

The Face of a Child: Children's Oral Health and Dental Education

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Abstract: Dental care is the most common unmet health care need of children. Those at increased risk for problems with oral health and access to care are from poor or minority families, lack health insurance, or have special health care needs. These factors place more than 52 percent of children at risk for untreated oral disease. Measures of access and parental report indicate unmet oral health needs, but do not provide guidance as to the nature of children's oral health needs. Children's oral health needs can be predicted from their developmental changes and position in the life span, their dependency and environmental context, and current demographic changes. Specific gaps in education include training of general dentists to care for infants and young children and those with special health care needs, as well as training of pediatric providers and other professionals caring for children in oral health promotion and disease prevention. Educational focus on the technical aspects of dentistry leaves little time for important interdisciplinary health and/or social issues. It will not be possible to address these training gaps without further integration of dentistry with medicine and other health professions. Children's oral health care is the shared moral responsibility of dental and other professionals working with children, parents, and society. Academic dental centers hold in trust the training of oral health professionals for society and have a special responsibility to train future professionals to meet children's needs. Leadership in this area is urgently needed.

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The recent *Oral Health in America: A Report of the Surgeon General*¹ and *The Face of the Child: Surgeon General's Workshop and Conference on Children and Oral Health*,² call attention to disparities in children's oral health and access to care. Dental care is the most prevalent unmet health care need of children.³ Children from poor and/or minority families and those who lack health insurance are at increased risk for unmet dental needs;^{4,5} together these amount to 52 percent of children.⁶ In addition, children with special health care needs are at increased risk for unmet dental needs.^{7,8} Children's unmet oral health needs raise profound questions about the education of health professionals, including dentists, physicians, and other providers of care for children and families. This article will review key aspects of children's oral health and call for changes in dental professional education to respond to unmet needs. Given the shortage of dental professionals trained to care for young children, professional re-

sponsibility for children's oral health should be shared with primary care medical practitioners. Greater integration of dentistry with medicine and other health and social systems serving children and families is needed to accomplish these objectives.

Children's Oral Health Problems and Their Consequences

Oral and craniofacial conditions are common in childhood: dental caries is the most common chronic disease of childhood,⁹⁻¹¹ and cleft lip and palate is one of the most common birth defects.¹² Many other genetic syndromes, developmental disabilities, and chronic diseases of childhood have oral/craniofacial components.¹² Oral and craniofacial injuries

are common and are a frequent site for child abuse injuries.^{13,14} Periodontal disease and pre-cancerous lesions are found in youth who smoke or use spit tobacco.^{15,16}

Oral health encompasses all the immunologic, sensory, neuromuscular, and structural functions of the mouth and craniofacial complex. It influences and is related to nutrition and growth, pulmonary health, speech production, communication, self-image, and social functioning.¹⁷⁻²¹ Oral health includes the interrelationship with all aspects of the child's developmental processes, genetic potential, and environmental circumstances.

Oral and craniofacial conditions have a significant impact on children's overall health and well-being. Dental problems result in an estimated 52 million hours lost from school,²¹ and many costly emergency room visits and hospital-based medical and surgical treatments.²² Untreated caries can interfere with growth,¹⁷ and provides a reservoir of infection for systemic spread. The treatment of dental problems accounts for approximately 20-30 percent of family health expenditures for children,^{23,24} and 20 percent of an estimated overall health insurance package for children.²⁵ This does not include the treatment of more costly craniofacial conditions, often tracked as medical expenditures. Oral and craniofacial conditions have substantial long-term impact on psychosocial, health, and economic outcomes.^{4,20}

Many oral and craniofacial disorders can be prevented.¹ The risk of some craniofacial birth defects can be diminished with attention to risk factors such as maternal folic acid intake, alcohol, and tobacco use. Cost-effective strategies exist to prevent caries, and there are also preventive strategies for oral and craniofacial injuries and tobacco use.

