

# Introduction



What affects the United States and its people affects the dental profession. Dentistry's future ability to promote the oral health of the nation will depend on its capacity to integrate new, better technologies into practice, to respond to changing consumer needs, to assure a sufficient supply of well-trained dental educators and dental students, to maintain a strong research focus and, all the while, to address the needs of those people who do not have easy access to dental care.

The national visibility for oral health has never been greater. This visibility is seen in recent national and state legislation, federal reports and the media. The United States Surgeon General gave national and international visibility to oral health and its relationship to general health and well being in: "Oral Health in America: A Report of the Surgeon General," published in May 2000.

The report's findings highlight oral health's relationship to general health. It provides an assessment of the status of oral health in America, how oral health is promoted and what needs to be done. The report finds, for example, that oral diseases and disorders affect health and well being throughout life. These diseases and disorders are complex, often are not self-limiting, compromise daily functions such as eating, speaking, swallowing, and school and work performance. The report notes that the mouth mirrors general health and well being, providing a diagnostic window to other, less visible parts of the body.

Changes in the nation's demographic profile, new technologies, evolving disease patterns, growing government and media influences, marketplace changes, the globalization of health care—all these and other factors affect dentistry just as they influence other parts of society.

The goal of the 2001 Future of Dentistry report is to help the dental profession cope with inevitable change, both at home and on the world stage. The findings and recommendations it contains were prepared by experts who came together in a mutual desire to improve oral health by improving oral health care. The report addresses all issues that touch the profession—no matter how sensitive they may be—and insists that all parochial views be set aside.

The report suggests actions in general terms, remanding to dentistry's leaders and organizations the task of developing and implementing specific activities. No organization can do this alone. Success will require collaboration, a will to break down barriers of isolation and pooling of resources for a common good. Such coalitions must cross all boundaries and involve groups both inside and outside the profession.

The trends and issues identified by the expert panels will not come as a surprise to most, and the recommendations will not require radical changes in direction. A roadmap to the future is presented that will benefit the profession and the public it serves. What new turns may appear as the route is traveled cannot be predicted. Most important is that the journey be undertaken and the direction traveled be determined by a dental profession which acknowledges its responsibilities and enthusiastically undertakes to reach its goals.

## THE ROLE AND RESPONSIBILITIES OF THE DENTAL PROFESSION

Dentistry is part of the broad spectrum of health services that address the needs of the general population. Its mission is to guard the oral health of the public. The American Dental Association defines its role more specifically as fostering "the improvement of the health of the public" and promoting "the art and science of dentistry."

Dentistry is known and celebrated for its high ethical standards and an awareness of its social responsibilities and public trust. Whatever actions the profession takes in response to future challenges, that trust must be preserved. To do so, the profession must find ways to provide care for those in need, regardless of their financial wherewithal or the challenges they present. Most Americans receive good oral health care; some do not. Those thought of as underserved include the indigent and special needs populations.

With the free-enterprise system as its foundation, the U.S. economy has permitted dentists and allied personnel to seek and receive fair compensation for their services. Decades of economic analysis show that dentistry has fairly controlled its fee structures, ensuring that periodic increases are in line with inflation and accepted rates for professional services. Moreover, dentists provide substantial amounts of free care to the poor.

Dentistry can be proud of its accomplishments. This nation's dental health care system—encompassing education, research and development, clinical practice and more—is widely regarded as the very best in the world. It is hoped that, as the global community grows closer together, the highest standards of oral health care will be made available to the entire world population. As a guide to the decades ahead, this Future of Dentistry report is intended to help maintain those standards and to ensure continued growth and improvement for years to come.

### KEY TRENDS

As a first step in forecasting dentistry's future for the next 5 to 15 years, it is helpful to examine key oral health, demographic, economic, scientific, financial and industry-specific trends.

#### Disease and Health Trends

The health of the nation, including oral health,

will continue to improve in the coming decades. Greater awareness of the health effects of lifestyle behaviors, such as tobacco and alcohol use, the value of physical exercise, basic hygiene and the role of diet, has contributed to a generally healthier population with increased life expectancy. Infant mortality rates in the United States, however, still lag behind those of other developed countries.

Like general health, oral health has improved dramatically in recent decades. The percentage of children and adolescents aged 5 to 17 years who have never experienced dental caries in their permanent teeth continues to increase. Likewise, adult Americans aged 18 to 34 years have less decay and fewer fillings in their permanent teeth than ever before. What's more, the percentage of people who have lost all their teeth has declined substantially in the last 30 years. In 1971-74, 45.6% of adults aged 65-74 were edentulous. In 1988-94, just 28.6% of Americans in this age group were edentulous.

Trends for other oral health conditions, such as periodontal diseases, are more difficult to track because of variations in the way these diseases have been measured. Overall oral cancer rates are declining, but certain site-specific oral cancers are actually on the rise. The incidence of tongue cancers among young males is climbing, while lip cancers are declining. The five-year survival rate for oral cancers has remained the same for the past 25 years.

There also are wide variations in oral diseases and conditions among racial and ethnic groups, between poor and more affluent populations, between males and females, young and old, generally healthier Americans and those with medical conditions and disabilities. The incidence of tooth loss, for instance, varies by race/ethnicity as well as income levels. Males are more than twice as likely as women to develop oral and pharyngeal cancers. The rate of oral cancers in African American males is 39.6% higher than in White males, and the five-year cancer survival rate for African Americans of both sexes is just 34% vs. 56% for Whites.

The aging of the population, increases in the numbers of people with disabilities, and a rapidly changing race/ethnic profile will require a dental workforce that is confident and competent to address both routine and uncommon oral problems. Dental professionals must be equipped to manage the oral health effects of comorbidities and medications, interacting more often with other health care providers, social service agencies and institutionalized patients.

### Demographic Trends

The world population increases by roughly a billion people each decade. Today, there are about 281 million people in the United States; by the year 2050, that figure is expected to reach approximately 400 million.

At the same time that America is seeing an aging of its population, it is also becoming more racially and ethnically diverse. Such demographic changes are expected to alter disease patterns as well as cultural attitudes and expectations about health care and lifestyle behaviors. As a corollary, health care delivery systems and the services they provide will also change.

### Economic Trends

Like all other elements of society, the dental sector is influenced by the overall performance of the economy. The supply and demand for dental care determine the amount and types of dental services provided, as well as the geographic distribution of dentists, the average income levels of dental professionals, the financial strength of dental practices and the number of applicants to and graduates from dental schools.

The robust economy of the past two decades has greatly benefited the dental profession. Between 1970 and 1996, real gross domestic product (GDP) doubled, representing an annual real growth rate of 2.7 percent. Through most of the 1990s, unemployment, interest rates and inflation have remained low compared to earlier decades, and prices today are rising at an annual rate of slightly more than 2 percent. The last genuine economic contraction occurred in 1991, and even that downturn was brief and mild. The ensuing decade has been one of uninterrupted prosperity and steady growth.

Dental markets have adjusted to supply-side forces by reducing the number of new graduates and to demand-side forces by changing the mix of services provided in response to changing disease patterns. Overall, fee increases have been moderate, and a smaller proportion of overall economic resources have been used to provide dental care. As a result, an increasing number of Americans have access to needed treatment.

### Science and Technology Trends

The rate of scientific and technological advancement has accelerated in recent years, a trend that

will continue into the next decade and beyond. Through research, dentistry has improved its understanding of the causes and sequelae of diseases and conditions and their interrelationships. The social, biological, and physical sciences have evolved and begun to merge, fostering an improved understanding of human health.

Through sophisticated biotechnology research, science is mapping the human genome and gaining knowledge of the organisms and microbes associated with such conditions as dental caries, oral candidiasis and periodontal diseases. Genetically engineered animals and foods have become a reality, and it is now possible to mimic nature by applying biomimetics to design and fabricate new drugs, tissues and organs. With these developments come critical ethical, legal and social questions that must be addressed.

Miniaturization and nanotechnology provide additional tools contributing to improved health care and communication. These technologies have tremendous potential, particularly in connection with optical laser systems and computer-assisted informatics. Information technology is revolutionizing the teaching and delivery of health care through virtual-reality systems, telemedicine and teledentistry.

The Internet makes global communications possible, increasing access to information around the world, breaking down national and other barriers and accelerating the speed of communication. Among other effects, these new technologies are improving efficiency in patient scheduling, referrals and record keeping. New technologies also are changing traditional methods of disseminating information through scientific journals, books and other documents. Increasing numbers of Americans are using the Internet to seek health information and make health care choices. The frenetic pace of this activity has an important downside: some of the materials disseminated in this way are bound to be of questionable value and accuracy.

The decades ahead will witness advances in science and technology as yet unforeseen. Dentistry will benefit from these advances and must be intimately involved in their progression.

### Advancing Determinants of Health

Over the past 50 years, a growing understanding of the many factors that affect health has spawned various public health initiatives in the United States and other nations. Underlying these initiatives is the

premise that the biomedical approach to disease cannot solve all health problems.

These initiatives spring from evolving models that spotlight factors affecting human health: lifestyle choices and personal skills, social and community influences, living and working conditions, the organization and provision of health care services, socioeconomic, cultural and environmental conditions.

In the United States, the national "Healthy People" initiative has entered its third decade of emphasizing health promotion and disease prevention. Oral health objectives have been part of this effort (now referred to as "Healthy People 2010") since 1979. Those objectives include reducing the incidence of oral disease across all population groups, promoting disease prevention measures like fluorides and sealants and improving the means of delivering care.

The emphasis is on promoting health, rather than preventing disease—an approach expected to gain momentum in the years ahead. Dentistry's record of health promotion through private practice and community-based prevention programs positions it to play a leading role in future public health initiatives.

