November 2000, the authors pointed out:

> Children's development processes are vulnerable to untreated diseases, including oral disease, making early identification of high-risk children and timely interventions critical. Moreover, opportunities to promote health and prevent disease and complications are maximal in childhood.[vii]

In America, young children are disproportionately represented in the below-poverty population and victimized by the ills which accompany poverty, including poor nutrition, limited access to health care, substandard housing, medically harmful or hazardous environments, and reduced likelihood that both parents are present. Such influences have important consequences for children's general health and their oral health. To some extent, interventions in any aspect of their health care must reflect a recognition that special efforts must be made to compensate for such factors.

Children's Oral Health

Given the broad audience to which this white paper is addressed, it is perhaps helpful to review some of the basic facts about children's oral health in America.

The Epidemiology of Dental Caries and Other Dental Diseases among Young Children

There is growing recognition that dental caries or tooth decay is the most prevalent chronic disease among children, five times more so than asthma. Yet less well known is the fact that it is concentrated among certain population groups. Between 20 and 25 percent of children experience 80 percent of total childhood caries. This group is disproportionately poor and represented by members of nonwhite racial groups (with the exception of Asian Americans). Preschool children with family incomes below the federal poverty level have nearly five times as many decayed teeth as children with family incomes three times the poverty level. One source notes: "The disparity in decay prevalence is most pronounced among preschool children and diminishes with age."[viii] Nearly one out of five children (18 percent) aged 2 to 4 already has caries that is readily evident on a simple visual exam and 16 percent have untreated caries.

The concentration of untreated caries and the infrequency of dental visits among younger, lower income, and minority children are also noteworthy. Surgeon General Satcher's report indicated:

> Twenty-five percent of...children have never visited a dentist before entering kindergarten, despite widespread understanding that the dental caries process is established before age 2 and the recommendation of experts that children as young as 1 may benefit from a dental visit.

In fact, fewer young children visited a dentist in 1998 than 10 years previously. The authors of the *JAMA* article cited above noted: "Most decayed teeth in preschoolers go untreated despite significant health consequences."[ix]

"Service frequency tends to increase with increasing income," notes one authority.[x] In other words, those with lesser need for dental care get it more frequently. Children from families with incomes below 200 percent of the federal poverty level are three times as likely to have unmet dental need as children whose families have income at or above 200 percent of poverty.

Looking towards the future, it is significant that the fastest growing portions of the nation's child population are precisely those among whom the prevalence of caries and other dental problems is highest—the youngest, the poorest, and minority children. This may portend the first upswing in the overall prevalence of dental diseases among children in more than a generation. It also means that, unless the dental workforce grows faster and locates more often in underserved areas, the extent of unmet need will only worsen.

In a paper commissioned for the Interfaces Project, Crall puts all of this into perspective relative to the total population of American children:

> Overall, tooth decay continues to be a significant problem for roughly 18 million children who experience dental caries as a chronic problem, but have difficulty accessing treatment. Roughly 25 percent or 4-5 million of these children exhibit disease levels and/or related pain severe enough to interfere substantially with routine daily activities (eating, sleeping, school, etc.). Yet, the oft-quoted statistic that 20-25 percent of children experience 80 percent of tooth decay also

implies that roughly three-fourths of children are at relatively low risk and exhibit relatively few decayed teeth at any point in time (although over 80 percent of children ultimately exhibit caries by age 18). The majority of these minimally affected and lower-risk children tend to have good access to dental services.[xi]

Dental Access Problems and Children

Papers commissioned for the Surgeon General's Workshop on Children and Oral Health in 2000 are also a rich resource for documenting dental access problems among children. Commenting on the overall picture of children's oral health in America, one author observed: "The disparities in children's oral health outcomes and access to care are glaring."[xii] Focusing on the neediest subpopulation, a second author pointed out: "Despite having publicly financed dental coverage [via Medicaid and SCHIP], low-income children suffer the most from dental disease and have the least access to dental care."[xiii] A third author commented:

> Despite their greater treatment needs, children of low-income, minority status, and children of parents with limited education, are not only less likely to access care, but they tend to have fewer dental visits when they do obtain care. Disparities are particularly evident among school-aged and adolescent children, but preschool children tend to have the fewest visits.[xiv]

There is evidence that access problems are especially serious for young children. The American Dental Association (ADA) reported, based on 1990 data, that only 2.6 percent of all patients seen by dentists were children under the age of five.[xv] Yet according to the 1990 census, they represented 7.4 percent of the total population at that time.

