La Fe Policy Research
and Education Center

Promoviendo Bienestar para Familias y Comunidad con Conocimiento, Confianza y Poder

Promoting Family and Community Well-Being through Knowledge, Trust and Empowerment

HISPANIC DENTAL EDUCATION AND PRACTICE IN TEXAS

January 2009

Acknowledgment

La Fe Policy Research and Education Center extends its appreciation to Dr. Felipe Morales for his generous financial support of this study. Dr. Morales is a dentist in private practice with a long history of involvement in addressing oral health disparities through comprehensive quality public health dentistry in community health centers.

The Hispanic Dental Education and Practice Report is a publication of La Fe Policy Research and Education Center who is solely responsible for its content.

La Fe Policy Research and Education Center (La Fe PREC) is a non-profit organization established in January 2006, to engage in policy analysis, education, leadership training, promoting civic involvement and advocacy for system changes in health and social policies.

Bienestar (well-being) is at the heart of La Fe PREC and affirms our cultural experience and holistic values. Bienestar defines a concept that advocates for equitable access to social, economic, and health and human resources for individuals and families in our community.

Our Vision: Mexican American families have comprehensive access to health and human resources that are available, accessible, acceptable, and accountable to their health values, decisions, and needs that positively contribute to their health and Bienestar.

Our Mission: To improve the decision-making capacity of Mexican Americans leading to their increased involvement in system changes in health and social policies.

La Fe PREC is a component of Centro de Salud Familiar- La Fe, Inc., based in El Paso, Texas. La Fe is a multiple service organization with over 40 years of social justice, and direct service delivery experience in health care, social services, housing, economic development, and education.

La Fe Policy Research and Education Center
1313 Guadalupe, Suite 102
San Antonio, TX 78207
(210) 208-9494
www.lafepolicycenter.org

HISPANIC DENTAL EDUCATION AND PRACTICE IN TEXAS

TABLE OF CONTENT

I. EXECUTIVE SUMMARY …………………………………………………….…… 4

II. INTRODUCTION ………………………………………………………….….. 6

III. DENTAL EDUCATION: RESOURCE ENVIRONMENT ………………… 7

A. National and State Dental Education Resources

B. Dental Supply and Demand Issues

IV. HISPANIC DEMOGRAPHICS AND ORAL HEALTH DISPARITIES 12

A. Demographic, Educational, and Economic Characteristics

B. Oral Health Disparities

V. HISPANICS IN DENTISTRY ……………………………………………… 16

A. Supply and Practice Representation

B. Applicants, Enrollment and Graduation Trends: 1996-2007

VI. INCREASING THE HISPANIC DENTAL SCHOOL ENROLLMENT .. 25

A. Impact of Federal and State-level Policies on Dental School Diversity

B. Texas Dental School Diversity, Commitment and Admission Process

VII. CONCLUSION ………………………………………………………………… 34

VIII. BIBLIOGRAPHY ....……………………………………………………… 35

(C) La Fe Policy Research and Education Center

I. EXECUTIVE SUMMARY

Background

General dentists, those that practice general dentistry, pediatric dentistry, and public health dentistry, are an aging group. In Texas, over half of general dentists are over the age of 47. With an aging and retiring dental workforce, dental schools are challenged to increase the number of graduates.

Coupled with the projected growth of the Hispanic population in Texas and the United States, the representation of Hispanics in dentistry is increasingly vital to addressing dental professional shortage areas and oral health disparities in the state. This is because Hispanic dentists, for the most part, tend to set up their practices in areas of Texas with the highest proportion of Hispanics, which in many cases, coincide with the areas of greatest need.

Hispanics in Texas have the greatest dental care access disparities of any other group. This includes lack of routine care visits for all age groups. For example, in Texas, dental caries and untreated decay among children 6-8 years old are 65% and 40% respectively, compared to the national average of 50% and 25%. Among Hispanic children, the rates are 73% and 42% respectively. While this example cites statistics for children only, the reality is that all age levels of the Hispanic population have similarly negative oral health results, as research has shown.

This descriptive study is intended to stimulate a dialogue based on these and other factors, in order to address the critical and persistent oral health and dental care disparities that exist in most areas of Texas.

Observations and Findings

A number of sources, including the Institute of Medicine and the American Dental Association, have performed studies on the current dental workforce and found no compelling evidence to recommend increasing the number of dental school graduates. Another source has posited that there is a maldistribution of health professionals, which impacts access to care and disparities in care. However, the demand for dental services is narrowly defined by most workforce studies, with the result noted above. There is no question that the underserved, whether due to their minority status, economic standing or other factors that place them outside the mainstream, simply do not seek care because of cost, and because of geographical and institutional barriers to care. Individuals who *need* care are clearly *not seeking* care.

While Texas has a long history of investment in dental education, there is a long overdue need to reform the dental workforce pipeline to address challenges that include the need to increase the delivery of quality, culturally responsive dental care services. To date, Hispanics and Blacks have made limited progress in increasing their representation in dental school enrollment and degrees awarded. While three Texas dental schools are making some efforts to increase diversity in their students, there does appear to be some weaknesses in recruitment and retention strategies. The model developed by the Baylor College of Dentistry seems to have had the most

success in that the College has structured a strong intervention framework, dedicated leadership, and a financial commitment to significantly improve the number of Hispanic and Black dental students.

Dialogue and Policy Development

Poor oral health impacts diet, nutrition and is linked to systemic physical health problems. Social activities are negatively impacted, especially school and work. The low level of Hispanic representation in the dental workforce further exacerbates the lack of access to care that already exists for the Hispanic population of Texas.

Oral health stakeholders must support a multi-pronged strategy to improve dental care for all Texans. This includes expanding the state's dental school capacity to increase enrollment, graduating more dentists, giving appropriate attention to reducing the current dentist shortages, and ensuring that future dental workforce shortages are averted. The recruitment and graduation of more Hispanic and Black dentists must be an integral part of public and private policy and resource support to address the shortage and oral health disparity issues.

In summary, for Texas, if the goal of improving parity between dental service providers and the population as represented in the U.S. Government's Healthy People 2010 plan is going to be attained, the number of Hispanic dentists would have to be increased from 722 to 2,071. The dialogue to move statewide policy and resources in this direction must begin immediately.

(C) La Fe Policy Research and Education Center

II. INTRODUCTION

The important interrelationship between Hispanics, the dental profession, and oral health in Texas are the focus of this descriptive policy study. Oral health is a vital contributor to an individual's overall health and well-being. To be in good physical and mental health, ready and able to learn, and to be productive enabling achievement of individual, family, or community pursuits can all be negatively impacted if poor oral health exist.

The dental profession has a central responsibility and obligation to help promote the importance of oral health, as well as effectively applying their technical, preventive and treatment skills to maintain the best oral health possible.[1] Over the past several decades, improvements in both public health and advances in dental practice have significantly and positively impacted the oral health of millions of Americans. The U.S. Surgeon General's "Oral Health in America 2000" report documents these improvements, while also noting that much more needs to be accomplished. In particular, it made clear that not every American benefitted equally from the oral health improvements.[2]

The Surgeon General's report plus subsequent research surveys and studies document that Hispanics are a population group which have unequal dental care access and oral health disparities.[3] The access issue is worsened by the under-representation of Hispanics in dentistry. For Hispanics in Texas, there is no coherent description of their oral health and their implications related to state health agencies and dental school efforts in addressing dental practice shortages or the under-representation of Hispanics in dentistry.