Despite the availability of preventive measures, the incidence of caries—about 50 percent in mid-childhood—has not changed in recent years.^{10,11} Disparities in oral health exist in children from low-income and minority families.^{4,5} Dental care is the most common unmet health need among children with special health care needs.⁷ This group is disproportionately represented among the ranks of the poor, which compounds their risk of problems with oral disease and access to care. Profound disparities have been demonstrated in some ethnic groups, such as Hispanic and American Indian/Alaskan Native populations.¹⁰

Children's Unmet Oral Health Needs and Access to Dental Care

Given children's inability to articulate their needs, it is not always easy to determine if they are being met. Measuring utilization of dental services is one way of assessing if children's oral health needs are being met. Utilization of dental care can be defined simply as a visit to the dentist, regardless of the type of care provided, as in the Medical Expenditure Panel Survey (MEPS).²⁶ This survey found that 43 percent of children had a dental visit in 1996 (with disparities by income and ethnicity). Using a more stringent professional standard of two dental visits/year,²⁷ even fewer children have adequate access. Alternatively, dental care can be inferred from the number of children who have a preventive oral health visit—as surveyed in the Inspector General's Report—which found that only one in five children served by Medicaid had a single preventive visit in one year.²⁸

Children's oral health needs can also be measured directly as a professionally discovered need related to untreated caries. The recent large National Health and Nutrition Examination Survey (NHANES III: 1988-1994) revealed much untreated disease, including profound disparities by race and income.⁵ Children's oral health needs can also be inferred from parental report of an unmet dental health need—as in the National Health Interview Survey (1993-1996)—which found dental needs to be the most common of all unmet health care needs.³

From any of these viewpoints, children's oral health needs are not being met in the United States. The reasons cited for children's inadequate access to dental care are many and have been considered elsewhere.^{4,28-30} One reason we have not made more progress in eradicating common oral diseases in childhood may be a narrow interpretation of their needs that fails to consider the broader social, developmental, and environmental context of children's lives.

Beyond Access: Fundamental Needs of Children and the Health Care System

A more accurate and detailed view of children's oral health needs can be inferred from a "child specific definition of medical necessity that draws upon the characteristics of children that distinguish their health care needs from those of adults."^{31,32} Such an approach provides more specific guidance to those responsible for training health professionals who will work with children. Health care needed by children is care necessary to: 1) promote normal growth, development, and overall health; 2) prevent disease and secondary disabilities; and 3) treat existing acute and chronic health conditions. Of note, a similar child-specific standard of medical necessity is already present in federal statute in the Medicaid Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) benefit, a model of comprehensive health care that applies to dental as well as medical care, but is only inconsistently enforced.³³ Unfortunately, definitions of medical necessity may be used by insurers to ration health services, rather than to provide guidance on health interventions important to the child's overall health and development.³⁴

The Five Characteristics of Children and Implications for Oral Health Care and Professional Training

Children's unique characteristics that predict what they need from health care systems include their position at the beginning of the lifespan; their constant developmental changes; their dependency on parents and other adults; the differential epidemiology of their health conditions; and current demographic patterns.^{31,32}

1. Children are at the Beginning of the Life Span.

The pathogens responsible for caries are passed from mother to infant in the first two years of life.³⁵ Thus oral health promotion and disease prevention,

including development of good dietary and oral health habits, must begin early. At the point of cavitation, caries experience is irreversible and cumulative, and prevention is both preferable and possible.

Oral health promotion also refers to the need for community action and societal policies that consider health implications in other sectors (for example, community water fluoridation, feeding practices in day cares, etc.). Children's health represents an investment in the future and must be optimized by adequate health care and societal policies as well as individual behaviors.

Implications for oral health care. Children need early oral health care that emphasizes preventive care, early intervention, health counseling, and anticipatory guidance. This care must start early and involve parents, even in the prenatal or early postnatal time period when parents are receptive to health information, and in order to intervene with transmission of pathogenic bacteria.