Among the factors recognized to contribute to children's access problems are:

- The geographic maldistribution of dentists (in the roughly 1,200 dental HPSAs across the nation, only six percent of need is met)
- Shortage of clinically active/practicing pediatric dentists (only about 3,600, for a below-19 population to pediatric dentist ratio of about 20,000 to 1, according to 2000 census data)
- Widespread ignorance about the need for dental intervention generally, but especially for young children ("They're only baby teeth, aren't they?")
- Medicaid- and SCHIP-related problems, in areas such as payment rates and levels of participation by dentists

Reasons for Special Concern about the Health of Primary Teeth

Despite the historic cultural tradition of dismissing the importance of dental attention for primary teeth, there is growing evidence that lack of such attention has negative consequences, many of them likely to affect children throughout their lives. Untreated dental disease can hinder a child's overall growth and development and furnishes a "reservoir of contagion" for abscesses and infections outside the oral cavity. Untreated caries has been linked to poor nutrition and failure to thrive in children. Premature loss of primary teeth can also lead to poorly positioned permanent teeth and malocclusion.

The long-term pain and infection caused by rotting teeth can also have broader ramifications, reducing a child's ability to concentrate in the classroom, read outside of school, and compete academically with other children.[xvi] A number of studies document extensive cumulative absences from school

linked to dental disease. As one observer noted: "Since dental appearance and function are important to quality of life, self-esteem, and economic productivity, lack of dental care in childhood and loss of permanent dentition can have life-long consequences."[xvii]

Looking forward into the adult years, decay in primary teeth is a strong predictor of decay in permanent teeth. Among the possible long-term consequences of poor oral health in childhood are negative effects on speech, nutrition, employability, economic productivity, and quality of life.

The ultimate tragedy of childhood caries and most other dental diseases is that they are entirely preventable, given appropriate interventions at the right time. Important additional considerations relate to growing evidence of medical sequelae of poor oral health, including heart disease, cancer, and poor birth outcomes among pregnant women.

Dental Caries: Tooth Decay

Dental caries is a bacterially caused disease that initially destroys the enamel of the tooth surface and can eventually affect the pulp (core) of the tooth. If left untreated, it can ultimately lead to tooth loss. Teeth are at risk for cavities over virtually the entire human life span; both primary (baby) and permanent teeth can develop caries. Because caries is irreversible unless arrested early, the disease is cumulative, increasing in prevalence with the age of the population.

A recent report from the Centers for Disease Control and Prevention (CDC) recalled just how far the nation has come in the prevention and treatment of caries during the past century: "At the beginning of the 20th century, extensive dental caries was common in the United States and in most developed countries. No effective measures existed for preventing this disease, and the most frequent treatment was tooth extraction."[xviii] Today, thanks to the discovery of fluoride and the development of such technologies as dental sealants, caries is largely preventable and most Americans can expect to retain most of their teeth as they age.

Despite considerable progress in reducing its prevalence, caries is still a widespread problem. Its concentration among vulnerable Americans—those with low incomes and people of color—is especially disturbing. Caries is the single most common disease of childhood—among 5- to 17-year-olds, it is five times as common as asthma, the most common chronic disease among children, and seven times as common as hay fever, according to the Surgeon General.

Particularly distressing is the high rate of untreated caries. Most decayed teeth in preschoolers go untreated, despite potential serious health consequences. About two-thirds of poor Mexican American and non-Hispanic black children aged 2 to 9 have untreated, decayed teeth. Nearly one-third of adults have untreated caries.

Among the potential short-term consequences of untreated dental caries are severe pain, failure to thrive, malocclusion, extractions, and trips to emergency rooms (ERs). Longer-term consequences include harmful effects on speech, nutrition, and self-image, which can affect economic productivity. Jonathan Kozol, who has written extensively on children's issues, has emphasized the debilitating effects of unattended dental ailments: "Although dental problems don't command the instant fear associated with low birth weight, fetal death, or cholera, they do have the consequence of wearing down the stamina of children and defeating their ambitions."[xix]

Possible Mechanisms for Preventing Caries and Other Dental Diseases in Young Children

In a paper commissioned for the Interfaces Project, Tinanoff et al. discuss the following options for preventing caries and other dental diseases in young children:[xx]