Nationally and in Texas there is a shortage of Hispanic dentists. We know that the overall professional dental supply issue magnifies the under-representation of Hispanics in dentistry, as well as being a contributing barrier to addressing oral health problems. The under-representation of Hispanic dentists may increase when measured against the growth of our population and oral health needs that are projected to multiply in our communities.

Hispanics represent 41.3 million or 14.1% of the total U.S. population of 293.7 million.[4] The growth of the Hispanic population since 2000 is 17% compared to 3% of non-Hispanics. Hispanics account for 49% of the overall population growth since 2000 and Hispanics are the 2nd highest growth population among all racial/ethnic senior groups.

In Texas, Hispanics represent 36.5% of the total state population, and 45% of the age 19 and under population.[5] The demographic, health characteristics and projected population growth will have significant implications to available and accessible health resources and dental services for Hispanics. Yet, dental care access issues among Hispanics have had limited policy and program attention.

This report includes: 1) a review of Texas dental education resources and the current dental supply and demand environment; 2) a description of Hispanics and their oral health status; 3) a profile detailing the trends in Hispanic dental school and practice representation, and 4) a review of state-level policy support for dental education and efforts to increase Hispanic dental school enrollment.

III. DENTAL EDUCATION: RESOURCE ENVIRONMENT

A. National and State Dental Education Resources

The Association of Academic Health Science Centers recently announced that the United States is "Out of Order and Out of Time" regarding the state of the nation's health workforce.[6] The finding indicates a major dysfunction in public and private health workforce policy and infrastructure. The study identifies decentralized workforce policy decision-making as a key reason for the current situation resulting in the suboptimal supply and distribution of the health labor force. While the dental labor force was not the study's focus, the critical issues raised are directly relevant to national and state dental policies impacting the supply of dentists. The issues include raising training costs and financial support, increasing student debt, labor market financial incentives, advances in care procedures that impact training an adequate number of dentists to meet the populations' oral health needs, and lack of racial/ethnic diversity in the workforce.

Nationwide there are 57 dental schools among 34 states, Washington D.C., and Puerto Rico. In addition, there are 714 dental residency training programs among 44 states. Approximately 12,000 faculty personnel are involved in the training of dentists and allied dental health professionals (dental hygienist, dental assistant, and dental laboratory technologist). Plus, there are approximately 406 vacant dental school faculty positions (2006-07), of which, 75% are full-time.[7]

In 2000, states with public dental schools received an average subsidy of $49,347 per dental student.[8] The referenced study in the Journal of Dental Education noted that revenue sources for public and private dental schools included 32% from state tax dollars, 27% from student tuition, 19% from clinic revenues, 9% from federal, and 13% from other sources. Nationwide, state support for dental education is declining, dropping from 45.6% in 1991 to 31.6% in 2000. The study noted that because dentists locate their practice primarily based on demand, state investments in dental education has little impact on the number of dentists because some states have many dentists, but invested little in dental education. However, a state's population size, per capita income, and the number of its students enrolled in dental school had a positive impact. Indeed, the number of state residents enrolled in dental school is a major predictor of a state's supply of dentist.

Investments in dental education have economic benefits since it has been demonstrated that the economic benefit of dentistry is significant to a community. Dentists provide local and national economic benefits that include economic activity, employment, and tax revenue. In 2000, national dental service expenditures total $203.6 billion plus generated tax revenues of $33 billion. It's estimated that the impact of 1 dentist practice contributes $1,278,253 to the local economy.[9] Revenues generated from dental procedures performed in 2006 totaled $91.1 billion, of which, $40.6 billion were received from patient out-of-pocket payments, $45.3 billion from private insurance, and only $5.5 billion from public programs. In Texas, the economic contribution of the dentistry profession was $1.9 billion dollars in 2005.[10]

Texas has a long history of public support investments in dental education. The state currently supports 3 public dental schools, 6 dental hygienist programs, and 22 community college allied dental certificate and associate degree programs.. The three dental schools include the Texas A&M Baylor College of Dentistry, and two University of Texas System Dental Schools. The dental schools are located in Dallas, Houston, and San Antonio respectively.

The **Texas A&M Baylor College of Dentistry** was originally established in 1905 as part of the Baylor University System. Institutional system transitions occurred until 1999, when it became a component of the Texas A&M Health Science Center. In 2007, the dental school had state revenue expenditures of $24,174,475 for instructional training, and $6,291,953 for dental clinic operating expenses.[11]

The **U.T. Health Science Center School of Dentistry in Houston** was also established in 1905. Originally known as Texas Dental College it became part of the U.T. System in 1943 and is located in the 3rd largest city in the country, and the largest city in Texas. In 2007, the dental school had state revenue expenditures of $16,193,047 for instructional training, and $3,813,154 for dental clinic operating expenses.[12]

The **U.T. Health Science Center, School of Dentistry in San Antonio** was established in 1970. The dental school has grown rapidly, comparable in size to the Baylor and Houston Dental Schools. It is currently ranked as one of the top 10 dental schools in the country. In 2007, the dental school had state revenue expenditures of $22,694,925 for instructional training, and $3,691,324 for dental clinic operating expenses.[13]

The degree to which the preceding national and Texas dental schools generate an adequate supply of dentists, and enroll and graduate a diverse student body reflective of the general population and respective needs for oral health services are explored below.

B. Dental Supply and Demand Issues

Are there enough dentists to meet the oral health needs and demand among the U.S. population? A study by the Institute of Medicine found that after reviewing various workforce models and projections, no "compelling evidence" and "no responsible basis for recommending" that total dental school enrollment be pushed higher or lower.[14] The study recognized the projected decline in the ratio of dentists to population, but felt other factors such as higher dentist productivity and some level of 'reserve' dentist service capacity would keep supply and demand reasonably balanced. However, the importance of surveillance and monitoring was urged because of possible developments that could change supply, demand, or needs. It is instructive that the purpose of the study was to assess dental education in the U.S. Multiple issues were identified and policy recommendations made. Note was made of the fact that the dental profession was at odds with itself on issue areas that included licensure; health care restructuring; being out of touch with students; practitioners and communities; and work force policies.

The American Dental Association (ADA) position is that the dental workforce is generally sufficient and should remain so into the future. Their 2001 study, the *Future of Dentistry*, projected that dentist-to-population ratios would continue to decline from 60.2 per 100,000 in 1994 to 54.2 in 2020.[15] In 2002, ratios widely varied across the U.S. from 31.3 in New Mexico

to 69.0 in New York. Again, the study concluded that growing demand could be met with the current and projected number of dentists. The continued increase in the service productivity of dentists is a particular salient reason that excess service capacity will exist to meet increased demand.[16] Similar results followed in another ADA study, *Adequacy of Current and Future Dental Workforce* in 2004.[17] The dental workforce is adequate considering trends in the growth and demographically changing U.S. population, dental disease patterns, workforce productivity, the number of dental school graduates and the number of retiring dentists.

Concurrently, the trend in dental school enrollment will not significantly impact the projected adequacy of the dental workforce to meet service demand. Trends in first-year dental school enrollment are one important parameter of future workforce supply. Four distinct periods highlight enrollment trends:[18]

- 1950 – 1965: An 18% enrollment increase (3,226 to 3,508) equivalent to a 1.2% annual growth.
- 1965 – 1978: A 65.6% enrollment increase (3,808 to 6,301) equivalent to a 5% annual growth.
- 1978 – 1989: A 36.9% enrollment decline to 3,979.
- 2003: First-year enrollment increased to 4,618, equivalent to a 1.1% annual growth.