Implications for dental professional training. Dental professionals must be comfortable examining infants and young children; sensitive to the needs and issues of parents and able to exercise optimum means of counseling them; and cognizant of co-existing medical, social, and developmental factors, including pregnancy risk factors. This applies to general as well as pediatric dentists, since the former provide the majority of pediatric dental care. Reaching children early requires collaboration with colleagues in pediatrics, obstetrics, nursing, and others in the larger health and social system interacting with children (for example, WIC providers; day care, Head Start, and school personnel, etc.).

Oral health promotion also requires that dental professionals be knowledgeable about public health and social determinants of health outcomes. There is a need for dental faculty who can model interdisciplinary interactions, community level activism, and public health advocacy. Course work in public health and societal considerations should support clinical experiences.

2. Children's Development Interacts with Oral Health.

Children are always changing. Developmental processes include physical growth and maturation, social, cognitive, and emotional development, learning, and achievement of independence.³⁶ These developmental processes are vulnerable to untreated

diseases, including oral and craniofacial disease. Interventions must be timely in order to avoid impact in critical stages of development. Because of their developmental changes, children may be more subject to positive and negative influences in their environment—including fluorides, lead ingestion, medication side effects, and psychosocial influences. Moreover, childhood is not a homogenous period: infancy, childhood, and adolescence are dramatically different periods.

Implications for oral health care. Developmental factors interact with most aspects of children's oral health. For example, toddlers with untreated oral disease and pain may not grow normally; adequate early nutrition is critical for normal brain growth. Children with pain from dental disease may be unable to concentrate in school. Timely treatment is necessary to avoid further impact on the child's development. Certain interventions for children with craniofacial anomalies, such as cleft lip and palate, must occur with key changes in physical development to maximize outcomes (for example, alveolar bone grafting). Other children with complex craniofacial conditions or trauma must receive critical psychosocial services in a timely fashion to support healthy emotional growth. Research on children is more complex, because of the need for longitudinal studies and the difficulty in distinguishing the effects of development from the effects of an intervention. This has slowed the development of an evidence base in many areas of children's oral and craniofacial care.

Implications for dental professional training. Providers of pediatric oral health care must be knowledgeable about key aspects of child health and development, including nutrition and growth and their interaction with oral disease. They must be able to match their clinical approaches to the child's developmental stage, and assess the child's capacity for understanding information and cooperating with care. Medical and dental professionals need awareness of children's vulnerability to positive and negative social influences that affect their oral health (for example, media messages that promote consumption of high sugar foods or use of tobacco; the presence of soda machines in schools; etc.). Something that is not an issue at one age may develop later. Dental providers must collaborate with other health, social, and education professionals to address children's health needs at critical stages.

3. Children's Dependency and Incompetency in Medical Decision Making Require Partnership with Parents and Other Special Provisions.

Children are dependent on their parents for protection, care, and nurturance. They depend upon their parents to understand and act upon oral health recommendations, to access oral health services, to make medical decisions for them, and to advocate for them in health and social systems. Parents interpret their child's needs and (usually) make decisions that reflect the child's best interests. Parents have both the moral and legal authority to act on their children's behalf, and they are generally "the experts" on their children.³⁷

Parental oral disease, attitudes, and past experiences with dental care have a direct impact on their own and their developing child's oral health. Disease transmission, the practice of oral home care, and development of healthy attitudes towards oral health are all impacted by family factors. Utilization of care can also be influenced by differences in culture and language.

Larger societal policies also have an influence on parents' abilities to promote their children's health and include such important factors as flexible work policies, changes in Medicaid eligibility, availability of public transportation to health centers, exclusion of oral health from medical coverage, and lack of an employer base for dental insurance.

Implications for oral health care. Health care for children cannot be designed without understanding their vulnerability and essential link to parents. Health professionals, educators, and researchers must partner with parents in all activities related to children's health, from clinical care to community programs to policy planning.

Children's dependency and vulnerability also create a positive obligation of health systems to ensure that children have access to needed care, regardless of their parents' social and economic difficulties. This leads to the need for "wrap-around" services, such as provision of transportation, case management, and other outreach services, which are explicit in the Medicaid EPSDT benefit.³³ Parents and older children also need specific health education and counseling.