- **Parental education.** The authors note that such interventions "work well at improving general knowledge levels, but only have a temporary effect on plaque levels, and have no discernable effect on caries experience." Nonetheless, they concede that parental education will "remain an important component of preventive dental programs," and call for improving the ability of such interventions to alter oral health behavior.
- **Diet.** Tinanoff et al. warn about the cariogenic capacity of fruit juices and fruit-flavored drinks, but dismiss those linked to cow's milk. They generally warn against "prolonged feedings with foods that contain sugar."
- **Tooth brushing.** The effectiveness of brushing children's teeth with fluoride-content toothpaste as a means of preventing caries is recognized. However, given the risk of fluorosis[1] from excessive swallowing of toothpaste, the authors recommend that children's tooth-brushing be supervised.
- **Systemic fluoride supplements.** The authors report recent recommendations that fluoride supplements should be prescribed only to children from unfluoridated communities, who are also identified at being at moderate or high caries risk. (2000 data from the Centers for Disease Control and Prevention (CDC) indicate that only 65.8 percent of Americans served by the public water systems received optimally fluoridated water.)
- **Professional topical fluorides.** Although fluoride varnishes are remarkably easy to apply to young children and have been proven safe and effective, they were not introduced into the U.S. until 1991, despite wide use in Europe for over 30 years. Presumably, their use in America is still limited.
- **Antimicrobials.** Evidence is reported of the effectiveness of three antimicrobial agents (Chlorhexidine, iodine, and stannous fluoride) in suppressing caries. The authors call for further research "before an antimicrobial approach to treat caries in preschool children can be widely adopted."
- **Sealants.** Despite the proven safety and effectiveness of pit and fissure sealants—and even despite evidence of their demonstrated value (a) for primary teeth and (b) among a population of 3-4 year olds—their use in young children has remained limited for a variety of reasons. Among these are skepticism on the part of dentists about the efficacy of sealants in primary teeth, difficulty in placing them in young children, and nonreimbursement by many insurers, including Medicaid in many states, for sealants when applied to primary teeth.

The implications of this paper for the overall Interfaces Project seem clear. With the exception of sealants, such interventions could seemingly be carried out by medical professionals without extensive, in-depth training.

Policy Issues in the Integration of Dentistry and Medicine

This section of the white paper discusses the primary focus of the Interfaces Project—"the nexus between primary medical and dental care for young children" and how it might be improved to contribute

[1] Fluorosis is an abnormal dental condition caused by excessive intake of fluoride and resulting in mottling of the teeth.

to "the advancement of their oral health." It begins with an examination of the pros and cons of augmenting the access of young children to dental services by involving medical practitioners in the delivery of that care. An issue of almost similar fundamental importance is the age or time at which a young child first needs attention from a dentist. The possible options for involving medical practitioners in promoting the oral health of young children are then explored. Brief attention is then devoted to "the other side of the coin"—how dentists might be involved in promoting children's overall health.

Should dental-medical integration be both acceptable and feasible, a number of issues related to the mechanics of integration arise. For example, what constitutes an optimal referral from a medical to a dental practitioner? How can interprofessional communications other than referrals best be conducted? How do the concepts of medical and dental homes interrelate? How can medical practitioners and dentists best function as members of a single team of pediatric care?

A number of other issues also warrant consideration: How can necessary knowledge about the disciplines of medicine and dentistry best be imparted to members of the other profession, both as part of their initial education in their field and ultimately as part of continuing education? How can the public best be assured that the intervention of medical professionals in the oral health of children is based on demonstrated knowledge and capacity in dental health? How can the demands of special populations—in particular, children with special health care needs—best be addressed within an integrated medical-dental system?

Finally, what are the implications of various models of meeting dental needs for integration? Can the historic chasm between medicine and dentistry really be bridged? Given the importance of financial and insurance barriers to access, will improved integration ultimately make a difference in the oral health of young children?

Medical and Dental Primary Care

In reviewing delivery systems and financing issues for the Interfaces Project, Crall makes note of an important factor related to young children's utilization of the primary health care system:

> Professional guidelines for the periodicity of primary medical care services recommend that children see a physician eight times during their first year of life for periodic well-child services,...three times during their second year, and once a year thereafter until age 6. For the most part, compliance with these recommendations is high.[xxi]

Thus, primary care practitioners are seeing young children on a regular basis—not to mention during intermittent pediatric visits for childhood illnesses. Therefore, a related argument for involving these physicians and nurses in children's oral health is that they are generally *seeing the children anyway* periodically and are in a good position to monitor oral health.