### **Increasing Globalization**

All the trends described thus far point to one incontestable fact: health care is a global concern that breaks down national boundaries. Microbes can be transported around the world in a matter of hours. Health care information can be transmitted from one corner of the globe to another in seconds. New and useful scientific findings and technologies can arise anywhere in the world. Dentistry is a resident of that global community and a vital participant on the world stage.

# Vision and Recommendations

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To guide the development of policy recommendations, members of the Future of Dentistry project adopted the following statement of vision and guiding principles.

## VISION STATEMENT:

*Improved health and quality of life for all through optimal oral health.*

## GUIDING PRINCIPLES:

- 1. Improving the health of the public in a socially responsible and culturally competent manner is the primary goal of the dental profession and will remain dentistry's central focus.*
- 2. The profession must continue its commitment to the adoption of appropriate science-based practices so essential to the future of dentistry.*
- 3. A strong educational system is critical to the future of dentistry.*
- 4. An aggressive approach to health promotion, disease prevention, and access to appropriate care will improve oral health and quality of life.*
- 5. Closer collaboration among all health professions will contribute to achieving dentistry's primary goal of improving the health of the public.*
- 6. The dental profession must develop a global perspective and an action plan to fulfill its responsibility as part of the world community.*

The dental profession must establish a rapid, flexible and effective response system for predicted and unknown changes in health care delivery, education and research in the future. Dentistry has numerous accomplishments resulting in the improved health of the public, but more needs to be done. The answers and the challenges are at the interface of the traditional areas emphasized in this report. The dental profession should now be ready to take a leadership role for the nation's oral health, building upon the base it has established.

This chapter presents a number of recommendations intended to encourage professional organizations and other groups to support existing and new programs.

## BROAD RECOMMENDATIONS

These recommendations transcend the area-specific issues and provide a guide for the coming five to 15 years.

### ORAL HEALTH PARTNERSHIPS

The success of the future of the dental profession relies on its ability to be responsive and proactive in meeting the public's oral and general health needs, to effectively incorporate new technologies and knowledge into practice, and to assume a leadership role in the globalization movement.

National and international partnerships and alliances will be needed to address the many issues raised in each of the chapters. Clear and direct avenues of communication must be established. Achievable goals, and the necessary resources for their accomplishment, must be identified. These goals must embrace the objectives of each organization and group.

**Broad Recommendation-1:** Establish and support partnerships and alliances among dental, other health care professional, and public health organizations, as well as business and social service groups, in order to address common goals to improve oral health.

#### Strategy

- ◆ Establish regular forums to meet with groups representing patients and families. By listening to the needs and experiences of these groups the profession will be better positioned to identify priorities and take action on activities that will make a difference to the health of the nation and the world.
- ◆ Establish and expand mechanisms for ongoing interaction among dentists, allied dental personnel, educators, researchers, manufacturers, and third party payers. These modalities should be used to strategically position and reposition all components of dentistry based on emerging trends and opportunities. This will align them with the common goal of improving oral health.

### ORAL HEALTH PROMOTION

Through office-based, home-based and commu-

nity-based efforts many of the health needs of the public are being addressed. The dental profession must continue and expand that commitment. It should maintain a constant focus on oral health promotion which will require increased resources for such efforts in the coming 5 to 15 years. All programs and efforts must include formal evaluations so that best practices can be identified and promulgated.

**Broad Recommendation-2:** Aggressively address the oral health needs of the public.

#### Strategy

- ◆ Promote and accelerate known and effective dental caries preventive measures, such as community water fluoridation and sealants.
- ◆ Undertake educational efforts aimed at the prevention of life-threatening diseases, such as oral cancer.
- ◆ Develop and implement programs targeted to special needs populations.
- ◆ Highlight the inter-relationship between oral and general health, and the role that common risk factors play in contributing to both.
- ◆ Enhance financing and reimbursement programs for oral health services, especially for low-income populations and for individuals with special needs.
- ◆ Develop and maintain databases that monitor and help predict the public's oral health needs, disease and life-style behavior patterns. Standardized and systematic population-based approaches to national and global data collection and analyses are essential to effective planning and program implementation.

### RESEARCH AND EDUCATION CAPABILITIES

Dentistry's research and educational institutions are national resources that provide and improve health care and health promotion for Americans. Perpetuating these resources and ensuring their capacity to train future generations of practitioners and to provide the life-long learning opportunities

for practitioners is critical. In addition, these resources play a lead role in maintaining and catalyzing needed international collaborations in research and education.

**Broad Recommendation-3:** Strengthen and expand dentistry's research and education capabilities.

### Strategy

◆ Augment resources for the dental research and education infrastructure, giving priority to those aspects which warrant immediate attention and resources. Funding for rapidly emerging clinical research opportunities is insufficient. Facilities need to be refurbished, replaced and modernized. New technologies, such as information technology and research equipment, need to be developed and adopted. Research and educational workforce issues need to be addressed. Collaborations among institutions should be encouraged.

◆ Enhance the visibility and prominence of dental schools at academic health centers. Dental schools are the institutions where the majority of dental research is conducted and are critical members of their academic health centers. They should become more prominent through their education, community service and research functions.

◆ Strengthen the interaction between research and education. Effective ways to accelerate the transfer of science findings into the dental curriculum should be developed and implemented.

◆ Develop new approaches to facilitate the transfer of emerging scientific knowledge into clinical practice. Oral health science and technology transfer centers could be established to promote the effective and accelerated transfer and adoption of research findings into practice.

### DENTAL WORKFORCE

Having a responsive, competent and "elastic" dental workforce is key to meeting the needs of the public. The rapidly changing environment and emerging science and technology base continually place new demands on the existing and developing workforce. The numbers and types of personnel needed to address oral health improvement and

their ability to meet the needs of the public are but a few of the many issues.

The issue of local problems being best addressed and solved with local solutions should be the mindset that tempers consideration of solutions. This includes, but is not limited to, states rights issues in licensure, use of allied dental personnel, workforce, and access and financing of dental care for the underserved. Other than in the area of research where obvious limitations in resources make this impractical, this basic concept should prove to be most efficient.

**Broad Recommendation-4:** Ensure the development of a responsive, competent, diverse, and "elastic" workforce.

### Strategy

◆ Expand efforts to recruit into and retain individuals in dental profession careers. Ideally, the dental workforce should reflect the ethnic and cultural diversity of the general population.

◆ Develop and implement methods to rapidly and effectively address the distribution and mobility of the dental workforce.

◆ Increase the availability and use of allied dental personnel, under appropriate supervision by dentists. This approach is a quick and cost-effective way to increase the "elasticity" of the dental workforce.

◆ Establish and expand efforts to recruit and maintain an adequate dental research and education workforce.

### FINANCIAL RESOURCES FOR THE DENTAL PROFESSION

Adequate funding is necessary to meet the many needs facing the dental profession's ability to address the public's needs. Underserved populations are restricted from needed access and desired care as a result of inadequate funding for programs, facilities and services. In addition, the dental schools are hard pressed to find adequate funds to modernize facilities that have fallen into disrepair. There is a shortage of faculty members in the educational institutions and researchers who are so vital to the advancement of dental science.

Student debt is a genuine problem for future dentists, hampering their ability to follow their desired professional path in order to find sources to satisfy their financial needs. These and other important aspects of dentistry are dependent on few dollars made available and the competition for those funds tends to fractionate the profession.

**Broad Recommendation-5:** Develop strategies to address the fiscal needs of the practice, education and research sectors of dentistry to ensure their viability and vitality.

### Strategy

◆ Assess the financial needs of the dental profession so that a reasoned and structured approach to optimal use of financial resources could be adopted. This would, in the end, advance the best interests of the oral health of the public.

### COLLABORATION BETWEEN DENTAL PRACTICE, EDUCATION AND RESEARCH

The dental profession will face challenges that will require close collaboration between dental practitioners, educators and researchers. While interactions do occur between these groups, they have usually occurred on an ad hoc basis. In the future, it would be helpful if these interactions occurred on a continuous basis within a formal organization. The individuals participating in this effort should meet on a scheduled basis to discuss issues of common concern. The cooperation would include the development, implementation and oversight of activities that address issues that could be best solved by its collective actions.

**Broad Recommendation-6:** Establish a formal organization with membership consisting of the American Dental Association representing dental practice, the American Dental Education Association representing dental education, and the National Institute of Dental and Craniofacial Research and the American Association of Dental Research representing research.

### Strategy

◆ Establish formal cooperative efforts to meet the resource and funding needs of those requiring oral health services and those responsible for offering these services.

### COLLABORATIVE MARKETING AND PUBLIC RELATIONS

Too often important issues in dentistry are presented to the public as controversies, if not exposés. Examples would include amalgam safety, waterline quality and general anesthesia. However, the profession has developed a progressive agenda to deliver services of ever-increasing quality. This agenda should be presented to the public through the media in ways that target and captivate the interest of consumers by virtue of their importance and innovation. An example would be an oral cancer awareness campaign.

**Broad Recommendation-7:** Utilizing the combined resources of the dental profession and dental industry, emphasis should be placed on the development of highly targeted, collaborative marketing and public relations initiatives.

### Strategy

◆ Develop a cooperative effort between various sectors of the dental profession and relevant business sectors to plan marketing and public relation initiatives. Cooperation such as this will leverage both funds and impact of these kinds of activities.

The recommendations that follow are based on the findings from the six subject areas explored.

## RECOMMENDATIONS FOR CLINICAL DENTAL PRACTICE AND MANAGEMENT

### DENTAL WORKFORCE

To assure that dental services are available to all who need them, it is imperative to establish the adequacy of the dental workforce. The workforce dif-

fers across the country and within specific communities. Factors that must be considered when evaluating the adequacy of the workforce in any geographic area include the socioeconomic status, race/ethnicity, disability or handicapped status, and

disease patterns of the population. Other factors that impact the capacity of the dental workforce are productivity, efficiency, extent of duties of allied personnel, new technology and techniques, and emerging research that alters the manner of diagnosis and treatment.