During these periods, the number of graduates peaked at 5,756 in 1982, dwindled to slightly less than 4,000 during 1990 – 1996, and stood at 4,443 in 2003. In 2007, slightly over 4,770 first-year students were enrolled, and there were approximately 4,720 graduates from the nation's dental schools combined. Other notable trends in the dental workforce include:

- Dentist employment growth is projected at 9% annually through 2016, from 161,000 in 2006 to 176,000 in 2016 (U.S. Department of Labor, Bureau of Labor Statistics)
- The number of active dentists will climb from 175,705 in 2004 to 186,796 in 2020.
- Approximately 80% of active dentists are generalists and 20% are specialists. The number of dental specialists is projected to grow to 27% by 2020.
- The per capita supply of primary care dentists (general and pediatric dentists) between 1995 and 2007 remained relatively unchanged with an average annual increase of 0.12.[19]
- The financial incentives for private practice are high, a very small number chose public sector employment.
- The mean income of a full-time solo dental practitioner was $198,100 in 2003, up from $94,200 in 1990.
- The average age of active practicing dentists is 52.
- Active female dentists are projected to grow from 16% of all dentists in 2006 to 30% by 2020. Currently, 19% of the dental workforce works less than full-time, and the gender impact is anticipated to increase it to 30% by 2020.
- Since 1980 dentist to population ratios have been falling, and it is estimated that more dentists will leave the workforce than enter it beginning in 2014 to 2027.
- The number of dental graduates is expected to remain fairly constant. Until 2007, the number of graduates exceeded the number of retirees.
- Interest in the dental profession remains high, the applicant to enrollee ratio is 3:1.

The IOM and ADA studies represent only a part of the discussion and debate regarding the supply and demand of the dental workforce. Another perspective is that there is or will be a crisis in access to oral health care if we do not act to abate it now. Access to dental care will become increasingly more difficult over the next several years, including among those who previously experienced little difficulty in accessing dental care.[20] The issue is not new to low-income, minority populations, home-bound and nursing home residents, and residents of inner cities and rural areas. They will continue and possibly face greater barriers in access to quality dental care. The access problems will be more acute because:

- The size, composition, and distribution of the population, driven by both the senior 'baby boomers and the shift to a much more diverse majority-minority population.
- The geographic maldistribution of dentists and ancillary dental workforce personnel, which the IOM and ADA studies appear to acknowledge. Numerous other public and private reports explicitly recognize the problem, beginning with the release of the Surgeon General's Report on Oral Health in 2000.
- Over 134 million Americans have no dental insurance (National Associations of Dental Plans). Therefore, millions experience dental pain daily but cannot afford dental insurance or out-of-pocket costs delaying treatment for long periods.
- The continuing lack of sufficient diversity in dental school enrollment and practice representation among under-represented minorities (URM), particularly among African Americans, Hispanics, and Native Americans.
- The failure of social policy, dental education or the private dental sector to address the problems.

The *demand* for dental services is narrowly defined in most workforce studies – the need and acting on the need by seeking care is driven by one's ability to afford paying for services through their dental insurance and/or out-of-pocket financial resources. This definition essentially leaves out tens of millions who have a need but cannot act on it (demand) unless the oral health problem is perceived and/or painfully felt as an emergency. "The extent of oral health disparities clearly indicates that many of those in need of oral health care do not demand oral health care."[21] In short, the *need for* and *demand for* dental services is not the same.

Missing from many of the dental workforce studies are people who need and want dental services but often encounter costs, geographical, and institutional barriers to care. The demand for dental services is also significantly impacted by changes in dental fees, i.e. higher fees, lower demand. Other influencing factors are education level, income, family size, age, dental insurance, health conditions, changing service mix, and ethnicity and language concerns.

The varieties of factors that influence demand are overshadowed by the ability to pay for services. The services are treated as a market commodity in which access, price, and quality are influenced by the incentives within a competitive market environment. Therefore, the simplistic ratio of dentist-to-population is insufficient because its leaves out populations for which there are not enough dentists and access is non-existent. "Very real shortages of dentists exist, and organized dentistry is not served by burying its head in the sand by labeling the growing problem as maldistribution."[22]

In summary, the debate on whether there is a shortage or maldistribution of dentists has not diminished. The fact remains that there are significant access problems to dental care. "Profound disparities in the oral health of the nation's population have resulted in a 'silent epidemic.'"[23] The education and training of new dentists is insufficient to meet the real demand/need, particularly among underserved, uninsured, low-income and racial/ethnic populations in both inner cities and rural areas. Additionally, the lack of diversity in dental school enrollment and practice remains significantly inadequate and impedes efforts to address oral health disparities.

(C) La Fe Policy Research and Education Center

IV. HISPANIC DEMOGRAPHICS AND ORAL HEALTH DISPARITIES

A. Demographic, Education, and Socio-Economic Characteristics

With less than 100,000 short of 24 million residents in 2007, Texas is second to California as the most populated state. Hispanics account for one in three Texans (Hispanic: 36.5%, White: 47.8%, Black:11.5%).[24] It is projected that the Hispanic population growth will continue, increasing as much as 85% by 2040, to become the largest racial/ethnic population. The shift in population trends will result in a decline in population of Blacks and most significantly in White Non-Hispanics by 2040. Over the next 40 years, the Texas population will grow by 14.9 million to become a majority Hispanic state.[25] The state's population is also young. The median age in Texas is 33.1, making it the youngest state.[26]

In addition to being a young and growing population, Texas can also be characterized by its low measures of income, low levels of educational attainment, and high levels of uninsured. When comparing the Household Median Income of states, Texas has continuously been in the bottom half. The U.S. Household Median Income in 2007 was $50,740; in Texas it was $47,548 (29th).[27] As of 2007, 25% of Texans are uninsured. Using a three year average (2005-2007), the Texas uninsured rate, 24.4, is higher than all other states and the differences are statistically significant.[28] Texas is ranked 49th in the percentage (79.1%) of residents over 25 who have a high school diploma or its equivalent.

In 2005, Texas was propelled into the "Minority-majority" status by significant growth among the Latino population with the following characteristics:

- *Age*- A young and growing population, Latinos median age is 26.6. Of all children under 18, 45% are Latino children.
- *Education*- Educational attainment is the lowest among Latinos. Latinos are more likely to have less than a high school diploma (45% compared to Blacks *(16.7%)* and White Non-Hispanics *(19%))*.
- *Household Income*- One of four Latino households will make less than the state's household median income. The median household income of Latinos has declined since 2004. During 2002-2003, Texas ranking dropped from 25th to 32nd in the U.S., placing it among the bottom half of states with the lowest income.
- *Labor*- Latino labor force participation makes up 67% compared to White Non-Hispanics *(66 %)* and Blacks *(69%)*. It is unclear how undocumented immigrants affect participation. Latinos are represented more in occupations like *Service (23%) and Sales and Office (22%)* where income and wages are lower than White Non-Hispanics and Blacks.
- *Poverty*- One-third of the population that lives in poverty is Latino. For a family of 4 who make the Federal Poverty Level's annual income *($20,000)*, it is estimated they are earning 46% less than a living wage. Latinas who are head of household with children under 18 in Texas have a one in two chance of living in poverty. One in four Latino elderly live in poverty.
- *Immigration*-Citizenship among Latinos is 70% native, and 6% and 24% identified as naturalized and not-a-citizen respectively.