As Crall points out in another paper, there are at least two ways in which pediatric and general dentistry already represent primary care:

> Dentists generally are not recognized as primary care providers in a health policy context; however, primary care dental providers (general dentists and pediatric dentists) are considered to be important members of "the primary care team" for two principal reasons. First, the general model for the care they provide embodies the fundamental components of primary care: first point of contact, continuity of care, emphasis on prevention, and coordinated, comprehensive ser-

vices. Second, the majority of the services they provide are not available from other types of health care practitioners.[xxii]

It is significant that a 1996 report issued by the Institute of Medicine (IOM), *Primary Care: America's Health in a New Era,* also makes note of the role of dentists as first contact health professionals:

> Several other health professions provide first-contact care for basic health services that are needed by most or all of the population. Principal among these professions are dentistry, optometry, and pharmacy. Each of these professions has a unique history in the American context, and the evolution of each has been largely independent of the medical professions and the development of other health professions with closer relationships to medicine, such as nursing and many of the allied health professions. The resulting patterns of basic and continuing services being provided by independent service settings are more a product of history than of logic, but there is no mandate from either health professionals or patients to change these historic patterns.[xxiii]

Nevertheless, the IOM report recognizes the limits of dentistry in a primary care context:

> The committee definition [of primary care] clearly describes functions that extend far beyond the services provided by dentists and…. The independence that characterizes their typical practice does not seem to be consistent with their inclusion in the primary care team…. Yet it would seem logical that good health care for the whole person, certainly a focus of primary care, should include good oral health.

The report concludes its consideration of dentistry and primary care by sketching out a fairly full model of collaboration:

> The committee, therefore, would encourage strengthening the two-way relationship between the primary care clinician or team and the provision of dental care…. For example, the primary care clinician could determine whether patients are receiving preventive and restorative dental services and encourage them to obtain such routine care. Some screening for oral health problems can be carried out in the primary care setting and lead to appropriate referral for dental services…. Conversely, the dentist can screen for medical problems to be brought to the attention of the primary care clinician. Screening for oral cancer is common; screening for diabetes and hypertension would take advantage of the sometimes routine contact between the dentist and patient. Reference to a common, computer-based patient record would facilitate such interaction.

Given the arguments that can seemingly be made for an expanded role for primary care practitioners in dentistry, what are the countervailing considerations? Perhaps the single major weakness of the argument in favor of expanding this role is the basic assumption that pediatricians, family practitioners, and other primary care clinicians have the capacity to take on an additional role and/or that they would willingly accept a larger role in promoting the oral health of children.

Evidence from the current asthma epidemic seems to give reason for pause about these assumptions. For a variety of reasons, asthma has reached epidemic proportions among the essentially same pediatric populations that are most at risk for dental disease. Fortunately, there is a scientific knowledge base that provides clear guidance on how asthma can be controlled; indeed, the National Heart, Blood, and Lung Institute of the National Institutes of Health has issued clear guidelines to primary care physicians on how to control asthma. In general, primary care clinicians accept their role in controlling asthma. However, the evidence is strong that many are ignorant about the most recent developments in

asthma treatment and that few have familiarized themselves with the guidelines, which have been available since 1991 and were updated in 1997.[xxiv]

If primary care clinicians are resistant to keeping up-to-date on a disease entity for which their responsibility is clear, there is reason to question whether they would embrace a larger role in oral health, much less obtain the requisite training to become proficient in screening young children for dental disease or in intervening in other ways. There seems to be an attitude on the part of a number of primary care providers, especially in light of additional gatekeeping responsibilities imposed under managed care, that their "plate is already full." This is a consideration that has to be weighed in any discussion of expanding their role in oral health.

Age of First Dental Visit

There are at least two schools of professional thought on the age or time at which a young child should optimally be first seen for a dental visit. The ADA, Bright Futures, and the American Academy of Pediatric Dentistry (AAPD) all concur that the first visit should be made by the time the child reaches his or her first birthday. However, the American Academy of Pediatrics (AAP) favors a first dental visit at the age of 3 years. Moreover, a recent AAPD survey found that a significant percentage of general dentists preferred to defer seeing young children until around the age of 3.[xxv]

Insofar as science offers direction, it would generally seem that the earlier a child is first seen by a dentist, the better. Yet the determination of this age has important implications for potential additional demands on not only the dental workforce, but also on primary care medical providers. If nondentists are to play a larger role in oral health, the earlier a child should be referred for a dental visit, the sooner the medical provider should also attend to a child's oral health.

How Medical Practitioners Might Intervene

An important factor affecting the additional time demands on primary care clinicians is the nature of their potential role in oral health. If their role is simply one of screening for dental disease and educating parents about oral health, the demands might be relatively light. But if their role includes periodic application of fluoride varnishes or even sealants, the demands would be considerably greater.

The AAPD's Filling Gaps Work Group has already devoted considerable attention to the topic of what oral health responsibilities primary care practitioners might assume. Table 1 presents a schema of responsibilities that were adopted by the Filling Gaps Work Group [*See Appendix A.*]. As the table indicates, the AAPD Work Group recognizes an appropriate role for physicians and nurses in risk assessment, anticipatory guidance, primary prevention (including the application of topical fluoride varnishes, but conditioning the application of dental sealants "under conditions specified"), and disease suppression. Yet it rules out entirely their involvement in dental prophylaxis, cavity repair, and atraumatic restorative technique. In other words, the work group would limit the hands-on involvement of physicians and nurses to those dental interventions that are nontechnical.