Continued study of dental workforce adequacy is essential. Studies should assess the number of dental care providers available to treat the public and should provide an in-depth analysis of the need for dental care as well as the demand for dental care. It should address the capabilities and duties of the various members of the dental team and establish whether alterations must be made to assure that the public can be adequately served.

The national supply of dental services will increase substantially due to enhanced dental productivity. There is potential to increase dental output through more efficient use of allied dental personnel. These factors indicate that an increase in the aggregate number of dentists may not be necessary. Nevertheless, the nation must be ready to act if circumstances change.

Existing regional workforce imbalances may become more pronounced in the future. Given the widely varying workforce conditions among states, one overall national policy is not likely to satisfy every state's needs. Each state should address its workforce issues based on its specific circumstances.

Flexibility is a desirable strategy for workforce policy. If more dental capacity is needed, an attractive workforce option is to adjust the number of allied dental personnel. This is a cost-effective means to generate additional dental services. However, dental hygienists and dental assistants are not available in sufficient numbers in some regions of the country. Open positions for dental hygienists in dental offices are difficult to fill, sometimes remaining vacant for extended periods of time.

***Clinical Practice Recommendation-1:*** Continued comprehensive studies should be conducted to assess the capacity of the dental workforce addressing all of the possible factors and variables that affect the ability to provide adequate services to the public. The status of the workforce should be reassessed periodically.

***Clinical Practice Recommendation-2:*** The dental profession must continually evaluate its data requirements and collect needed data in sufficient quantity, frequency and detail to form the basis for a rational assessment of workforce requirements.

***Clinical Practice Recommendation-3:*** Due to regional workforce imbalances, a consortium of appropriate leaders and other policymakers should be convened to develop a plan to address these issues.

***Clinical Practice Recommendation-4:*** Individual states or regions should develop workforce plans that address their specific needs.

### WORKFORCE MODEL

With the data collected from these workforce assessments, valid evaluations of the future needs of the ever-changing population will be possible. It is imperative to develop a workforce model that portrays the emerging pattern of the need for dental services. Creative methods must be developed to assure an "elastic" workforce that adjusts to the changes in a timely and effective manner.

Factors that might be considered in the model could include geographic distribution of dental health care providers, the approved duties of allied personnel and incentive programs that attract practitioners to underserved areas.

***Clinical Practice Recommendation-5:*** Workforce models should continually be evaluated and changed, refined and strengthened, as necessary to forecast the future dental care needs and demands of the public.

### WORKFORCE BALANCE AND DIVERSITY

The dental profession must develop a balanced workforce. A balanced workforce is one that is sufficient in number and educationally and culturally prepared for the many roles required to satisfy the needs of the public. The workforce must also be balanced in its capacity to address health promotion and disease prevention as well as diagnosis and treatment for the public it serves.

Today's dental workforce is not representative of the ethnic composition of the population. Furthermore, enrollment in dental schools and participation in the allied dental fields from minority populations is far below what is desirable in trying to achieve balance with the present and future ethnic distribution of the public. It is imperative that efforts be made to increase the participation of the growing minority groups into the dental profession.

Programs to address this issue should include, but

not be limited to, outreach programs in the K-12 educational environments, community outreach efforts, public education programs, mentorship associations, scholarships and other incentive programs. Alliances with organizations outside the dental profession would foster a team effort that extends to every level of the social structure.

**Clinical Practice Recommendation-6:** The dental profession, through collaboration among all levels of organized dentistry, governmental agencies and educational institutions, should devise a program of recruitment to encourage the youth of minority populations to enter an educational track that would lead to joining the dental workforce.

### WORKFORCE MOBILITY

The social responsibility that the dental profession assumes demands that it help ensure an adequate workforce. States have traditionally retained the responsibility assuring the best interests of their citizens regarding health services. This has translated into assessing competency and deciding the standards required by health professionals to practice within the various states. This is an important principle and needs to be maintained, while continuing to meet the needs of a mobile citizenry. It is important to note also that need and demand for dental services are sometimes unsatisfied in certain geographic areas because of a scarcity of dental workforce. Improved workforce mobility would facilitate adjustments to satisfy regional requirements.

**Clinical Practice Recommendation-7:** The dental profession should support licensure by credentials for dentists and dental hygienists.

The increasing demand for preventive dental services requires greater use of personnel from the allied dental team. There are regional shortages of dental hygienists that increase the difficulty of fulfilling staffing needs. The lack of mobility of dental hygienists created by state licensure processes is another factor contributing to the staffing shortfall for dental hygienists. Varying levels of duties allowable in states cause discrepancies in training, ability and compensation. This, in turn, inhibits geographic mobility.

To encourage potential applicants to enter the profession, and to retain qualified hygienists, authorized duties should be commensurate in all

venues and the ability to move from one state to another should be possible. In addition, the duties allowed for dental assistants should be uniform among all states, allowing well-trained and experienced individuals to provide services in areas to which they move.

**Clinical Practice Recommendation-8:** Workforce studies should be undertaken to identify the optimum number and distribution of allied dental personnel.

**Clinical Practice Recommendation-9:** The dental profession should establish as a goal the standardization of approved duties for allied personnel within the United States.

### PUBLIC AWARENESS

The public must understand the importance of oral health in order to appreciate and take advantage of the services available. Education efforts must be made to ensure that every individual is aware of the necessity of visiting a dental practitioner on a regular basis. Optimal oral health care can be achieved only by a cooperative effort of all interested parties, including the public, the government, private industry, and health care providers. Alliances should be forged to structure and fund this effort.

**Clinical Practice Recommendation-10:** An alliance should be formed comprised of the dental profession, organized dentistry, government health agencies and dental industry to develop and fund a "National Health Awareness Campaign" focusing on increasing the awareness of the public and policymakers of the importance of oral health.

**Clinical Practice Recommendation-11:** Lobbying activities should be organized that include the participation of all levels of society to convince legislators that oral health is a major part of general health and that increased funding is necessary to support efforts to achieve the goal of optimum oral health for all.

Low-income children often suffer from dental neglect and pain. This can cause decreased nutrition, inattention in school, and lost school days. Studies show a 60% decrease in dental decay in communities with fluoridated water. It is unacceptable to

spend tax dollars for dental care but neglect the obvious savings of water fluoridation.

The dental profession must make a greater effort to convince the public and policymakers about the efficacy and cost effectiveness of fluoridation. It must be shown that prevention is our greatest cost containment device. It must be illustrated that communities without fluoridated water continue to exist today, affecting our lower socioeconomic groups more severely than other groups with greater access to care and prevention. The public and policymakers must also be convinced that fluoridation will protect the entire community.

***Clinical Practice Recommendation-12:*** The dental profession, together with all interested parties, should increase efforts to convince the public as well as local, state and national policymakers that fluoridation of water supplies is a safe and cost-effective way to protect oral health.

With over 30,000 new cases and over 7,800 deaths reported annually, oral cancer now accounts for approximately 3% of all cancer deaths in the United States, a number which exceeds that of melanoma and cervical cancer. The dental profession must make sure that every individual knows the importance of a regular oral cancer examination and is encouraged to receive one on an annual basis.

The public should be educated about the importance of oral examinations by qualified health professionals and other pertinent information, which will heighten the awareness of the risks of developing oral or pharyngeal cancer as well as the benefits of regular screening.

***Clinical Practice Recommendation-13:*** The dental profession should conduct intensive public service information and education efforts to reduce the death rate due to oral cancer through early diagnosis.

### RISK-BASED DENTAL CARE

Given the changing oral disease patterns and treatment options, future clinical practice may be expected to incorporate more diagnostic-based data into treatment plans. Research and experience suggest that each patient presents different risk factors and that patient recall and evaluation should be based on their susceptibility to various oral diseases. Scientific studies to support or deny the effectiveness of risk-based dental care, that is, treatment patterns

based on risk assessment strategies, are not available and should be developed.

***Clinical Practice Recommendation-14:*** A comprehensive study should be undertaken to assess the efficacy of risk-based dental care.

### EVIDENCE-BASED CLINICAL PRACTICE AND SCIENCE TRANSFER

Evidence-based dentistry is a concept for which health professionals have developed renewed interest. The study of the appropriate uses of this process in assisting dentists and patients to arrive at the best decisions needs renewed commitment. The potential of this approach along with possible misuses need to be understood by dental practitioners, educators, researchers, and policymakers.

The current meaning of evidence-based dentistry and its interpretation by practitioners, patients and policymakers are not the same. Confusion exists and there is a barrier to the use and application of evidence-based practice reviews. Creation and adoption of uniform diagnostic codes on which to base evidence-based therapies will help eliminate the current misapplications of evidence-based clinical practice.

Understanding the dimensions of evidence-based practice and contributing to development of the needed science and scientific study designs to enhance the knowledge-base will allow the practice of dentistry to evolve more rapidly. Enhanced understanding of, and communication regarding, evidence-based dentistry will help reduce the considerable uncertainty that currently exists regarding its definition and role in the modern practice of dentistry.

Evidence-based practice involves the incorporation of such new knowledge into practices. However evidence-based practice also involves expertise on the part of the clinician interacting with patients to determine their needs and demands. The interface and balance among the current science, practitioner competence and the patient should to be maintained.

***Clinical Practice Recommendation-15:*** Dental practitioners, educators, researchers and policymakers should develop a common definition of evidence-based practice.

**Clinical Practice Recommendation-16:** The dental profession, in concert with all other interested parties, should identify ways in which to integrate science from systematic research, practitioner expertise, and patient choice to ensure the appropriate application of the latest knowledge into the delivery of care.