Implications for dental professional training.

It is critical that dental trainees learn how to approach parents with sensitivity and respect cultural differences while communicating positive health messages. With good communication skills, providers can encourage parents' efforts towards improving their children's oral health and avoid the use of negative or judgmental language. Negative approaches interfere with the development of a good relationship, and decrease one's ability to influence parental behavior. Professionals should be aware of social circumstances that support or interfere with parents' ability to promote their children's health and should develop the ability to work as part of interdisciplinary teams with other health providers (social workers, primary care practitioners, etc.) to address complex family circumstances.

Health care must be geared to "the best interests of the child."³⁷ Accordingly, health professionals must also monitor parental decisions for their children, to ensure they are in the range of acceptable choices and do not result in significant harm to the child. Health professionals also have an obligation to screen for child abuse and neglect. Most child abuse injuries occur in the oral and craniofacial area, but such injuries are underreported in the dental setting.^{13,14} All providers working with children should be aware of the ethical and legal dimensions of pediatric care and their obligations as providers. They should know how to contact appropriate social agencies when abuse/neglect is suspected.³⁷

As the child matures, there is a moral obligation to involve them in decisions about their care as age and ability allow—especially for decisions that may be elective (such as in certain orthodontic and craniofacial interventions).

4. The Differing Epidemiology of Childhood Disease Calls for Specialists and Team Care.

Chronic disease of adulthood consists of common disorders (cardiovascular disease, hypertension, stroke, arthritis, cancer, etc.). By contrast, the spectrum of chronic disease of childhood includes a multitude of diverse conditions that are relatively rare

(with the exception of asthma). About 18 percent of all children have a "special health care need."^{*7,38} Ongoing medical conditions or associated treatment regimens can interact with and complicate oral health issues. A child with impaired immunity, for example, may be more susceptible to systemic complications of oral disease, and a child on medications producing xerostomia or with a sugar base may be more susceptible to caries. Children with special health care needs (CSHCN) have increased difficulties with access, and dental care is their most frequent unmet health need. The trend towards increasing survival of CSHCN will only increase the numbers of children seeking care with more complex oral health needs.

Implications for oral health care and professional training. Children's unique disease patterns call for pediatric specialists who can work with generalists to ensure that children receive appropriate care. In addition to access to routine dental care, these children need dental specialists (such as pediatric dentists) who are trained in diseases of childhood, child development, and their interaction with oral disease, and who can work as members of the health teams these children require. At the same time, general dentists must be knowledgeable about the oral manifestations of systemic conditions, the systemic impact of oral conditions, and the impact of medications and other therapies on oral health, so they can provide the simpler care for these children.

For all CSHCN, the complex interactions of health, development, and environmental influences lead to the need for coordinated, interdisciplinary team care.³⁹ Such team care should include the full integration of oral health professionals, as in craniofacial teams.⁴⁰ Collaboration with other health professionals including pharmacists (who can address oral consequences of medications) can lead to better oral health care for CSHCN.

5. Children are Disproportionately Disadvantaged in Our Society.

As a group, children are more likely to be disadvantaged by poverty or minority status, and many others lack health insurance. Taken together, children at risk for unmet dental needs amount to a shocking

* The federal Maternal and Child Health Bureau defines children and adolescents with special health care needs (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." McPherson M, et al. A new definition of children with special health care needs. *Pediatrics*, 1998; 102: 137-40.

52 percent of the population of children. Given the high birth rates among minority populations and the increasing survival of CSHCN, this proportion is not likely to diminish in the future.