In a paper commissioned for the Interfaces Project, Tinanoff et al. developed a similar table, with dental functions arrayed slightly differently.[xxvi] Their suggested division of responsibilities seems to rule out involvement of medical professionals in the application of dental sealants. Otherwise, it seems remarkably similar to that of the AAPD Work Group.

The paper by Tinanoff et al. also reports that the U.S. Preventive Services Task Force, an independent panel of experts in primary care and prevention, has been systematically reviewing the evidence on the effectiveness of clinical preventive services. The Task Force is currently revising the oral health

chapter of its *Guide to Clinical Preventive Services* to assess evidence on the effectiveness of dental services when provided by a primary care clinician. When the Task Force completes this work, it will constitute important input for continued discussions about integrating medical care with dental care.

A related consideration is what restrictions state medical practice laws impose on physician and nurse intervention in dentistry. After an extensive review of laws governing physicians for the Interfaces project, Rosenbaum concludes that there are few statutory limits on physicians per se.[xxvii] (This is not true for dental auxiliary personnel, including dental hygienists and dental assistants, whose role is discussed later in the paper.)

As with most issues, integration may ultimately boil down to a matter of money. If physicians cannot be reimbursed by third party payers for their interventions into the oral health of young children, this in itself may be a barrier to integration. This issue certainly warrants the attention of insurance regulators and public policy makers.

Intervention of Dentists in Children's Overall Health

As noted earlier, far less attention has been devoted to "the opposite side of the coin"—possible interventions by dentists to promote a young child's general physical health. At present, the most that seems possible to assert is that a role in general health education seems appropriate. Possible suggestions for dental intervention in children's physical health include monitoring of childhood immunizations, assessing the child's nutritional status, and screening for certain conditions (e.g., obesity).

Dentists' potential role in promoting physical health would seem to naturally encompass areas that are influenced by or affect the oral cavity and already fall within their purview. Prevention of oral trauma through educating parents and children about the use of safety helmets when riding bicycles or skateboards, seatbelts when riding in automobiles, and mouthguards when playing sports would also seem to logically be part of a dentist's broader responsibility.

More attention needs to be given to what dentists' role in physical health might entail. This would seem a natural topic for discussion between dentists' and primary physicians' groups.

Mechanics of Integration (Referrals and Other Communication, Medical vs. Dental Home, Team Concept)

Regardless of medical practitioners' role in oral health, there will come a point where the medical professionals' scope of responsibility will end and that of dentists will pick up. At this point, physicians would need to refer young children to dentists, and the involvement of physicians in activities beyond that point would continue more as reinforcing and monitoring of compliance with dental recommendations. Suggestions for better integration of medicine and dentistry seem to indicate that physicians and nurses would augment and supplement dentists' involvement in these areas.

Questions arise about the nature of adequate and effective referrals. Much can be learned from experience under managed care models, where primary practitioners routinely refer patients for the attention of physician specialists and such allied health professionals as podiatrists and dieticians. Central to the concept of a medical referral is continuing responsibility of the primary practitioner after the referral is made, at minimum in some form of follow-up to see that care was provided according to the terms of the referral. Given the differing nature of professional boundaries between medicine and dentistry as opposed to those between primary and specialty medicine, for example, it would seem that physicians' responsibilities for follow-up in an oral health context might be more limited.

However, the relative paucity of pediatric dentists and general dentists willing to provide care to young children, especially in certain geographic areas, is understandably going to present physicians seeking to refer such children for dental services with a dilemma. In some cases, physicians may simply not know the names of specific dental providers to whom they can refer young children. For a referral to be made by primary care clinicians, must they be able to assure that dental services are available and must they be able to refer to a particular dentist or dentists by name?

Related topics concern routine communications between medical and dental practitioners, and whether dentists should be considered part of a "pediatric team." Presumably, this would involve inter-professional sharing of medical and dental histories as well as special communications about such matters as allergies or noteworthy risk factors. Members of either profession might also want to call the others' attention to significant characteristics of the child's family (e.g., parental illness, familial problems, etc.). Yet ultimately, the principal reason for such consultation and collaboration would be a positive contribution to clinical outcomes; without such results, it is doubtful that members of either profession would find such coordination worthwhile.