- Latinos have a higher uninsured rate (38%) than their White Non-Hispanic counterparts (17%). Latinos represented 59% of the state's total uninsured population in 2006.
- Even when educated, Latinos and Blacks with a bachelor's degree are still three times less likely to be insured than White Non-Hispanics (16% versus 5%).

B. Oral Health Disparities

Oral health disparities persist in the United States. Since the U.S. Surgeon General's 'Oral Health in America' 2000 report an abundance of subsequent research continues to document the oral health and dental care access disparities, though there has been some progress.[29] The populations most impacted include low-income, less educated, uninsured, rural, racial and ethnic groups, individuals with disabilities, elderly, and migrant workers. Hispanics, particularly Mexican Americans, are a population significantly impacted by both general health and oral health and dental access disparities.[30]

As previously noted, approximately 134 million Americans (44.7%) do not have dental insurance and profound disparities have resulted in a silent epidemic of oral health problems.[31] A recent *Health Affairs* article notes, "Despite improvements in oral health status and clear links between oral and systemic health, oral health is not accorded the same importance in health care policy as is general health."[32] Oral health expenditures account for approximately 7% ($70 Billion) of the over 1 trillion dollars spend annually on health care. As a result, dental concerns and unmet treatment needs continue not to be adequately addressed. The Health Affairs paper provides the following research findings:

- In 1994-2004, 60% of adults had a prior year dental visit versus 43-50% among racial/ethnic minorities, 44% for populations below poverty level, and 38% for those with less than a high school education. Among Hispanic seniors, untreated caries and periodontal diseases were 41% and 17% respectively compared to White Non-Hispanics of 16% and 9% respectively.
- The most prevalent unmet health need of children is dental care. Almost half of 2nd graders and nearly 80% of adolescents are impacted by dental caries. Of all children ages 6 or older, 75% of caries experienced occur in 33% of children whom are Black, Mexican American, American Indian/Alaska Native, and low-income groups. Preventive dental sealant rates for Blacks and Mexican American children are 33% lower than those of White Non-Hispanics.
- Among older adults, untreated caries and periodontal diseases have a different impact on Hispanics (41% and 17% respectively), and Blacks (37% and 24% respectively), compared to White Non-Hispanics (16% and 9%) respectively.

Other recent studies and surveys illustrate the following as well:

- In 2003-2004, untreated dental caries and presence of sealants among women were 40% and 11.4% respectively for Hispanics, 40.2% and 7.7% for Blacks, compared to 18.2% and 26.6% for White Non-Hispanics. About 71 % of women with health insurance that included a dental component saw a dentist in the past year, versus 58.6% with health insurance and no dental component, and 38.6% for women with no health insurance.[33]
- In 2005, well over half (58%) of low-income adults lack dental coverage and most go without routine dental care. Lower income adults who had a dental visit in the prior year

were at 35%, compared to higher income adults at 67%, and they were 1.5 times as likely to have an unmet health need (14% versus 9%). Low-income adults with dental coverage continue to have less than adequate access to dental care, with 1 in 10 (10%) unable to get dental care when needed.[34]

- In 2005, Hispanics and Blacks with a dental visit in the past 6 months was 29% and 32% respectively, compared to White Non-Hispanics of 49%.[35]
- A lack of significant dental insurance coverage and dental care disparities persist, particularly among Hispanics, Blacks, and Native American/Alaska Native Children.[36]
- Medicaid as a safety net for dental care access and care continues to have significant barriers.[37] Dental disease remains a significant problem among children ages 2-19 who are enrolled in Medicaid – 1 in 3 have untreated tooth decay and difficulties accessing a dentist.[38]

In Texas, the most recent state-level Oral Health Report appears to describe steady improvement in the oral health and dental care access of Texans.[39] The fact remains that Texas ranks below national averages on many oral health and dental care access indicators. In two national oral health reports, the state received an overall 'oral health report card' grade of C and F.[40]The indicators include prevention, access, private coverage, Medicaid coverage and reimbursement, oral health infrastructure, and state policies.

Since 1993, Texas has been engaged in a 'class action' civil suit attributed to the "failure of the State of Texas to implement a Medicaid program that assures that indigent children and youth receive timely, comprehensive health care."[41] The class action suit was on behalf of 1.5 million children entitled to health benefits through the Early, Periodic Screening and Diagnosis and Treatment program referred to as Texas Healthy Steps. The lack of adequate access to dental care was one focus of major concern.

In 2004, 20% (1,517) of 8,000 dentists provided care to Medicaid enrolled children. Each dentist would have to provide care to 1,621 children to adequately cover the 2,458,671 eligible. However, only 223 of the 1,517 dentists took care of more than 1,500 children. United States Supreme Court action was required for a final consent degree to be signed (August 2005) by the state to address the problems. Higher dental care reimbursement and special oral health and dental care initiatives are currently being implemented. "Overall inadequacies in the supply and distribution of the oral health workforce are compounded in Medicaid and SCHIP by low participation among dentists and the disproportionate burden of oral disease in the low-income populations."[42] It is too early to know whether their implementation will lead to meaningful solutions in addressing the targeted disparities.

The following oral health and dental care access disparities are illustrated as challenges that require solutions:

- Dental caries and untreated decay among children 6-8 years old are 65% and 40% respectively, compared to the national average of 50% and 25%. Whereas, the Healthy People 2010 objectives for these indicators is 42% and 22% respectively. Among Texas' racial and ethnic groups these indicators are:
  - White Non-Hispanic: 61% and 39% respectively
  - Black: 63% and 38% respectively

- Hispanic: 73% and 42% respectively
- The percent of children ages 1 to 17 with preventive visits in the past year and with teeth reported in excellent or very good condition are 65.6% and 61.3% respectively compared to the national average of 72% and 68.5% respectively.
- The percent of children ages 1 to 17 below the income poverty level who had a preventive visit in the past year teeth were reported in excellent or very good condition are 58.1% and 43.3% respectively compared to the national average of 59.2%% and 48.8% respectively.
- Blacks and Hispanics fared worse in Texas as well, when compared nationally in select oral health indicators. The percent of children ages 1 to 17 by racial and ethnic group with preventive visits in the past year and with teeth reported in excellent or very good condition are:
  - White Non-Hispanic: 72.4% and 78.9% respectively compared to the national average of 77% and 76.4%.
  - Black: 67.1% and 56.1% respectively compared to the national average of 66.4% and 61.1%.
  - Hispanic: 58.9% and 44% respectively compared to the national average of 60.9% and 46.7%.
- Among Texas adults ages 18 and above the percent with 1-5 teeth removed, is 24.5% for White Non-Hispanics, 35.5% for Blacks, and 36.8% for Hispanics.
- Among Texas adults ages 18 and above the percent who visited a dentist or dental clinic in the past year, 48% and 51.4% of Blacks and Hispanics respectively did not have a dental visit compared to 34.1% for White Non-Hispanics.[43]

In summary, poor oral health impacts diet and nutrition and affects social activities, as well as school and work. Plus, research has increasingly shown important associations between poor oral health status and other systemic health problems and risk factors, such as diabetes, respiratory ailments and heart disease, pre-mature births and low birth weight babies, HIV, and eating disorders.