## DIAGNOSTIC CODES

With scientific advances, methods and approaches to evaluation, diagnosis, and treatment planning will change. Likewise, implementation of preventive interventions as well as definitive therapy will evolve. Outcomes assessments can help guide the introduction and evaluation of new methods. More-over, appropriate diagnostic codes in conjunction with clinical judgment of practicing dentists and the treatment goals of patients can assist dentists and their patients in arriving at the most appropriate treatment choices.

However, outcomes assessments in dentistry are likely to remain incomplete in accuracy and scope until more broadly based diagnostic protocols are implemented. Research databases derived from clinical settings, if properly designed and implemented, will allow for more immediate understanding of efficacious clinical diagnostic and treatment applications. Scientific evidence, based on outcomes data, would broaden the base of knowledge for clinical practice, research and education.

With these tools, clinical practitioners can then employ diagnostic and therapeutic services objectively, while preserving the ability to utilize sound professional judgment. The dental profession must establish sound scientific application for outcomes, based on accurate diagnostic protocols.

**Clinical Practice Recommendation-17:** An appropriate system of diagnostic codes should be developed and integrated into the daily practice of dentistry.

A network of practitioners, assembled by the appropriate professional organizations and connected by electronic communication, could provide a large source of data on procedures and outcomes. Clinical practitioners, to enhance their ability to monitor clinical and procedural protocols, should be able to access unbiased and reliable information easily.

**Clinical Practice Recommendation-18:** The dental profession should strive to develop the leading repository of the most accurate dental diagnostic and therapeutic databases.

## TECHNOLOGY TRANSFER

Clinical practitioners must apply the most appropriate technology to patient care. New diagnostic and treatment methodologies are available that would improve care, but are not swiftly implemented because of cost or concern about the ease of integration into dental practice. Lack of familiarity makes many practitioners hesitant to use new technologies.

**Clinical Practice Recommendation-19:** A consortium of representatives of dental practice, research, education, and the dental product industry should be established to ensure the rapid transfer of information regarding new modalities of oral health care to private practitioners.

## DENTAL LABORATORY TECHNICIAN TRAINING AND PROGRAM ACCREDITATION

Prosthetic services will continue to be a large part of dental practice. Given longer life expectancy and the inevitable loss of teeth by the older population, it is imperative that the resources for providing the needed restorations are made available. Dental laboratory technicians typically fabricate the prostheses under a dentist's direction.

The dentist must remain the repository of laboratory skill and knowledge. The laboratory industry should not become the authority on laboratory procedures. Abdication of the dentist's role in the laboratory phase due to educational cost/convenience must not create a vacuum of knowledge in the profession. Dental school curriculums must maintain sufficient focus and resources to continue to prepare dentists to provide prosthodontic/restorative therapies that continue to constitute the majority of the service component of a general dental practice.

There are no national standards for dental technicians and accrediting programs are decreasing. A shortage of qualified dental technicians will create a risk situation in the areas of access and quality of care, especially for the financially disadvantaged populations.

**Clinical Practice Recommendation-20:** A study should be undertaken to address the adequacy of the number of dental laboratory technicians and to develop a strategy for attracting qualified individuals into that profession.

**Clinical Practice Recommendation-21:** The dental profession should develop strategies to maintain the dentist as a knowledgeable director of laboratory procedures to insure the safety of the patient.

## RECOMMENDATIONS FOR FINANCING OF DENTAL SERVICES

### EMPLOYER-BASED DENTAL BENEFITS

Major changes in employer funding of dental benefits are expected. Higher medical costs and competitive pressures will lead to more defined contribution programs, more voluntary programs, greater employee cost sharing, and optional coverage for retirees. These changes will impact the use of dental services and the mix of services. Third party payments are simply a means of helping fund dental care. They must never inappropriately influence the dentist's diagnosis and treatment recommendations.

**Financing Recommendation-1:** The dental benefits industry should explore a market-oriented solution to financing dental services which would include tax deferred dental/medical savings accounts and direct reimbursement plans.

**Financing Recommendation-2:** Financing of dental services should be structured so it will not inappropriately interfere with the professional judgment of the dentist or create unwarranted intrusion into the decisions reached jointly by dentists and patients regarding appropriate and best treatment options.

Radical changes in the health care delivery system have often left patients in positions where they feel defenseless in their attempts to receive quality care. In many cases this can be directly traced to unwarranted intrusion by third parties into the doctor/patient relationship. To remedy this situation national legislators have sought to initiate actions that would give Americans access to responsible care. Organized dentistry has been a pacesetter in the struggle to ensure that patients have the right to choose health providers within a plan; have the option of joining a point-of-service-plan outside the network; be assured of prompt care; have access to care within reasonable distances from their home; and have the ability to pursue legal action against negligent health plans.

**Financing Recommendation-3:** The professional dental communities must continue their support of national legislation that will protect patients from health plans that place bottom-line profit ahead of quality and access to care. Even after passage of

such legislation, the profession must remain vigilant in ensuring that the intent of the legislation is not undermined.

**Financing Recommendation-4:** The dental profession should develop an active campaign to educate employers and employees regarding dental benefits choices so they can become better health care consumers. This campaign should include dentists as members of the educational team.

### INNOVATION IN DENTAL FINANCING ARRANGEMENTS

Patients are experiencing greater limitations, restrictions, exclusions, larger co-payments, static maximums, and administrative problems which are contributing to their growing frustration. If these factors continue and are not corrected, they will lead to growing dissatisfaction on the part of patients; some may be unwilling to continue their dental insurance plans. Changes in technology, disease patterns and demographics may stimulate development of new dental benefit programs that would have different reimbursement methods, incentives and covered benefits. These changes could impact the types of services provided. Innovative dental insurance programs should be developed to respond to these changes.

**Financing Recommendation-5:** The dental profession should encourage the dental benefits industry to streamline procedures, reduce administrative burden and policy limitations, and provide greater flexibility for covered individuals in their reimbursement for dental services.

Dentists are reporting increasing frustration in dealing with dental benefits companies. A growing number of dentists are distancing themselves from dental insurance companies proclaiming themselves to be "insurance free." Bureaucratic and administrative problems, excessive and time consuming paperwork and telephone activity, "lost" submitted forms and radiographs, interference with treatment, fee restrictions and payment delays are among the reasons cited. It is difficult to determine how significant the "insurance free" trend will become, but it appears to be

gaining acceptability and momentum. If the dissatisfaction becomes more widespread, it will negatively impact the value of dental insurance in the future.

**Financing Recommendation-6:** The dental profession should commence constructive dialogue with third party carriers to develop a user-friendly attitude and more efficient administrative procedures in their dealings with providers and purchasers.

Third party carriers have been slow to respond to new techniques and options for dental treatment

with regard to including them as reimbursable procedures in their plans. This is burdensome to both practitioners and patients. Carriers need to respond quickly to changing science and technology with updated coverage that includes the more recent and efficacious diagnostic and treatment modalities.

**Financing Recommendation-7:** The dental benefits industry should shorten its response time for including scientifically accepted new diagnostic and treatment options as reimbursable procedures in their plans.

## RECOMMENDATIONS FOR ACCESS TO CARE

The guiding vision for the dental profession is that all Americans will be able to receive the dental care they need, regardless of their financial, geographic, health status, or other special circumstances. The dental profession is eager and willing to assist in securing access for all Americans. However, providing access to dental care for all requires the cooperation of every segment of society, including policymakers, the dental profession, and the general population. Most dentists provide free or discounted care to people who otherwise could not afford it. But charity alone is not enough. We as a society—policymakers, the dental profession, community leaders and the public—must summon the political will to break down financial and other barriers that diminish access to care.

The large majority of Americans can and do access dental services, and the private delivery system provides high quality dental care for those who avail themselves of it. However, for the numerous individuals who face barriers to care, commitment must be made to develop new and innovative approaches to facilitate access.

### THE DISADVANTAGED

There are two large groups of people with low incomes. One group consists of those with incomes below the federal poverty level, and their family members. In 1996, this group consisted of 38 million people, or 14% of the U.S. population. Many of this group are the long-term unemployed. The second group consists of the working poor, those who fall between 100 to 200% of the federal poverty level, and their family members. In 1996, this group consisted of 53 million people, or 20% of the population. Within both of these groups are found a dispro-

portionate number of African Americans, Hispanics, Native Americans, and recent immigrants.

### LONG-TERM UNEMPLOYED

For the long-term unemployed, adequate public financing is essential but currently, in most states, non-existent. One exception is the Michigan's Healthy Kids Dental Program where funding does accommodate market level reimbursement and administration of the program is handled privately. This has resulted in improved access to care for covered children.

New programs should be developed which would address the demand for services from this segment of the population. It is essential that the reimbursement fees for these services not fall below prevailing market rates and thus, in the long term, should be indexed to assure that goal. In order to accommodate the anticipated increase in demand, these programs may have to be introduced incrementally, with initial limited resources targeted to children. Administration should be redesigned to be comparable to employer-based dental prepayments plans. Non-economic barriers to care for this population should be addressed such as cultural diversity, language, education and transportation needs.

**Access Recommendation-1:** Public funding should be expanded to provide resources that would cover basic dental services for the long-term unemployed. In order to assure participation by providers and improve access, dentists should be reimbursed at market rates for their services. Administration should be managed utilizing the same procedures and systems as employer-based dental prepayment plans.

## THE WORKING POOR

The working poor are defined as those people who are employed in low-wage positions (i.e., 100-200% of the poverty level) in economic sectors where there is a lack of affordable private prepayment programs. Programs to address the needs of this population could include some level of financial participation by the individual employee.

Public funding could provide the individual with a stipend to subsidize the purchase of either a traditional prepayment plan or dental savings account. The federal or state governments could address the necessity to spread the risk by the creation of pools. The administration of the program could be contracted to the private sector.