The expansion of managed care in both medicine and dentistry has led to widespread acceptance of the models characterized by the terms "medical home" and "dental home." Each of these terms implies a single point of contact for a patient, with responsibility for assuring continuity of care, coordinating referrals to other health care professionals, monitoring quality of care provided under the terms of referrals, etc. The question arises, however: If a child has a primary care office providing a "medical home" and a dental office offering a "dental home," how do the two interrelate? Given the traditional independence of the two professions, there would seem to be reason to regard the two as separate entities. However, if a "medical home" is meant to be all-encompassing, with overall responsibility for a child's health, the "dental home" might be regarded as subsidiary to the "medical home." Obviously, this is an issue that warrants further attention as attempts are made to improve the integration of medicine and dentistry.

Cross-Training and Professional Education

In the paper on professional education issues commissioned for the Interfaces Project, Krol explores a number of aspects of how physicians might be trained in oral health.[xxviii] He cites a number of potential opportunities for improvement. For example, at present, anywhere from 38 to 63 percent of physicians receive no oral health training during medical school. Surveys of pediatricians indicate that between 51 and 76 percent deem their residency experiences deficient in dental education. Similarly, most family practitioners indicate that they do not receive information on oral health during their specialty training. In addition, 60 percent of pediatricians indicate that they receive no instruction in oral health via continuing medical education (CME) opportunities.

In addition, Krol notes that there are no explicit requirements for oral health training in medical education. Although some educational programs, projects, and models are available for physician education in oral health, there is no organized national commitment to educating physicians on the topic. He notes that numerous opportunities exist, at all levels of the current medical education system, to incorporate oral health training. Krol concludes that the production of physicians competent in children's oral health will require a commitment by various medical education stakeholders to integrate oral health into the continuum of physician education

Consumer Protection/Quality Assurance

For medical providers to assume a larger role in the oral health of young children, they will need to acquire specific knowledge and develop clinical skills appropriate to these new responsibilities. Current medical and nursing training could not reasonably be expected to have ensured these competencies since they rarely include instruction and experience on oral health. For this reason, issues arise regarding consumer protection and quality assurance. These issues include the integration of oral health into the education and training of medical primary care providers, the development and implementation of clinical protocols suitable for oral health supervision by medical providers, and the determinants of criteria for referral to dental professionals. Methods customarily utilized to ensure provider competencies (e.g. national examinations, state boards, specialty certifications, continuing education requirements, etc.) would need to incorporate oral health components in order to ensure that medical providers assume these new roles responsibly and authoritatively.

Children with Special Health Care Needs

By virtue of the complexity of their diagnoses and needs, children with special health care needs (CSHCN) present unique challenges to both medicine and dentistry in terms of their demands on both fields. In a paper commissioned for the Interfaces Project, Casamassimo observes: "Dentistry's participation in the care of the special needs population has been spotty at best."[xxix] The same observation might be made about primary care medicine, which is one of the reasons many families of CSHCN turn to specialists to act in the role that is assumed by primary care physicians for other children.

Some observers underscore the special importance of timely access to dental care for this high-risk group:

> The consequences from delays in access to oral care for children with special health care needs include postponed bone marrow and organ transplants, cardiac and other critical surgeries, failure to thrive, breathing difficulties, septicemia, brain abscesses, and other serious complications.[xxx]

Casamassimo highlights some of the special dilemmas posed in providing dental care to CSHCN, including "postural, medical, and treatment issues that have safety implications" and challenge the competency and experience of both dentists and primary care physicians alike. He emphasizes the special importance of the "dental home" for this group; the same might be said of the "medical home."

All of these considerations make integration of medicine and dentistry for CSHCN not only challenging, but also particularly important.

The Scope of Dental Practice and Possible Use of Allied Dental Staff as "Dentist Extenders"

The use of nurse practitioners and physician's assistants has enabled the medical profession to increase physicians' productivity and extend primary medical services to people living in underserved areas. Questions arise, however, about the appropriateness of a suggested analogy to mid-level dental providers, since dental personnel function differently than medical personnel. In addition to dentists, dental providers include registered dental hygienists, who are trained in the provision of clinical preventive services and health education; dental assistants, who provide "chair-side" aid that facilitates dentist's provision of surgical care; expanded function dental assistants (EFDAs), who can further enhance dentists' productivity by delivering some of the components of restorative services; and dental laboratory techni

cians, who fabricate dental prostheses. Of particular relevance to the care of young children are those dental personnel who can help determine a child's level of risk for dental caries, provide targeted preventive services and health education, and promote positive oral health behaviors within families.

At present, about 100,000 dental hygienists practice in the United States. In addition, there are about 200,000 dental assistants and 70,000 dental lab technicians. The number of dental hygiene programs and students has increased by almost 18 percent since 1990.