The past decade has seen growing debate about the 'practice of dentistry' and its capacity to address the increasing oral health and dental care access concerns and unmet needs. "The current practice model of dentistry, which serves insured patients and those who can pay out of pocket, must be changed to include the rest of the population."[44] Indeed, "the oral health education system is in need of major reform."[45] It is argued that dental education has not kept pace with multiple changing realities – demographics, needs, new discoveries, desires and expectations, and interdisciplinary and health system needs.

For Hispanics, these issues are clearly salient given the documented levels of oral health and dental care access disparities that impact them. Their purported levels of low representation in the dental workforce further exacerbate the problems and solutions needed to improve their oral health and overall systemic health and well-being.

(C) La Fe Policy Research and Education Center

V. HISPANICS IN DENTISTRY

The representation of Hispanics in dentistry is more critical since one in three Texans is Hispanic. The growth and demographic characteristics of the Texas population is pertinent to understanding the importance of and challenges in the training of a diverse and adequate supply of health professionals. Of note, Hispanic students in public schools nearly doubled from 1990 to 2006 accounting for 60% of total growth in public school enrollment – 166% increase is projected by 2050 (11 to 28 million). Also, in 2007, 334,000 Hispanics were enrolled in public and private colleges and universities, that's 100,000 more than in 2000. If one assumes current Hispanic educational attainment is maintained, Hispanics with a bachelors degree are projected to climb from 8% in 2000 to 18% in 2040.

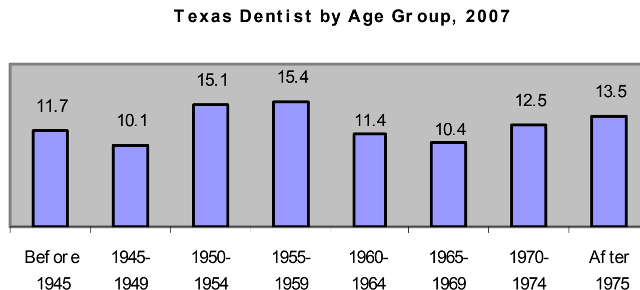
What is the current supply of dentists and what is the current representation of Hispanics in dental practice? What are the enrollment and graduate opportunities and trends of Hispanics in the dental education and training pipeline? What are the implications for the distribution and access to oral health services for Hispanics as a result of current supply and trends? These are critically important questions.

A. Supply and Practice Representation

Demographically the supply of dentists in Texas is reflected in their dentists-to-population ratios, their distribution and areas of concentration, and their age. Including specialist, there are an estimated 10,748 dentists serving the public in Texas in 2007.[46] This would make the ratio of dentists per 100,000 population 45.7. Excluding the specialist and examining only "primary care dentists" (general, pediatric, and public health dentists), there are 8,931 or 38.0 per 100,000 population. **These 8,931 are referred to as "General Dentists" henceforth.** Women represent only about a quarter of Texas dentists despite representing 51 % of the general population.[47]

General dentists are an aging group (Figure 1). About 5.6% of the general dentists were born before 1940 (over the age of 68) and may not be in practice despite having an "active" license. Over half (52.3%) in Texas are over the age of 47. With an aging and retiring dental workforce, dental schools are challenged to increase the number of graduating dentists.[48]

Figure 1

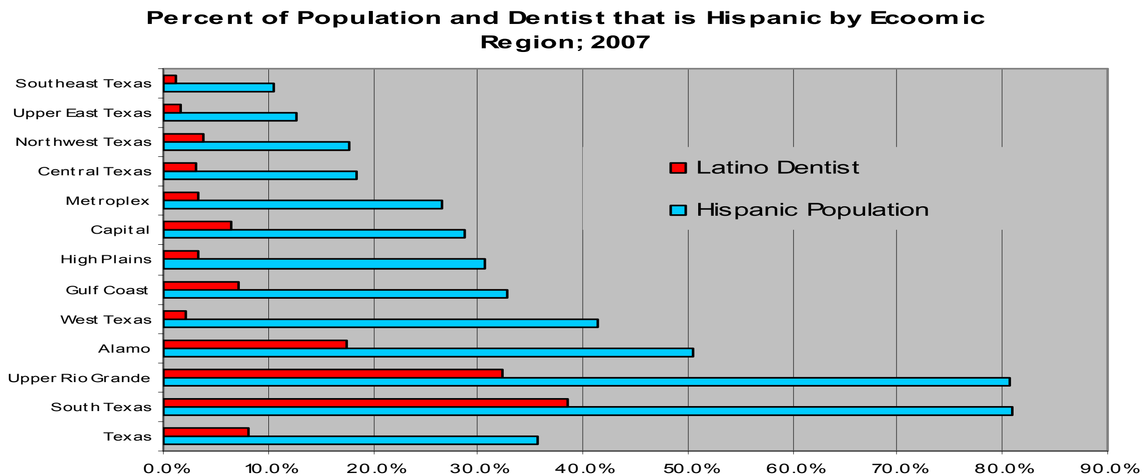


Increasing the representation of Hispanics in dentistry is vital to addressing the disparities in oral health and the large number of dental professional shortage areas. We begin our understanding of

Hispanics in dentistry by assessing their practice representation. Dental licensure data (2007) was acquired from the Texas Board of Dental Examiners (TBDE). However, the TBDE data does not contain a racial/ethnic identifier for licensed dentists. The surnames of the licensed dentists provided by TBDE were compared with a Spanish Surname List developed by the U.S. Census Bureau.[49]

A state total of 722 (8%) general dentists were identified as Hispanic, far below their state population representation of 36% (Figure 2).

Figure 2



Source: U.S Census Bureau 2006 Population Estimates and List of Spanish Surnames; Texas State Board of Dental Examiners, 2007

When examined by the State's Economic Regions[50], the largest number, 173 (24%), of Hispanic general dentists are located in the Gulf Coast Region. The region includes the largest populated city (Houston) of the state, and retains one of the state's three dental schools. Hispanic dentists represent 7.1 of the region's dentists. The Gulf Coast Region is the 2nd most highly populated area in the state, containing 24% of the state's total population and 22%, the largest portion, of the state's Hispanic population.

As illustrated in Figure 2, Hispanic dentists are more concentrated in regions with a high Hispanic population. Hispanics in Texas represent 36% of the population and only 8% of the dentists, however in the three Economic Regions with the highest percentage of Hispanic population, South Texas and Upper Rio Grande, both 81% Hispanic, and the Alamo Region, 51% Hispanic, only 39%, 32%, and 17%, respectively of the dentists in those regions are Hispanic.

In South Texas, which has the highest Hispanic population concentration and one of the highest numbers of Hispanic dentists, also has the highest percent of Texas dental school graduates, 86%.[51] In addition, a higher percentage of Hispanic dentists are female, 36%, compared to Non-Hispanic dentists, 27%.

Dental Shortage - There are currently an estimated 54.1 dentists per 100,000 population in the United States or 1,708 people per dentist. This ratio is not representative of the availability of dentists to various populations across the country. In states such as New Jersey, Massachusetts,

Hawaii and New York, the ratio is about 74 per 100,000. You will only find about 35 to 40 dentists per 100,000 in Texas, Mississippi, North Carolina, Nevada and New Mexico.[52] Certainly, in the U.S. and Texas, dentists are not evenly distributed or balanced against apparent need.