Implications for oral health care and professional training. The dental delivery system (a fee-for-service system) has not met the needs of a substantial portion of children, as is borne out by the high prevalence of unmet dental needs among children;³ the large number of children without any dental insurance¹; the poor access to care and the low dental provider participation rates in Medicaid;²⁸ and the high disease rates among low-income and minority children.⁵ Such a system that rations dental care by ability to pay and personal choice disadvantages children, who are overrepresented among the poor, and are not in control of their own access to health care.⁴¹

Dental trainees must be given a sense of the unmet oral health needs of vulnerable pediatric populations, and the health professional's role in addressing these unmet needs. They must understand the

complex interplay of medical, economic, and social determinants of children's health outcomes, including the need for wrap-around services and collaboration with other health and social professionals. These concerns call for increased attention in the dental curriculum to cultural competency, and social determinants of health, and experience working with vulnerable populations including children from poor and minority families and CSHCN. Increased recruitment of dental trainees from diverse populations will help dental schools understand the nature of needed care in these populations, and will generate dental professionals who will be more likely to return to serve those populations.

In summary, the rationale behind child-specific definitions of medical necessity leads to changes needed in dental and other health professional education. Dental providers must understand the characteristics of children and their implications for children's oral health care. They must be prepared to work with parents and other health and social systems serving children, and to advocate for societal and policy changes that can advance children's oral health. This will require an increased educational emphasis on interdisciplinary care, social determinants of health, and cultural competency. These recommendations are summarized in Table 1.

Table 1. Responding to the oral health needs of children, families, and diverse populations: critical areas requiring emphasis in undergraduate dental education

- Behavioral and social determinants of health outcomes
- Child health/development and examination of infants and young children
- Child abuse/neglect
- Collaboration with physicians and other health professionals
- Cultural competency
- Dental public health issues, including fluoridation and other public policies
- Ethical and legal issues in the care of children
- Family-centered care
- Experience in interdisciplinary and interprofessional health care teams
- Health promotion (for example, tobacco prevention/cessation, nutrition)
- Injury prevention
- Oral-systemic health linkages and systemic health
- Pediatric dentistry
- Professional ethics and advocacy beyond the clinic
- Research exposure including health services research
- Science of caries transmission and medical management of caries
- Scientific advances in other oral/craniofacial areas
- Service learning opportunities for experience with target populations
- Unmet oral health needs of children
- Working with parents

An Ethical Mandate to Provide Oral Health Care for Children⁺

Embedded in this rationale for a child-specific definition of medical necessity are also important moral considerations. As a matter of justice, children should receive needed oral health care (as part of basic health care), because of the importance of such care to their overall opportunities in life. For example, poor oral health can lead to high absenteeism and hinder children's achievement in school;²¹ poor children experience nearly twelve times as many restricted activity days from dental disease as children from higher income families.⁴ Since access to oral health care is one important determinant of oral

⁺ Some of the arguments in this section are drawn from papers presented at Ethics and Oral Health, a conference held in preparation for the Surgeon General's Workshop and Conference. Full papers appear in the *Journal of Medicine and Philosophy*, Do children get their fair share of health and dental care? Kopelman L. M., ed. April 2001; 26 (2).

Table 2. Twenty-one competencies for the twenty-first century from the Pew Health Professions Commission

1. **Embrace a personal ethic of social responsibility and service.***
2. **Exhibit ethical behavior in all professional activities.**
3. Provide evidence-based, clinically competent care.
4. **Incorporate the multiple determinants of health in clinical care.**
5. **Apply knowledge of the new sciences.**
6. Demonstrate critical thinking, reflection, and problem-solving skills.
7. **Understand the role of primary care.**
8. **Rigorously practice preventive health care.**
9. **Integrate population-based care and service into practice.**
10. **Improve access to health care for those with unmet health needs.**
11. **Practice relationship-centered care with individuals and families.**
12. **Provide culturally sensitive care to a diverse society.**
13. **Partner with communities in health care decisions.**
14. Use communication and information technology effectively and appropriately.
15. **Work in interdisciplinary teams.**
16. Ensure care that balances individual professional, system, and societal needs.
17. **Practice leadership.**
18. Take responsibility for quality of care and health outcomes at all levels.
19. **Contribute to the continuous improvement of the health care system.**
20. **Advocate for public policy that promotes and protects the health of the public.**
21. Continue to learn and to help others to learn.