This type of structure would empower the disadvantaged to make choices regarding dental care in a manner similar to the rest of the population. By bypassing the employer and going directly to the individual, the difficulties of providing employer-based prepayment for this segment of the market is avoided. Individual employee contributions could be withheld from wages.

**Access Recommendation-2:** New programs, subsidized in part by public funding, should be developed in which individual employees could purchase insurance plans directly from risk pools if their employers do not provide it.

## THE DISADVANTAGED IN GEOGRAPHICALLY ISOLATED AREAS

Adequate availability of dental care is a problem for the poor in inner cities and rural areas. Financing care for the long-term unemployed and the working poor are essential first steps to address access. Additional efforts are needed to increase availability of care for those groups in geographically isolated areas. The dental profession should encourage dentists to provide services in these locales.

**Access Recommendation-3:** Effective incentives should be offered to attract dentists to underserved areas. These could include loan forgiveness, tax credits or adequate reimbursement rates.

A program similar in design to the National Health Service Corps would be beneficial in providing increased workforce to underserved areas. Eligibility

for this program should not be limited to new dental graduates. Older dentists and those in semi-retirement may provide an important pool of personnel to address this issue. Long term funding at adequate levels is essential to the success of this type of program.

**Access Recommendation-4:** The National Health Service Corps program should be expanded to help provide dental care in the underserved areas.

## SPECIAL NEEDS POPULATIONS AND INDIVIDUALS WITH DISABILITIES

Access for special needs populations and individuals with disabilities is difficult because of the special needs of these individuals and the complex management of their care. Many of these patients are homebound, institutionalized or unable to cooperate with care in a traditional dental setting. Furthermore, health providers require special skills and educational background to effectively manage some of these individuals' health problems. Financing for the care of this group of people will require reimbursement rates at levels that will attract providers to undertake the additional training necessary to manage these patients. In addition, educational programs to train providers with the necessary specialized skills should be developed and widely implemented.

**Access Recommendation-5:** A publicly funded or subsidized dental program should be developed for people with disabilities, recognizing their special needs.

**Access Recommendation-6:** Outreach programs at the state and local levels, which might include the establishment of specialty dental clinics, should be developed to meet the needs of patients unable to receive care in traditional dental offices.

## THE ELDERLY

Utilization and access among the elderly have increased resulting in much improved oral health. This trend is likely to continue. Although many of the elderly can budget for dental care without dental prepayment, others might access care to a greater degree if prepayment were available. There is evidence that employers are reducing retirement-based prepayment coverage for their former employees. The development of a market-oriented solution to

this lack of coverage, supplemented by the growing economic resources and improved oral health of the elderly, will meet many of the access needs of this population.

**Access Recommendation-7:** Tax-deferred dental/medical savings accounts should be established in which the balances accrue over time and can be used by the elderly as needed during their retirement.

## RECOMMENDATIONS FOR LICENSURE AND REGULATION OF DENTAL PROFESSIONALS

Issues of licensure and regulation of dental practice are the responsibility of individual states. These issues also continue to be very important to dental professionals. Although the health and welfare of the public is the underlying goal of both professional licensure and regulation of dental practices, these activities can restrict the dentist's freedom to practice how and where they wish.

While progress continues to be made in reducing the impact of overly restrictive licensure regulations, standardized requirements that cut across all state boundaries are still in the formulation and discussion stage. Changing disease patterns will influence the content and design of licensure examinations. Competency and continuing education requirements will further evolve, generating continued debate about their necessity and application.

Licensing issues are not confined to the practicing dentist. Geographic imbalances in the dental workforce are creating a changing environment in the marketplace as it relates to competition among states to attract an adequate number of dental health personnel. Irrespective of many traditional barriers to freedom of movement of practitioners, many states may alter licensure requirements to ensure a more adequate dental workforce.

Possible changes in expanded functions for dental assistants and hygienists may affect licensure, regulatory, and certification requirements. Accordingly, non-dentist clinician demands for unsupervised practice raises the potential of fragmentation of care to the detriment of the quality of care received by the public.

Regulations have increasingly affected the dental health care system. Federal, state and local governments continue to promulgate regulations related to the safety of the dental office and environmental issues. Meeting the requirements of these rules has dramatically increased the overhead costs of dental care practices and could influence the choice of dental materials used in restorative dentistry. Laws, such as the Americans with Disabilities Act, do not primarily target the health professions, but have profound implications for health care delivery. Federal and state activities are likely to

increase in the near future in the area of access to care for Medicare, Medicaid, and SCHIP beneficiaries. Federal activity is also likely to occur in the area of the workplace environment. New proposals being considered could increase the cost of delivering care, thereby increasing consumer costs and, ultimately, decreasing access to oral health care.

### NATIONAL BOARD EXAMINATIONS AND CONTINUING COMPETENCY

National board and regional clinical licensing examinations are anticipated to reflect more accurately the change in dental disease patterns and clinical practice patterns. Limits on resources and time will necessitate less emphasis on, or elimination of, some traditional educational themes within dental schools. The balance between development of cognitive and clinical skills will change and continue to be a source of controversy and debate. This debate will intensify as it relates to measurement of initial and continuing competency.

**Licensure and Regulation Recommendation-1:** National board examinations, as well as regional clinical licensing examinations, should evolve to reflect more accurately the change in dental disease patterns and clinical practice patterns.

**Licensure and Regulation Recommendation-2:** The dental profession should support a study to address the issues of continuing competency.

### PATIENT-BASED LICENSURE EXAMINATIONS

Patient-based licensure examinations present a myriad of ethical and procedural problems. Within the past few years, several dental professional organizations have called for elimination of licensure examinations that involve delivery of care to patients. Simulation technology or post-treatment case review has been successfully incorporated into competency examinations for many other professions.

***Licensure and Regulation Recommendation-3:*** The profession should strive for approaches aimed at evaluating the clinical competency of a dental practitioner by simulated methods or post-treatment case review.

Licensed dentists have undergone extensive education and training to prepare them to diagnose and treat oral diseases. It is essential that the primary care provider possess this broad knowledge and extensive preparation. Movements to permit the independent practice of limited areas of dentistry, such as denture and preventive services, risk fragmenting preventive, diagnostic and therapeutic roles. This fragmentation will mean that dentists' judgments will sometimes be replaced with the judgment of individuals with insufficient training to the detriment of the quality of care received by patients.

***Licensure and Regulation Recommendation-4:*** In order to assure the quality of care for patients, the dental profession should maintain the role of dentists as the ultimate authority for the diagnosis of, treatment planning for and delivery of care for oral disease.

Currently, individuals undertaking initial competency examinations face a wide variety of requirements in various states and regions of the country. First and foremost, the standard of care for dentistry is the same for all regions of the U.S. and should be applied universally for all patients. In addition, regional differences in examinations make it difficult for individuals to prepare for the various requirements. Also, for individuals taking the examination at a location where they do not reside and/or where they did not train, it is especially difficult to find patients exhibiting the appropriate case-mix required by the examination administered at that location. In order to prepare their students for initial examinations, regional differences in examination content require dental schools to vary their curricula in ways not indicated by dental science.

***Licensure and Regulation Recommendation-5:*** The dental profession should establish as a goal the equivalence or unity of all examining bodies.

The knowledge and clinical skills between general dentists and ADA-recognized specialists are substantially different. As dental specialists continue

their education and practice, their clinical skills become further removed from their original training as general dentists. In many areas, additional examinations are required for a specialty license. The requirement that previously licensed specialists be re-examined as a general dentist when relocating is an unnecessary burden that does not protect the public nor improve patient care. Such a requirement requires specialists to practice outside the scope of their specialty in order to retrain themselves for a general dentistry examination.

***Licensure and Regulation Recommendation-6:*** The dental profession should encourage all licensing boards to develop guidelines and procedures that allow for the examination of educationally-qualified specialists in their respective areas of expertise without requiring concurrent examination for a general dentistry license.

The dental profession has supported the freedom of movement of dentists within the U.S. This is an important principal of personal and professional freedom. More importantly, without such potential mobility, addressing regional and local workforce imbalances are more difficult.

***Licensure and Regulation Recommendation-7:*** The dental profession should intensify efforts to achieving licensure by credentials in all states.

In recent years regulatory activity has had a profound effect on the manner in which dentistry is practiced. Whereas some of this regulatory activity has been appropriate and welcome, much of it has been justly criticized as being insufficiently substantiated by scientific data. Any regulations pertaining to dental practice must be based on valid scientific principles. Regulations will only be beneficial if they add safety and value to the services provided and if compliance does not require unreasonable burden. The dental profession must remain a leader in developing and influencing legislative and regulatory activity affecting dentistry.

***Licensure and Regulation Recommendation-8:*** The profession must continue to be vigilant and proactive in identifying and researching potential hazards that might impact the safety of patients, the dental workforce, and the environment.

**Licensure and Regulation Recommendation-9:** The dental profession must remain proactive in advocating scientifically valid solutions to identified hazards.

**Licensure and Regulation Recommendation-10:** The ADA's Division of Government Affairs and Constituent Dental Societies must remain vigilant and vigorous in ensuring that the voice of dentistry is heeded in regulatory discussions.

## RECOMMENDATIONS FOR DENTAL EDUCATION

Education is expected to undergo dramatic changes in the next 15 years. The cost of dental education, probably the highest of all the major academic offerings, threatens to price dentistry out of the education marketplace.

Greater integration of the dental school into the surrounding academic community will help to sustain support but will not prevent cash-starved health science centers from looking at their dental schools as a potential financial resource for its medical programs.