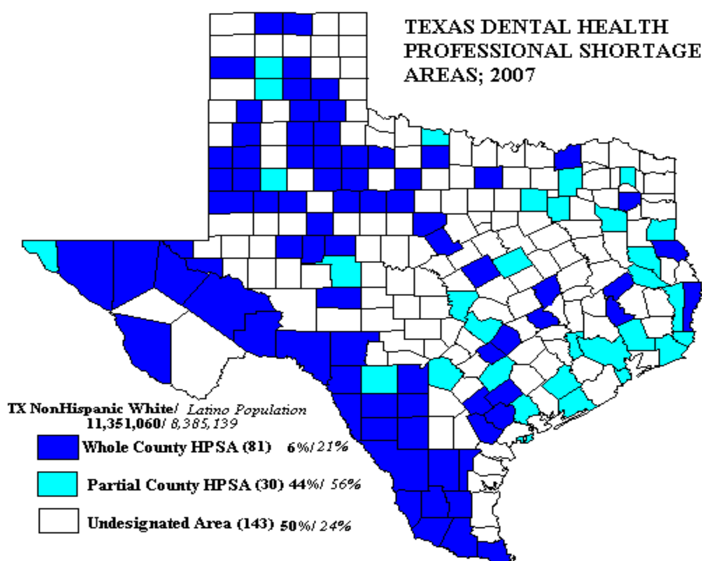
In Texas, the state ratio is 36.5 per 100,000 or 2,737 people per dentist.[53] The dental practitioner shortages, as with other health professionals, is often most severe in rural, low income, and or majority minority areas. As previously stated, Texas has one of the highest minority populations at 52% and one the lower household median incomes in the country.

The disparity in dentist-to-population ratios is exacerbated in the state's urban and rural areas, which are foreseen to be widening in the years to come (Urban: 37.9, Rural: 23.6). Of the 254 Texas counties, 127 experienced a decline in supply ratio and 46 have no general dentist.[54]

The Texas Department of State Health Services has designated 81 counties as Whole County Dental Health Professional Shortage Areas (HPSA) and 30 as Partial Dental HPSA (Map 1). The 14.4 million people living in the 111 counties represent 62% of the state's total population, 63% of all children under age 18, and 60% of all people over age 64. These counties also contain much of the state's minority populations, about 76% of Hispanics and 67% of Blacks live in these areas compared to 50% of the state's White Non-Hispanics. The US/Mexico Border Regions of Upper Rio Grande and South Texas have the highest concentration of whole counties with a dental HPSA designation than any other regions of the state.

Indeed, the shortage in dentists does not appear to be on the decline. Of the 81 counties that are whole county dental HPSA, 64 were designated within the last 2 years and only 1 is slated for removal from the list. The growing disparity in general dentists and access to oral health resources will impact the health of the state.

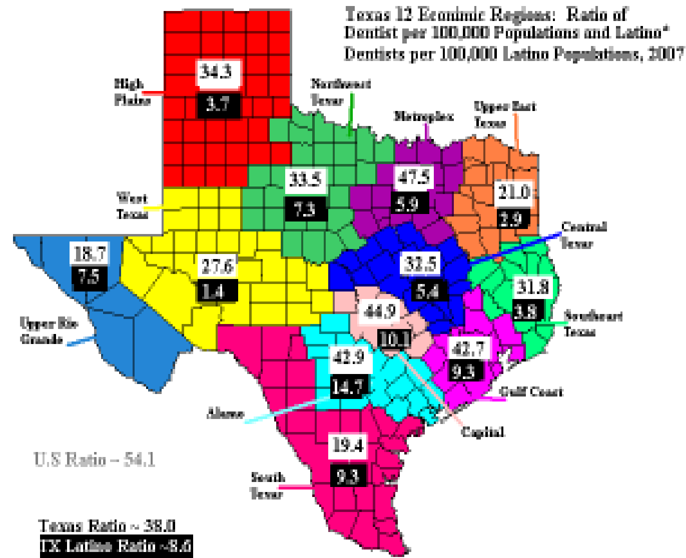
Map 1



Source: Texas Department of State Health Services 2007

The dentist-to-population ratio ranges from a high of 47.5 in the Metroplex Region to a low of 18.7 in the Upper Rio Grande region (Map 2). The Upper Rio Grande and South Texas Regions along the U.S./Mexico Border have the lowest dentist-to-population ratios (18.7 and 19.4) in the state.

Map 2



Eight of the twelve Economic Regions have a lower Hispanic dentist to Hispanic population ratio than the state's overall Hispanic ratio of 8.6. Nonetheless, the majority of Hispanic populations living in whole or partial county dental HPSAs also contain the highest percent of Hispanic dentists which is indicative of research that shows Hispanic dentists are more likely to serve Hispanic patients, and practice in a more heavily Hispanic populated dental HPSAs.

It appears also that Hispanic dentists do not follow the normal dental graduate pattern for establishing their practice in regions with higher household median incomes. Table 1 compares demographic and socio-economic characteristic of four Economic Regions to those with the lowest and highest dentist-to-population ratios. In South Texas and the Upper Rio Grande, the two most heavily Hispanic populated regions, have the two lowest dentist-to-population ratios exist, yet these two areas have the 3rd and 5th highest (out of the 12 regions) Hispanic dentist-to-Hispanic population ratios. Of note is that none of the state's dental schools are located in these regions.

Table 1

Two Economic Regions with the lowest dentists to 100,000 population ratio:			Two Economic Regions with the highest dentists to 100,000 population ratio:	
South Texas	Upper Rio Grand	Demographic and Socio-Economic Characteristics	Capital	Metroplex
9%	3%	Percent of Texas population	7%	25%
4%	2%	Percent of General Dentist in TX	6%	31%
81%	81%	Hispanic Population	29%	27%
31% / **35%**	33% / **36%**	PCT uninsured, 2005 (all/**Hispanic**)	20% / **31%**	23% / **46%**
23%	19%	PCT receiving Medicaid	13%	10%
$34,452	$34,980	Median income*	$48,142	$44,514
Source: U.S. Census Bureau; 2007 Population Estimates and Small Area Health Insurance Estimates 2005. Texas Health and Human Service Commission. *An average of "Household Median Income" of the counties in that region that were surveyed in the 2007 American Community Survey (ACS); the Upper Rio Grande is El Paso only.				

The overall availability of a dentist declines as the population is increasingly low income, Hispanic, and uninsured. The median household income in South Texas ($34,452) and Upper Rio Grande ($34,980) Regions are comparably lower than in Mississippi ($36,338), which ranked 50th in 2006. In addition, the 35% and 36% rate of uninsured Hispanics exceeds the Texas rate of 24% as well as all the other states in the U.S.

In summary, according to the 2000 census, 3.5% of practicing dentists in the United States were Hispanic. In Texas, Hispanics represented 32% of the total state population while comprising 4% (297) of all general dentists. If the achievement of parity between dental and population representation by 2010 is a goal, the number of Hispanic dentists would have to increase to 2,071.

B. Applicants, Enrollment and Graduation Trends: 1996 - 2007

Proportional to the size of the state of Texas, the number of dental schools and number of dental graduates is far below parity to the state's population. For prospective dental students, the process of applying to Texas dental schools begins online by students submitting their application to the Texas Medical and Dental School Application Service (TMDSAS). This umbrella state agency collects and distributes student application information to prospective schools.