A major factor limiting the use of dental hygienists and other allied dental personnel are state professional practice laws, which typically limit their scope of service without a dentist's supervision. Crall recently observed:

> Most states allow dental hygienists to provide a limited scope of preventive services, usually under the supervision of a licensed dentist. A small number of states with particularly acute dental access problems allow expanded-duty personnel with additional training to provide basic restorative procedures.[xxxi]

Many remain skeptical about utilizing allied dental professionals to extend dentists' services—either independently, as care providers, or under supervision, as boosters of productivity. The primary reason is the lack of a close parallel between physician extenders and allied dental staff. As noted above, even general dentistry entails a significant amount of surgery, including routine cutting of hard and soft oral tissues, which allied dental personnel are not qualified to perform.

The Interfaces Project and Policy Considerations

This white paper recognizes both the many conceptual vantages and the numerous barriers to improving the integration of medicine and dentistry in the interest of enhancing the oral health of young children. The specific policy issues that derive from the discussion in this white paper include the following:

1. **Access augmentation through physicians as an issue per se (advantages/limits):** Given the serious barriers to access by young children to needed oral health care, is integrating physicians and other health professionals into the delivery of children's oral health services an appropriate step? Will it result in positive effects with respect to access, prevention, and education about needed oral health services? Or will it further segment care and waste scarce resources?

2. **Age of first dental visit and its association with risk:** What is the appropriate age for a young child's first dental visit? At what age and by whom is preventive intervention best begun? Do science and technology enlighten the policy debate on this subject and provide definitive answers?

3. **Value and nature of a referral for dental care:** When a physician or other medical professional refers a child for preventive or curative/reparative oral health services, is such a referral substantively different from referrals that physicians make for non-primary care services such as psychiatric and other mental health services, surgical intervention, vision or hearing correction, etc.? What ultimately constitutes an effective referral? Is it ever appropriate for a medical professional who detects oral health problems *not* to refer a child for dental care, for example, when there is a shortage of dentists who will treat children?

4. **Dental home/medical home concepts:** How do the concepts of "medical home" and "dental home" for young children interrelate? Is a dental home best conceptualized as part and parcel of the medical home, or something separate and distinct from a medical home?

5. **Team care:** How can the practice of dentistry be integrated into a system of care that facilitates access to other needed services for children, including medical care, income support, nutrition, child care, education, and related services? For children with special health care needs, whose needs are demonstrably the most complex and multi-faceted, how can such integration of professional services be effected? Will simple collocation (e.g., in safety net facilities) suffice? Given the important role played by hospitals in meeting both the emergent oral health needs of some children and the secondary or tertiary backup roles for some children with the most severe oral health needs, how can the nexus between hospitals and dental practitioners be strengthened?

6. **Interprofessional communications:** How can communications between dental practitioners and primary care medical practitioners be improved, so that members of each profession are as fully informed about a child and his or her medical/dental case history as necessary?

7. **Dentists' role in overall pediatric health supervision:** If the integration between medicine and dentistry were improved, what would be the nature of dentistry's contribution? In addition to assisting in health education about such matters as periodic requirements for inoculations, what role can dentists play in promoting children's general health?

8. **Interprofessional education and training:** To foster better integration between the two professions, what specific elements of pediatric oral health do pediatricians, family practitioners, and other medical professionals engaged in primary care need to know? What elements of pediatric medicine do dentists need to know? When are the best opportunities for such cross-training? What role can professional associations play in promoting cross-training? How can interprofessional training be incorporated in continuing medical and dental education programs?

9. **Current curricula for primary care practitioners:** What facets of dental science need to be addressed in primary medical care curricula? How much information do physicians need to know about oral health in terms of semester hours or other measures?

10. **Public safety/patient protection:** If primary care practitioners are going to assume a larger role in assuring young children's oral health and preventing dental disease, how is the public to be assured that they are sufficiently trained and competent in the oral health functions they assume?

11. **Basic science:** What are the implications of conceptualizing and addressing caries as a disease process, as opposed to the surgical repair of manifestation of dental disease, in terms of new opportunities for interventions by nondental medical professionals? (This implies that physicians and other medical practitioners might intervene in those aspects of dental care ranging from risk identification to disease suppression, including reducing strep mutans[2] counts.)

12. **The chasm between dentistry and medicine:** What are the unintended consequences of having two separate medical and dental delivery systems? What sort of actions and technologies are available and feasible to repair the historic, long-term breach? How should this broader issue be addressed in integrating the services for young children provided by primary care practitioners and dentists?