*Competencies emphasized in this discussion of children's oral health are bolded. From *Recreating Health Professional Practice for a New Century* (Chapter IV): the fourth report of the Pew Health Professions Commission, Dec. 1998. Executive summary. http://futurehealth.ucsf.edu/pdf_files/rept4.pdf

health outcomes, all children should have access to this care. The existence of cost-effective preventive measures further supports the need to provide such care.

Children's vulnerability places a moral obligation upon adults to see that children's needs are met. The obligation to help extends beyond parents and includes all those who see the needs of children—health professionals, teachers, policy makers, and the public.⁴⁴ Although society grants parents the responsibility for their child's health care, it also has an obligation to ensure that care reaches the child. The fact that children are both dependent upon others and disadvantaged by poverty leads to the need for special provisions to ensure children receive needed care. The importance of children to the future of society increases the societal obligation to protect children's interests.

Ethical Obligations of Professionals

Dentists and other health professionals providing pediatric care have an obligation to help ensure access to oral health care for children.⁴¹ Dental professionals and pediatric practitioners are in the best position to know what children require in the way of oral health care; that special knowledge creates a special obligation to speak out on behalf of children's unmet health needs. Dentists and physicians also have an obligation to act in the public good in a general sense, in view of the large public contribution to the funding of medical and dental education,⁴³ and the profession's implicit contract to serve the public good.⁴⁴⁻⁴⁶ Finally, as the American Dental Association Code of Ethics and Professional Conduct articulates, considerations of justice require dentists to participate in efforts to improve access to oral health care for all.⁴⁷ Ethics is a required part of the dental curriculum, but the content of such courses may focus on professional ethics in the dental office, and not examine larger issues of professional responsibilities and social justice. A personal ethic of social responsibility and service as well as ethical behavior in professional activities is emphasized in the health professional competencies for the twenty-first century proposed by the Pew Health Professions Commission. Competencies that are essential to improving oral health care for children are highlighted in bold in Table 2.

The Role of the Academic Dental Center

The academic dental center also shares in the obligation to address children's oral health for other important reasons. First is the obligation to train the next generation of dental professionals. Academic dental centers hold in trust, for society, the resources that provide education for future dental professionals. Such professionals must be trained to meet the health needs of society, including disadvantaged children. Second, they represent a large investment of public dollars and have some obligation to serve the interests of the public in their training, research, and

service missions and to advance social justice agendas.⁴⁸ Third, academic dental centers can and should play a role as effective leaders and as agents for change in the dental and larger health community.⁴⁹ In particular, they can play roles by developing responsive community outreach services, research, and training programs,⁵⁰ and promoting integration with medical and other health services to better meet the oral health needs of vulnerable populations.

A Model of Shared Responsibility for Children's Oral Health

Currently, no profession is adequately addressing the need for oral health care early in the life span when preventive interventions can produce the greatest long-term benefits and cost savings. Children are seen by primary care medical providers in early years, but they have limited training in oral health.⁵¹ Most general dentists lack training to provide oral care for infants and young children, and access to pediatric dentists is severely limited by their small numbers (3,500 nationwide). Even dramatic changes in dental professional education—and an increase in the numbers of pediatric dentists trained—will not change this situation in the short run. Increasing Medicaid dental reimbursements may help to a degree, but will not increase dentist's comfort with younger children and infants. Expanding the role and function of allied dental health professionals could also help the situation, but there are substantial political and legal barriers to such changes. However, these models are being explored again.^{52,53} Continuing education and university-community partnerships can help address this gap in some communities.⁵⁴

Table 3. Strategies for addressing the shortage of oral health professionals for vulnerable populations