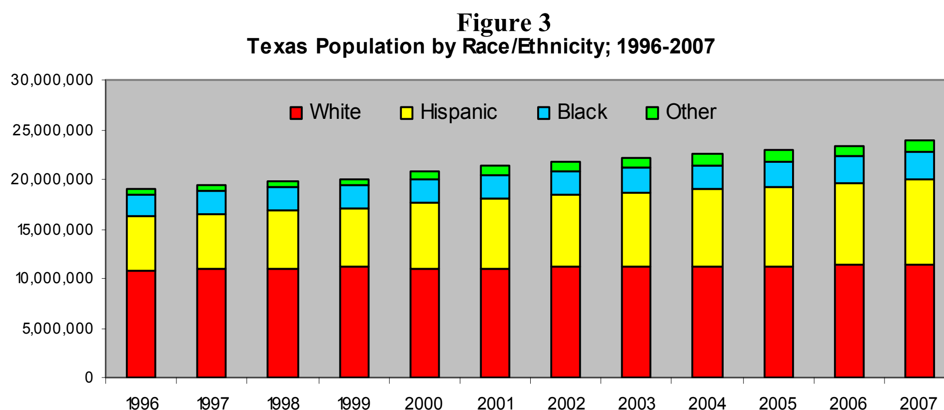
A uniform standard applies to all prospective students that include 90 semester hours and a B.A. degree from an accredited U.S. or Canadian College or University. All applicants must have completed biology, general chemistry, organic chemistry, biochemistry, physics, English, calculus/statistics, and have letters of recommendation, a personal essay and the Dental Admission Test (DAT). As uniform as the first stage of the application process is, each school determines their process for reviewing and determining qualified application for their institutions.

The Dental School Applicant Pool - Eighty (80) percent of the state's practicing dentists graduated from a Texas dental school, 19% from other schools across the Nation, and the remaining 1% were educated in a foreign country.[55] It is important to note that dental schools are legislatively mandated to enroll 90% of Texas residents and the other 10% can include out-of state and foreign exchange students. For Hispanic dentists, the percent that went to a dental school in Texas is slightly lower, 77%; 3.7% were foreign trained, 3.6% earned their degree in Puerto Rico, and the remaining 15.7% went to school in a state other than Texas.

Figure 3 illustrates the growth of the Texas population by race and ethnicity for a twelve-year period.

Figure 3

Texas Population by Race/Ethnicity; 1996-2007



Most of the population growth is attributable to Hispanics. During this period, the Hispanic population grew from 5.4 million in 1996 to 8.6 million in 2007, a 58% increase. The youth of the population suggest an increasing percentage of Hispanics are in an age-range (21 – 27) at which most students either apply, are enrolled, or graduate from dental school.

In 1996, Hispanics represented 35% of young adults ages 21 to 27, and 40% in 2007 (Figure 4). Compared to White Non-Hispanics, Blacks, and Others; Hispanics retain a much larger gap between the percentage of potential applicants ages 21 to 27, and their percent representation of all dental school applicants. One would anticipate a larger percentage of Hispanics applicants. For example, White Non-Hispanics represent 42% of the total population of young adults ages 21 to 27 and also represent 46% of all dental school applicants in 2007. "Other" applicants represent 32% of all applicants, yet represent only 5% of young adults.

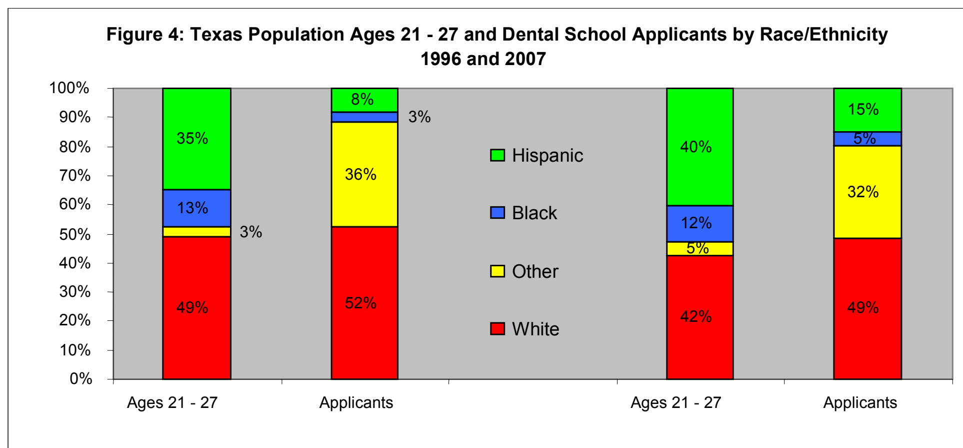
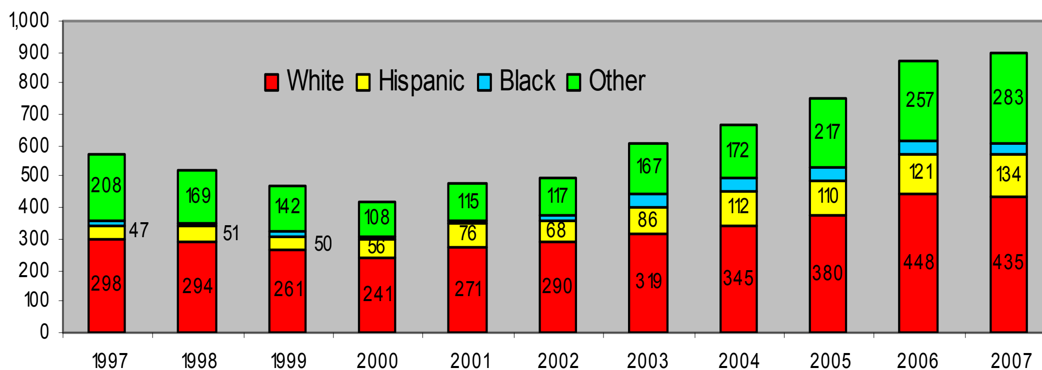


Figure 5 illustrates that the number of applicants to Texas dental schools decreased between 1997 and 2002, falling from 571 to 478 per year.

Figure 5

Texas Dental Schools: Applicants by Race/Ethnicity, 1996-2007

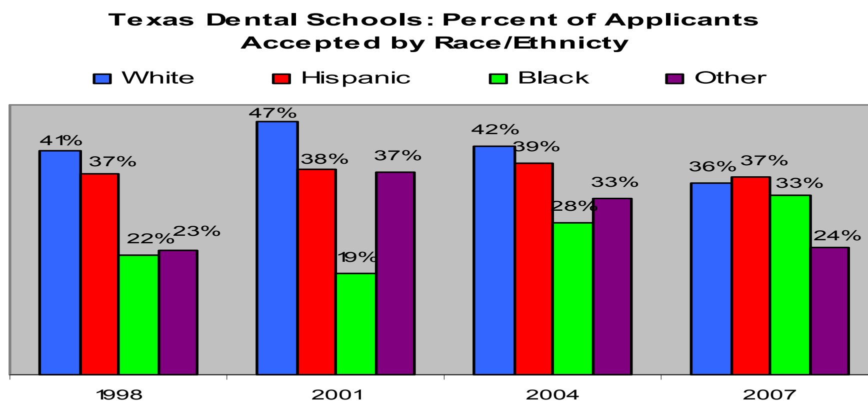


Source: Texas Medical & Dental Schools Application Service (TMDSAS), 1996 - 2007

In 2003, there were 609 applicants, a 23% increase. The number of applicants continued to increase each subsequent year to a high of 894 in 2007. All racial and ethnic groups experienced a proportionate increase except that White Non-Hispanics and Blacks experienced a decrease from 2006. Hispanic applicants doubled between 2002 and 2007, increasing from 68 to 134. In 2007, the number of Hispanic applicants had increased by 185% compared to 46% for White Non-Hispanics since 1996. Arguably, the increase in Hispanic applicants is an improvement, however, will it continue to increase given the current size of and projected Hispanic population growth among young adults ages 21-27? More importantly, will an increase in the number of applicants also lead to increased enrollment sufficient to seriously address the severe shortage of Hispanic dentists?