13. **Dental finance/reimbursement issues:** How do finance and reimbursement issues for both medical and dental services affect appropriate care delivery?

[2] Strep Mutans is the naturally occurring bacterium that causes dental caries.

14. **Family issues:** How do underlying family characteristics, particularly those of families in poverty, influence decisions about best integration of medical and dental services?

If effective integration is to take place, the historic gap between medicine and dentistry must be bridged, perhaps not in this single effort alone, but incrementally, and as extensively as possible. While the Interfaces Project cannot fully address other larger issues of financial barriers, dental workforce limitations, medical workforce training in oral health, and other impediments to access, it needs to recognize these factors and work to ameliorate them at the same time that it deals with issues of integration and collaboration.

Appendix A

Table 1-1. Potential Provider Roles for Addressing Dental Caries in Children[a]

Level of Caries Intervention	Procedure	Pediatric Dentists	General Dentists	Dental Hygienists	Pediatricians/ Family MDs	Nurses/Nurse Practitioners	Obstetricians[b]	Dental Assistants	Lay Health Workers
Risk Assessment	Parent interview and visual screening of the child's mouth (If high risk, a complete dental diagnostic examination by a dental professional is required.)	•	•	•	•	•	-	•	•
Anticipatory Guidance	Education and preemptory counseling appropriate to the child's level of risk	•	•	•	•	•	•	•	•
Primary Prevention	Oral hygiene instruction	•	•	•	•	•	-	•	•
	Dietary counseling	•	•	•	•	•	-	•	•
	Application of topical fluorides	•	•	•	•[c]	•[d]	-	O[e]	-
	Application of dental sealants	•	•	O[f]	O[g]	O[h]	-	O[i]	-
Dental Prophylaxis	Mechanical removal of deposits and accretions on the child's teeth	•	•	•	-	-	-	O[j]	-
Disease Suppression	Tailored fluoride regimens, dietary interventions, plaque management, and use of topical antimicrobial agents	•	•	•	•	•	-	•	-
Atraumatic Restorative Technique (ART)	Mechanical removal of carious tooth structure and placement of bioactive dental restorative materials	•	•	-	-	-	-	-	-
Cavity Repair	Restorative, surgical	•	•[k]	-	-	-	-	-	-

[a]Key:
• = Appropriate role for the provider type.
O = Appropriate for the provider type under conditions specified.
- = Not an appropriate role of the provider type.
[b] Obstetricians can provide anticipatory guidance to pregnant women but have no direct role with young children's oral health.
[c] Physicians require training to appropriately place topical fluorides.

[d] Nurses require training to appropriately place topical fluorides.
[e] Dental assistants' authority to place topical fluorides varies by state.
[f] Hygienists' legal authority to place sealants varies by state.
[g] Primary-care physicians are not trained or equipped to place sealants and doing so may be outside their legal authority.
[h] Primary-care nurses are not trained or equipped to place sealants and doing so may be outside their legal authority.
[i] Dental assistants' authority to place sealants varies by state.
[j] Dental assistants' authority to provide a dental prophylaxis varies by state.
[k] General dentists can provide definitive reparative care to the extent of their individual technical skills and expertise.

Source: Dental Care Considerations of Disadvantaged and Special Care Populations. Conference Proceedings, April 18-19, 2001. Baltimore, MD.

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[ii] Bright Futures was initiated in 1990 and guided by the Health Resources and Services Administration's Maternal and Child Health Bureau, with additional program support from the Health Care Financing Administration's (now the Center for Medicare and Medicaid Services') Medicaid Bureau. Its mission is to promote and improve the health, education, and well-being of infants, children, adolescents, families, and communities. Bright Futures has developed comprehensive health supervision guidelines with the collaboration of four interdisciplinary panels of experts in infant, child, and adolescent health. One set of guidelines addresses children's oral health.

[iii] See, for example, Ichiro Kawachi, Bruce P. Kennedy, and Richard G. Wilkinson, *The Society and Population Health Reader: Income Inequality and Health*, Volume I, Income and Health (New York: The New Press, 1999); Norman Daniels, Bruce Kennedy, and Ichiro Kawachi, *Is Inequality Bad for Our Health?* (Boston: Beacon Press, 2000).

[iv] Burton L. Edelstein, *Disparities in Oral Health and Access to Care: An Individual, Community, and National Issue*, A Paper Prepared for the Surgeon General's Workshop on Children and Oral Health, March 2000.

[v] Wendy E. Mouradian, *Ethics*, A Paper Prepared for the Surgeon General's Workshop on Children and Oral Health, March 2000.

[vi] Burton L. Edelstein, "Young Children" [Filling the Gaps Book Chapter, no date.].

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