All of this is taking place at a time when expansion of oral and craniofacial science, changes in disease patterns, advances in dental materials, coupled with technologic advances are competing with the traditional elements of dental education for curriculum time. Compounding these issues is the recent reduction in dental school applicants, the lack of progress in increasing the diversity of dental school students and faculties, and an inadequate pool of qualified faculty members.

Reduced government support and increased regulatory requirements have contributed to the escalating educational cost. This eliminates large segments of the college population from considering dental school as a career. This is even more evident among certain minority groups who are enrolling in other career programs with shorter training periods and higher rates of return. A continuation of this trend promises to negatively impact attempts to increase the diversity of the dental workforce. Upon graduation, large educational debt may be a factor in career choice, forcing many of these young practitioners to place undue emphasis on monetary priorities during the formative phase of their careers. For some, this means forgoing a career in dental education.

### FINANCIAL SUPPORT FOR HIGH QUALITY DENTAL EDUCATION

The provision of quality dental service for all Americans must be considered a national goal. Critical to obtaining that goal is the education of a high-quality, diverse cadre of dental practitioners.

**Education Recommendation-1:** The provision of sustained federal/state funding to support dental student training, either in the form of scholarships or direct unrestricted block grants, should be a high priority issue.

**Education Recommendation-2:** Creative financing and partnership with various communities of interest should be developed to increase the diversity of the dental workforce.

**Education Recommendation-3:** Programs should be developed to educate dental students and young graduates in debt and financial management.

Government leaders have suggested that reductions in federal and state support of educational institutions, such as dental schools, should be made up by the private sector including corporations, faith-based organizations, foundations and individuals. In this regard, dentists have proven to be charitable individuals by virtue of providing large amounts of free care to the poor. However, they generally have not focused their charitable giving on their dental educational institutions. Since corporations and foundations frequently assess alumni support as a measure of the worthiness of the institution, an increase in support by dentists for their alma mater would likely be highly leveraged. Such support would make the dental educational system less dependent on tuition and clinic income, and would likely lead to the graduation of dentists in less debt, as well as the development of a dental educational system which is in greater resonance with the issues that confront clinicians in private practice.

**Education Recommendation-4:** Dentists should be encouraged to provide significantly increased financial support for their educational institutions. They should also suggest to grateful patients as well as to other philanthropic individuals among their friends, that they consider a gift to the local dental school.

### COST REDUCTION

Non-tuition revenue sources for the education industry have been pushed to limits. Thus, additional costs must be absorbed by tuition increases that add to high student debt. State contributions to health education centers are often controlled by medical administrations that, with their own budget pressures, are becoming increasingly reluctant to share their declining funds. To address the potential of reduced or insufficient funding, dental schools should seek ways to provide education at reduced cost without compromising quality.

**Education Recommendation-5:** Dental schools should explore regionalization in dental education in which dental schools collaborate to reduce costs and enhance quality in dental education. Dental schools should examine the cost effectiveness of sharing teaching faculty through electronic distance learning.

Innovative techniques, such as placing curriculum on a DVD, clinical simulation, and virtual reality warrant further evaluation as means of reducing instructional costs.

**Education Recommendation-6:** Dental educators should seek to use new technology and scientific advances which have the potential to reduce the cost of instruction.

### OFF-SITE CLINICS

Maintaining a fixed clinical site, owned and operated by the dental school, is exceedingly costly. The medical model of sending students to hospitals and clinics for third and fourth year training experiences has resulted in significant cost reductions relative to corresponding dental school-based training. Off-site training opportunities for dental students that are educationally sound and provide access to care for the underserved should be encouraged.

Attempts to increase the dental school's clinical income through establishment or expansion of clinic activities outside of the school's primary location could put the school in direct competition with its practicing community. When dental schools have established clinics staffed by clinical faculty in affluent neighborhoods, the local professional response has not been supportive.

**Education Recommendation-7:** Any plans for a dental school to expand its clinical activities outside the school's primary location should be discussed with local practitioners, alumni and local components of organized dentistry.

**Education Recommendation-8:** Research should be conducted on the cost effectiveness of off-site training opportunities.

### CULTURAL COMPETENCY

The dental profession should reflect the diversity of the population and have the cultural understanding and skills needed to provide services to a growing and diverse patient population. Dental schools have a responsibility to recruit and retain under-represented minority students and faculty and for training students to be culturally competent in dealing with various populations.

**Education Recommendation-9:** Dental schools should develop programs in which students, residents and faculty provide care for members of the underserved populations in community clinics and practices.

**Education Recommendation-10:** Dental education curriculum should include training in cultural competency, as well as the necessary knowledge and skills to deal with diverse populations.

### CURRICULUM DEVELOPMENT

The explosive growth in dental knowledge will challenge dental educators to provide programs that enable the new graduate to deliver quality dental care to the public within the traditional curriculum length. The dental education curriculum should become more relevant to the practice of modern dentistry. Areas which should receive greater emphasis include: special needs populations; applied pharmacology, including pain management; business management; esthetic dental techniques; implant prosthodontic therapy; and increased knowledge of systemic disease. This would better prepare dentists to treat patients with complex medical problems. The skills necessary to evaluate the safety, efficacy, and cost effectiveness of new treatments also should become an integral part of the curriculum.

**Education Recommendation-11:** Dental schools should undertake a comprehensive evaluation of undergraduate curricula to assure that the appropriate and modern scientific and clinical content is included.

**Education Recommendation-12:** Dental researchers (especially clinical researchers) should become more integrated in the foundation of curriculum and, when possible, in clinical activities.

**Education Recommendation-13:** The education community should enhance undergraduate exposure to the ethics of dental practice while also providing cultural competency that provides information and training on delivering care to all segments of the population.

## INTEGRATING ORAL HEALTH EDUCATION INTO OTHER HEALTH CURRICULUM

Oral health is an integral part of total health. A closer collaboration between dentistry and the other health care disciplines is imperative to assure that the public is best served.

All health care professions should convene to discuss how best to incorporate oral health content into their curricula and practices. To do this, the dental profession should be prepared to consider those aspects of the respective health care professions that could be incorporated into dental education and practice. This effort will require the cooperation of health teaching institutions and universities.

**Education Recommendation-14:** A formal dialogue among all health care professions should be established to develop a plan for greater cooperation and integration of knowledge in medical and dental predoctoral education, hospital settings, continuing education programs, and research facilities.

**Education Recommendation-15:** An inter-disciplinary structure between dental and medical schools should be established to promote close cooperation between health teaching institutions and universities.

## CLINICAL TRAINING OPPORTUNITIES

The practice of dentistry has become increasingly complex. New clinical and technologic information competes for time in the overcrowded dental curriculums with traditional clinical skills. While there is gen-

eral consensus that an additional year of education and clinical training would enhance the ability of tomorrow's dentists to treat patients with complex needs, the cost associated with additional clinical training, coupled with its subsequent impact on student debt, has put a damper on its adoption. Developing sufficient numbers of programs that allow all students to participate would further enhance the students' clinical and diagnostic abilities. Postgraduate Year One (PGY-1) students could receive their initial licensure following graduation from dental school.

**Education Recommendation-16:** When economically and logistically feasible, a PGY-1 year should be a requirement for all dental graduates.

**Education Recommendation-17:** In order to make PGY-1 economically feasible, the dental profession should develop lobbying efforts directed to increasing the funding support for additional General Practice Residency and Advanced Education in General Dentistry programs. This funding should be sufficient to offer all future dental graduates the opportunity for further clinical training.

## FACULTY DEVELOPMENT

The growing number of faculty vacancies, especially in the clinical specialty areas, appears to be related to the significant disparity in income available through the private dental practice and that associated with faculty positions. The many full-time vacancies for faculty, reported to number between 300 and 400, could make it difficult to maintain high dental education accreditation standards. The long term ramifications of a continuing problem in this area include reduction in new knowledge and techniques, diminished quality of teaching and care, and greater dependence on dental graduates from non-accredited schools.

Using distance learning combined with structured hands-on training, a significant number of practitioners could be trained as faculty clinicians within a short period of time.

**Education Recommendation-18:** The dental profession should design and implement a formal education program to train existing dental practitioners to become members of the dental faculty.

**Education Recommendation-19:** The dental profession should develop educational tracks with special degrees or certification for students interested in research, education, or public health futures. Specialized curricula should be developed to train these individuals for work in those areas.

**Education Recommendation-20:** The dental profession should seek actions to extend debt forgiveness programs to dental graduates who are willing to make a commitment to academic dentistry.

Insufficient numbers of specialty-trained faculty could lead to a shortage of specialists in the distant future. Affordable, high quality, postdoctoral training opportunities for the development of dental specialists are essential to the viability of the profession. All components of the dental care system are dependent on the training of sufficient number of specialized clinicians, practitioner consultants, dental researchers and educators.

**Education Recommendation-21:** Federal programs that underwrite research and specialty training need to be enhanced with sufficient funds allocated to dental applicants.

**Education Recommendation-22:** Specialty organizations should be encouraged to continue efforts dedicated to funding teaching scholarships and fellowships.

**Education Recommendation-23:** Dental educators should be encouraged to test alternative, less faculty-dependent models for educating dental students.

### CENTERS FOR RESEARCH EXCELLENCE

Dental schools must be supportive of the development of new knowledge and its incorporation into practice. The success of the future of dentistry depends upon the dental schools' expansion of scholarly activities. The conduct of and resources for these activities will increasingly rely on multi-disciplinary and multi-institutional collaborations. Competition for scarce research dollars, which can enhance faculty productivity and offset portions of educational salary commitments, is expected to increase. It is unlikely that all dental schools will be able to successfully compete for the funds necessary to develop and maintain a sophisticated research

program. The mission of these research mega-centers would focus on developing the research capabilities of faculty members of a research consortium. Both on-site and off-site research involvement would be offered.