- Increase diversity of workforce
 - Make better use of allied dental professionals; expand functions
 - Review dental school selection criteria for students interested in addressing societal issues
 - Train more pediatric dentists for work with complex patients
 - Train primary care medical practitioners in oral health promotion and disease prevention
 - Train other professionals working with children in oral health concerns
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Primary care medical practitioners (pediatricians, family physicians, nurse practitioners, obstetricians, etc.) should help share responsibility for children's oral health by becoming more involved in early oral health promotion and disease prevention. Pediatric practitioners already emphasize disease prevention, early identification of problems, and age-appropriate anticipatory guidance in regular well-child visits. The primary care medical provider role could include counseling on caries prevention, assessment and referral for oral health problems, and provision of simple caries control treatments such as fluoride varnishes in high-risk populations. A recent study demonstrated that pediatricians can acquire some of these skills with relative proficiency after a brief course of instruction.⁵⁵ In addition, physicians have a relatively high participation rate in Medicaid (>65 percent for pediatricians, *AAP News*, 2000), which could offer substantial advantage with vulnerable populations. A core curriculum in oral health for other professionals dealing with children (for example, nurses, nutritionists, pharmacists, occupational/physical therapists, school teachers, etc.) could increase the numbers of those prepared to help with prevention and early recognition of oral disease.

It is still critical that general dentists receive more training in the care of common oral health problems in young children so they can treat identified dental disease. Given the scarcity of pediatric dental resources, pediatric dentists should be freed up, when possible, to care for more complex patients. Strategies for addressing the shortage of oral health professionals for children are summarized in Table 3.

The opportunity to share responsibility for children's oral health with primary care providers and others working with children also leads to opportunities for joint ventures in target populations. The same children are at increased risk for a whole host of other health and social problems including, for example, asthma, substance abuse, and low birth weight. It is more efficient—and possibly more efficacious—to approach target populations and common determinants of health jointly, rather than create a myriad of new programs for oral health alone.⁵⁶ Such a strategy is also likely to be more effective in advocating for policy change.

Integrating Oral Health into Overall Health in Professional Training/Service Delivery

These changes all require that dentistry become more integrated into medicine and the rest of the health system. Such integration is needed to promote interdisciplinary collaborations in service, research, and training. It may also lead to more equitable policies regarding dental coverage and reimbursement issues, since dentistry will have more of a presence generally. The direction of greater integration of dentistry with medicine and the rest of the health system has been predicted and recommended by previous analyses.⁵⁷⁻⁵⁹ Recommendations for dentistry and specific competencies for health professionals of the twenty-first century developed by the Pew Health Professions Commission echo many of the themes arising in this analysis of children's oral health care needs (Table 3).⁵⁹

Conclusions and Recommendations

The large unmet dental needs of children call for substantial changes within dental education. Understanding the differential needs of children leads to the conclusion that general dentists need:

- training in oral health care of young children, including those CSHCN with simpler oral health needs, and in family-centered care;
- greater experience with interdisciplinary/inter-professional teams and ethnically diverse populations; and
- further exposure to ethics and public health issues including social justice and multiple determinants of health.

Strong moral arguments support the provision of basic health care for all children—including oral health care. Focus must move beyond the patient in the dental office if the oral health needs of all children are to be met.

At the same time, other professionals involved with children, especially primary care medical practitioners, could play a greater role in children's oral health promotion and disease prevention, thus sharing responsibility for prevention of disease in the

early years before significant health problems ensue. Allied dental professionals also have a role to play in addressing the critical workforce shortage. These measures will require greater integration of dentistry with medicine and the rest of the health care system. In addition, it is likely that policy level changes will be needed to accomplish this.

It will be difficult to create needed change without rethinking the essential components of dental education, including the structure, emphasis, and length of training. Such a process will require significant leadership and innovation from the dental academic community. This community has a critical leadership role to play in view of the societal trust it holds in the future training of all dental professionals. Looked at another way, if professional training is not redirected to address the 80 percent of dental needs that occur in the most vulnerable children,⁶⁰ we must conclude that dentists are being trained to treat only 20 percent of children's dental problems. This does not seem to be an equitable distribution of society's investment in dental education, and it does not serve the future of a significant number of children.

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