**Education Recommendation-24:** The dental profession should support the establishment of centers for research excellence that provide research training and opportunities for organized research for dental faculty within a defined geographic area.

### MAINTENANCE AND ENHANCEMENT OF EDUCATIONAL FACILITIES

Many of dental education's physical facilities require major renovation. Many students are not using state-of-the-art equipment. With schools unable to set aside funds for deferred maintenance, the financial resources needed to purchase new technologies to enhance student learning are unavailable.

**Education Recommendation-25:** The dental profession should develop lobbying efforts directed towards the development of new assistance programs for the improvement of the physical facilities of dental schools.

### ALLIED DENTAL PERSONNEL TRAINING

Training opportunities for some members of the dental team are not sufficient. There are shortages of all dental allied personnel. If the dental team is to function in the most efficient manner, a sufficient number of competent team members should be available. In addition, dental practitioners need to provide a stimulating work environment with sufficient reward systems to acknowledge performance excellence by dental team members. Continuing education opportunities, supported financially by dental practices, may provide the incentives for existing team members to stay in practice.

**Education Recommendation-26:** Well-funded, innovative recruitment programs to identify and enroll quality candidates for dental hygiene, dental assisting, and laboratory technology education should be developed.

**Education Recommendation-27:** The development of additional training programs for allied dental personnel, which employ both traditional and innovative educational programs, needs to be encouraged. This could be accomplished through the combined efforts of national, state, and local dental societies, working with various allied communities of interest.

**Education Recommendation-28:** Credit against educational debt should be sought for dental team members who work with dentists in designated underserved locales.

**Education Recommendation-29:** Continuing education programs, designed to provide upward mobility for dental team members, need to be developed and offered.

## CONTINUING EDUCATION OPPORTUNITIES

Opportunities for high quality, relevant, continuing education appear to be one of the top-ranked issues among practitioners. The change in disease patterns and case mix necessitate that high quality, hands-on programs are offered to these individuals. Reasonable cost and flexibility of offerings need to be basic tenets of any system. Suitable reward systems are important for continuing education participants. Whenever possible, rewards should be integrated with continuing competency initiatives.

**Education Recommendation-30:** The dental profession should continue its efforts to ensure quality control, educational counseling, and appropriate recognition for achievement.

## RECOMMENDATIONS FOR DENTAL AND CRANIOFACIAL RESEARCH

The dental profession and the public have contributed to and benefited from many advances in understanding the causes, progression, diagnosis, prevention and management of dental diseases and conditions. Public health issues, changing demographics and diseases, science and technology will continue to drive research opportunities.

Dentistry will benefit from a range of studies including: (1) biomaterials and tissue engineering; (2) chemotherapeutic preventive agents and therapies; (3) the relationship between oral and systemic conditions; and (4) gene therapy, gene therapeutics and pharmacogenomics. Behavioral intervention studies, to optimize lifestyle behaviors leading to enhanced oral health, will also be important. With the changing demographics there is a need also to study the complex diseases and conditions of the elderly and special needs populations and to continue to investigate interventions to reduce and eliminate health disparities and improve quality of life. In addition, the development of better and new animal models for oral diseases and conditions, the design and conduct of well-controlled clinical trials, and the availability of sufficient resources to support research will be needed. Continued research on the fundamental mechanisms of oral disease and on the promotion of oral health will continue to drive change in dental practice, education, and perhaps change the entire role of dentistry in the health care system.

## OVERALL FUNDING OF RESEARCH

Maintenance of the visibility, funding and support of dental research is critical to the profession's science base. Although there are many funding streams, federal support is critical to basic research, clinical and epidemiologic studies and health services research. Currently the proportion of federal funds for biomedical and behavioral oral health research remains below that of the proportion of dental expenditures as a percent of total health expenditures.

**Research Recommendation-1:** Professional organizations, and patient advocate groups should form a coalition to support the long-term maintenance of National Institute of Dental and Craniofacial Research (NIDCR) as a separate institute within the National Institutes of Health (NIH).

## OPPORTUNITIES FOR RESEARCH

The mapping of the human genome creates exciting opportunities for dentistry, medicine, and humankind. This resource will allow us to build upon the areas with which dentistry has experience such as, anthropology, evolution theory, and forensics. It will permit the profession to advance scientific knowledge in biometrics, tissue engineering,

risk assessment, and diagnostics. The dental profession should take the lead in encouraging research, training researchers and developing new knowledge using the human genome.

**Research Recommendation-2:** The dental profession should be an active member of the National Health Profession Coalition for the Human Genome.

Research on pathogenesis, prevention, etiology, diagnosis, and treatment is necessary for all oral diseases. Future research will form an improved definition of genetic, environmental and microbial risk factors for oral disease that will lead to development of a profile for patients at risk for advanced disease.

**Research Recommendation-3:** Additional studies should be undertaken to develop new approaches to the non-invasive diagnosis and genetic assessments of patients at risk for caries, periodontal diseases, oral cancer, craniofacial anomalies and other oral conditions. Clearly accepted criteria for the diagnosis of oral diseases should be developed.

### TREATMENT PARADIGMS

A major opportunity for the profession rests in the increasing number of techniques to manage oral diseases through non-surgical approaches. The challenge is in achieving the appropriate balance between surgical and chemotherapeutic management of oral diseases. This balance will ultimately be determined by the most efficacious interventions that emerge from research. Examples include positive findings from studies of the treatment of early dental caries lesions with chemotherapeutic agents containing antimicrobials, fluorides and/or sealants, thus eliminating or limiting the need for restorative care. Also, several new drugs recently approved by the Food and Drug Administration (FDA) for management of periodontal diseases could alter treatments that have traditionally relied on surgery, mechanical therapy and plaque control.

**Research Recommendation-4:** Controlled clinical trials must be conducted to assure the safety, efficacy and appropriateness of new and emerging approaches to the treatment of oral diseases.

### CHANGING POPULATIONS

While the rapidly changing demographics of the population is unquestioned, the effect of these changes on oral diseases and health is not well understood. The questions that need to be addressed include: How long patients will maintain their teeth? Will they experience more, less or different oral diseases? What are the interactions of oral diseases with other conditions? And what are the effects of these issues on dental service requirements? Predisposing factors and demographic trends known today can be used to predict the possible future incidence, prevalence and sequelae of diseases and conditions and their impact on health care delivery, education and research.

**Research Recommendation-5:** Federal agencies, the insurance industry, private foundations and the dental profession should establish partnerships to fund the development of systems that can model future oral diseases or conditions in the context of rapidly changing demographics, increased co-morbidities associated with aging, and enhanced understanding of complex oral diseases.

### USE OF BIOMATERIALS

Many dental services involve reparative and replacement therapies using biomaterials to replace diseased tissue and to restore function. Until we reach a state where all diseases can be actively prevented, the need for improved rehabilitative therapies remains. Ideally these materials and appliances should be compatible with the host, and they should be durable, long-lasting, functional and esthetic. The interrelationship between biomaterials and bioappliances with host tissues and immune response warrants continued study. An example of this issue is the long-term host acceptance of implants. These therapies must demonstrate predictable longevity with minimum iatrogenic effects. A specific emphasis should be placed on applying emerging approaches derived from biomimetics, nanotechnology and other investigations to the restoration of oral, dental and craniofacial tissues.

**Research Recommendation-6:** The research community should establish as a goal the refinement and improvement of biomaterials and bioappliances with the aim of increasing their efficacy and longevity and minimizing their iatrogenic effects.

The future of oral health care and product development will require a closer relationship among engineering, materials sciences, biology and genetics. This is witnessed by the development of guided tissue regeneration and the emergence of oral-based diagnostic tests, among others. To foster the necessary research and the ultimate adoption of research findings, a closer relationship is needed between science and clinical disciplines that could address the unique aspects of oral diseases and conditions. In addition, the profession must be prepared to understand the emerging science disciplines and to apply new diagnostic and therapeutic approaches effectively and appropriately to patient care and community health.

**Research Recommendation-7:** The scope of clinical research should be expanded to incorporate tissue engineering and biomimetic approaches.

## DISEASE-SPECIFIC EXAMPLES

### Dental Caries

Dental caries, although a preventable disease, continues to be a highly prevalent disease. Caries is declining overall but remains a problem for millions of citizens. New thinking is needed in the community and public health dental sectors to address the major caries problems that occur in underserved populations.

**Research Recommendation-8:** Health promotion activities should be undertaken to educate the public of the continued presence of dental caries and the need to engage in preventive and diagnostic regimens to assure optimum oral health.

### Links Between Oral and Systemic Disease

The mouth has been called the mirror of the body, reflecting signs and symptoms of health and disease. Recent research reveals findings that relate oral infections to systemic conditions. Specifically, emerging evidence indicates that chronic oral infections such as periodontal diseases may contribute to the risk for preterm birth, diabetes, stroke and cardiovascular disease.

**Research Recommendation-9:** If it is demonstrated that oral infections are related to one or more systemic diseases, coalitions within the health professions should encourage national and international clinical trials to establish optimal dental treatment protocols.

**Research Recommendation-10:** If clinical trials confirm the existence of links between oral and systemic diseases, health promotion activities will need to be targeted to high-risk groups.

### Oral Cancer

In 2000, an estimated 30,200 Americans developed oral and pharyngeal cancers and 7,800 died from these cancers. Tongue cancer incidence and mortality are increasing, especially among young White males. Oral cancer in young adults appears to be associated with the risk factor of tobacco smoking, drinking alcohol and low consumption of fruits and vegetables. In addition, the incidence and mortality from various oral cancers are related to ethnicity and gender. African American males have a 20% higher incidence rate of oral and pharyngeal cancers than White males and their mortality rate is twice as high.

**Research Recommendation-11:** The research community should establish as a priority goal the identification of patients at risk for oral cancers.

## RESEARCH WORKFORCE

There are insufficient numbers of appropriately trained individuals in dental research to conduct the planned agenda. This is especially true in clinical research, on which there is less emphasis in federal training programs. The allure of lucrative private practice seems to draw students away from considering these career avenues. Loan forgiveness at the national, state or dental school level in exchange for teaching may help students to enter careers in research. The profession should monitor the need for researchers and the number of training positions necessary in order to assure that adequate numbers of qualified researchers are available. Without an adequate research workforce, the opportunities for advancement in scientific knowledge will be severely diminished.

**Research Recommendation-12:** The dental profession should educate legislators about the need for economic support for individuals who wish to follow a career track into research.

**Research Recommendation-13:** Professional organizations should develop mechanisms to provide financial support for research projects and/or training for dental school faculty in their fields of interest.

**Research Recommendation-14:** Together with non-profit organizations and industry, the dental profession should consider creating and supporting fellowship programs for research.

### FUNDING FOR CLINICAL RESEARCH AND FOR RESEARCH FACILITIES

The opportunities and needs for dental clinical research, specifically clinical and community trials, are extensive. Basic sciences continue to contribute to a rapidly expanding knowledge base that is ripe for clinical research and development. Severe limitations in the funding for dental clinical research; however, diminish opportunities to enhance oral health services and care through patient-oriented research. There is a serious need to increase the resources to perform clinical research and science transfer so that new findings make their way from the scientist, to the clinician, for the ultimate benefit of the patient. Federal and private policymakers understand these opportunities exist. The contributions of clinical research to improved oral health of the public must be clearly described to policymakers and other communities of interest.

**Research Recommendation-15:** The dental profession, in concert with federal agencies and the private sector, should work for enhanced resources for clinical research.

**Research Recommendation-16:** Building upon the ADA's Research Agenda for the Practicing Dentist, the dental profession should convene a clinical research consortium to develop and oversee the implementation of this agenda.

### CENTERS FOR RESEARCH EXCELLENCE

Centers for research excellence that can provide research training and opportunities for dental faculty need to be established. The mission of these research mega-centers would focus on developing the research capabilities of faculty members.

**Research Recommendation-17:** The dental profession should support the development of oral health research centers of excellence that would facilitate collaborative and clinical research.

### RESEARCH FACILITIES

Many research facilities have not been modernized for decades. As a result, some investigators are using less than state-of-the-art equipment. Without the necessary technological infrastructure to conduct complex and cutting-edge investigations, the research personnel will be unable to provide the critical advancements that will lead to the improvement of dental care and the oral health of the public.

**Research Recommendation-18:** To improve the research capabilities of dental schools, funding programs for enhancement and modernization of their facilities should be developed and promoted.

### SCIENCE AND TECHNOLOGY TRANSFER

The rapidly expanding knowledge base requires the practicing dental profession and dental students to be fully informed and prepared to use technologies emerging from basic science. The timely transfer of research findings into dental practice is a priority. The creation of centers that would aid in providing state-of-the-science information to practitioners and dental allied personnel is desirable. This could be accomplished by the development of regionally placed "Oral Health Technology Centers." Dental societies, dental schools, dental public health organizations and representatives of the private sector are in a unique position to create such regionally placed centers.

**Research Recommendation-19:** A plan to ensure the effective and accelerated transfer of research findings and new technology into practice and into the dental curriculum should be established.

The promotion of oral health is everyone's responsibility. Many individuals and organizations are not aware of the current potential for these activities and what roles they must play to realize these prospects. Creating an effective science transfer system will be necessary if dentistry is to be in the forefront of health promotion. The increased understanding of the etiology, pathogenesis and management of dental, oral and craniofacial diseases and conditions clearly emphasizes the need to involve all members of the health professions, the public, and policymakers. In order to make further gains in the oral health of the public,

all health care disciplines must discuss how best to incorporate oral health content into their curricula, practices and policy. Similarly, dialogue must take place regarding those aspects of the respective health care professions that in turn should be incorporated into dental education and practice.

**Research Recommendation-20:** The dental profession should take the lead in convening all members of the health care community in developing a plan to incorporate appropriate oral and systemic health care concepts into the respective curricula.

## RECOMMENDATIONS FOR GLOBAL ORAL HEALTH

Global oral health practices and concepts thematically address research, education, health care delivery, product development, approval and distribution, and health promotion. Distance no longer is an impediment to collaborations. Language also is becoming less of a barrier.

As dentistry acts locally, its future demands that it must think and act globally. The future of dentistry will favor a philosophy that joins dentistry in the United States with the global dental community. This approach will encompass the training and education of dentists and allied dental personnel, systems of dental health care delivery, and a movement toward best practices for clinical practice, teaching and research.

### INTERNATIONAL COLLABORATION

As globalization advances rapidly in this new century, crosscutting issues emerge that demand a worldwide collaborative approach to solving health problems. The leadership of the American dental profession is essential to establish and reinforce the importance and relevance of oral health to total health. Dentistry must be fully involved in international organizations and activities for research, education and clinical practice. This involvement requires a commitment to learning from other countries and cultures and creates a mandate for leadership with sensitivity.

**Global Health Recommendation-1:** The American dental profession should be an active partner and leader in the global environment.

The United States will benefit from dentistry's global involvement. As the demographics of this country continue to change and reflect multiple cultures from around the world, answers to many of the disease management, disease prevention and health promotion questions will be found through collaborations with other countries.

**Global Health Recommendation-2:** International collaborative networks should be established to facilitate funding and implementing of research, education and practice-related activities.

Positioning oral health as a fundamental priority along with other health issues throughout the world is a challenge that must be undertaken. The World Health Organization (WHO) is critical to providing central guidance for efforts in the developing world as well as for information sharing and partnerships across countries of every socioeconomic group.

**Global Health Recommendation-3:** The American dental profession should work to restore and perpetuate the presence and effectiveness of oral health programs at the WHO.

### PROMOTING DISEASE PREVENTION THROUGH INFORMATION SHARING

Success in preventing and controlling oral disease in the United States is dependent upon an ability to share knowledge and expertise with others around the world. Also, there is a unique opportunity to promote health on a global scale by addressing those risk factors that have a direct effect on oral as well as general health. When countries work together, each may be able to realize greater benefits for the health of their citizens.

**Global Health Recommendation-4:** The dental profession should emphasize the importance of addressing global oral health and general health issues to its members and to other health professions.

Dentistry must play an active role in promoting health through active participation in controlling the global spread of risk factors such as tobacco use, and diet fads among others. This will require den-

tistry to be part of multi-national initiatives and to be involved with the public and their representatives.

**Global Health Recommendation-5:** National and global health policies, particularly those promoting primary preventive strategies, should be developed.

The experiences and programs of each country provide the basis for global resources that can be used to improve the practice of dentistry, facilitate research, and monitor disease. Each country has unique approaches to care delivery, payment systems, education, and intervention strategies that affect oral and general health and lessons can be learned from each other.

Microbial infections can rapidly be spread around the world. Emerging and re-emerging infections and conditions, such as dental caries, oral manifestations of HIV infection and oral cancers, mandate the need for surveillance as well as ways in which to address emerging problems. Monitoring the determinants of oral diseases, and of oral health and disease status on a global level, is critical for the assessment of the effectiveness of delivery systems, service provision and for directing research and education programs. By monitoring and studying infections and conditions worldwide, the United States will be better prepared to manage these infections and conditions domestically.

**Global Health Recommendation-6:** The international dental profession should work to establish and maintain a strong global data bank that would capture information which helps to prevent the spread of diseases and promote the best clinical practices.

### INTERNATIONAL WORKFORCE

Having a dental workforce prepared for international collaborations in each country also is critical to global health. These collaborations require individuals who can effectively address emerging issues and support the movement toward best practices and health promotion. All aspects of dentistry must be addressed—research, education and practice. Fortunately, technologies are now available for efficient communication and timely transfer and storage of information and data. An investment in the training of personnel who could work with global resources and databases is needed.

**Global Health Recommendation-7:** The international dental community should ensure that there are sufficient individuals trained in epidemiology, dental informatics, and health services research.

In order to strengthen linkages among all investigators so that future collaborative research initiatives will be facilitated, it is desirable to provide training for researchers and educators from various countries. In addition, it will be necessary to broaden the education of U.S. scientists to prepare them for the challenges of conducting international collaborative science.

**Global Health Recommendation-8:** The international dental community should foster the development of exchange programs and fellowships to ensure that basic principles of ethics, competencies, and sensitivity to cultural differences are maintained.

**Global Health Recommendation-9:** The international dental community should foster research training for investigators from developing countries.

### GLOBALIZATION OF DENTAL PRODUCTS

Access to the Internet is rapidly affecting the distribution of and access to dental products by the dental manufacturer, the dental distributor, the dental laboratory, and the dentist. Many manufacturers who have sold through distributors are now creating websites and are selling products to dentists and laboratories through the Internet. With the globalization of the production and distribution of dental products comes the need to assure that these products are safe, efficacious and comply with appropriate safety records and regulations. It is important that the global dental community work together to see that the identification process of products is very clear and in compliance with local laws and regulations.

**Global Health Recommendation-10:** International standards for dental products and equipment should be fostered.

**Global Health Recommendation-11:** The international dental community should support the emerging development of standards for dental education and clinical practice.

## INTERNATIONAL HEALTH PROMOTION AND EDUCATION

The global dental profession presently provides considerable international volunteer patient care. These activities should provide educational benefits for local practitioners, a process critical to sustain the health of the involved community. An important benefit of strengthening the educational component of volunteer efforts is that it will enhance the perception of the importance of oral health among the general populations of those countries.

*Global Health Recommendation-12:* The global dental community should foster the expansion of international volunteer activities to include educational components for local practitioners and populations.