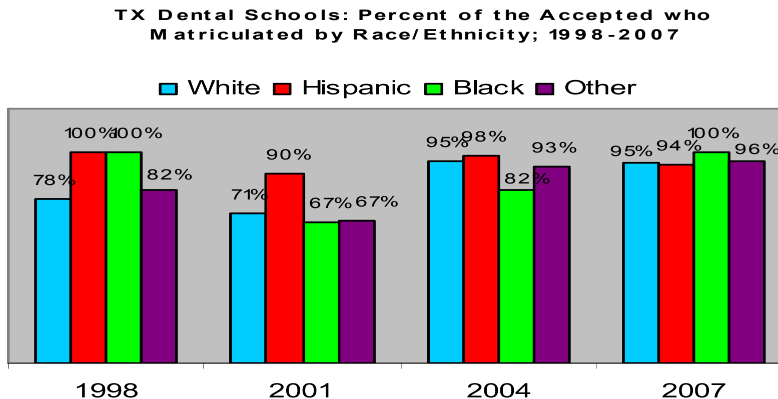
Matriculation- According to Figure 6, the percentage of accepted Hispanic dental school applicants is catching up to Non-Hispanic Whites surpassing them by 1% in 2007. In that year, 37% of Hispanics who applied were accepted compared to 36% of White Non-Hispanics. Blacks, like Hispanics, are under represented in dental schools. Blacks have had a more consistent and lower acceptance rate than either Hispanics or White Non-Hispanics. However, they too are demonstrating an upward trend in the acceptance rate, from 22% in 1998 to 33% in 2007.

Figure 6



In Figure 7, the percent that matriculated is a percentage of those who were accepted. Hispanics, have a higher matriculation rate than any other racial/ethnic group. Plausible reasons include applicant residency status and financially constrained options.

Figure 7

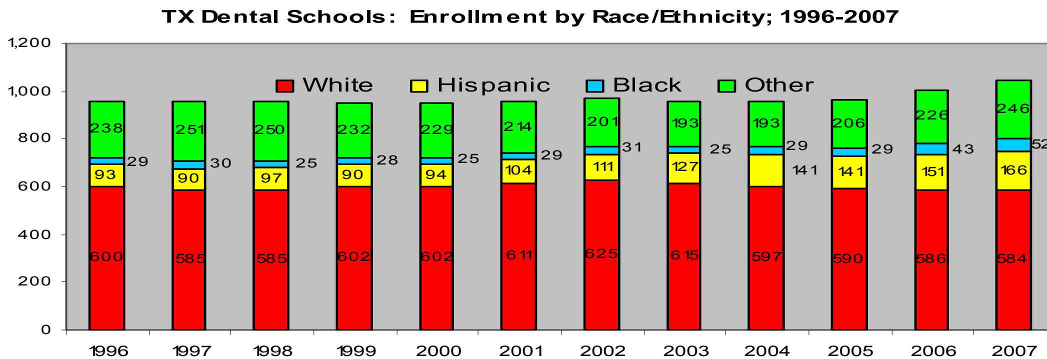


(C) La Fe Policy Research and Education Center

That is, Hispanic applicants are less likely to apply to out-of-state schools versus White Non-Hispanics whom may be accepted and decide on attending a non-Texas dental school. Or, if the economic characteristics of the Hispanic applicant pool mirrors those of Texas' Hispanic population (a disproportionately low median income), they may be less likely to opt for a school outside of the state due to financial constraints.

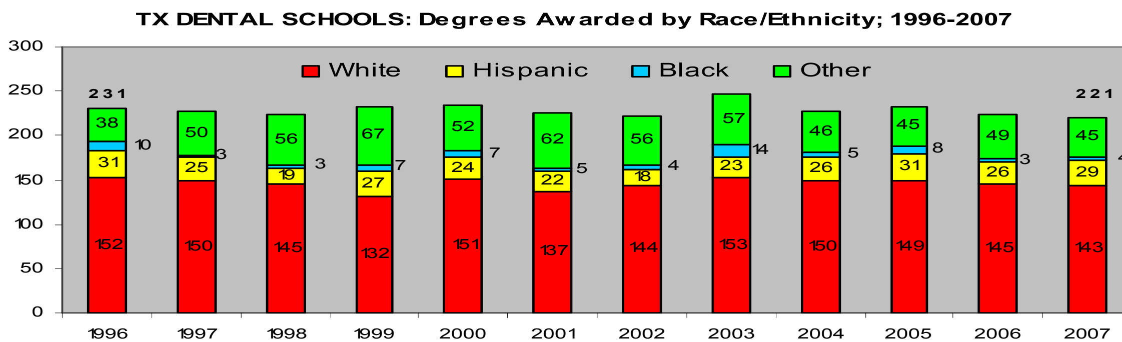
Despite an increase in applicants, the enrollment numbers have been relatively stagnant as illustrated by Figure 8 below. Total enrollment has hovered at about 960 from 1996 to 2005. In 2007, total enrollment increased to 1,048 from 1006 in 2006.

Figure 8



With a majority of practicing dentists coming from Texas schools and the history of shortages and undersupply of dentists, it is disappointing that the number of dental school graduates has also remained stagnant. Figure 9 indicates that between 1996 and 2007, the average number of degrees awarded was 229. There was a slight increase in 2003 when 247 degrees were awarded. Blacks and Hispanics, in 2007, continued to have low representation as dental school graduates, 2% and 13% respectively, compared to their population representation of 11% and 36%. Little to no improvements has occurred over the 12 years since 1996. White Non-Hispanic representation has decreased slightly, representing 65% of all degrees awarded in 2007, compared to their population representation of 48%. Among 'Other', they represent 20% of all degrees awarded compared to their population representation of 5%.

Figure 9



In summary, several observations are noted in examining the racial/ethnic characteristics of Texas dental school applicants, enrollment, and degrees awarded. First, the enrollment and

dental degrees awarded have not sufficiently increased to effectively address the dental shortage needs of the state. Secondly, Hispanics and Blacks have made limited progress in increasing their representation in dental school enrollment and degrees awarded. In particular, the growth of the Hispanic population and larger potential dental applicant pool ages 21 – 27, further illuminate the limited progress of dental schools to increase Hispanic representation. Thirdly, "Other" minority populations are disproportionately over-represented in dental schools. And, finally, Hispanic applicants appear increasingly as competitive to White Non-Hispanics as evidenced by their rate of acceptance and graduation rates. It suggests that the quality of Hispanic dental school applicants is good but the number of applicants may be too low.

VI. INCREASING THE HISPANIC DENTAL SCHOOL ENROLLMENT

Through interviews conducted, documented research and literature reviews, this section will explore state-level policies that have influenced the underrepresentation of Hispanics in dental schools and identify current institutional strategies to address the problem.

As indicated earlier, the issues raised by the Association of Academic Health Science Centers report "Out of Order and Out of Time" are particularly salient for the dental profession. Some of the concerns raised in this report discuss some of the key relevant issues: 1) raising training costs and financial support; 2) increasing student debt; 3) emphasis on labor market financial incentives; 4) advances in care procedures that impact training an adequate number of dentists to meet the populations' oral health needs; and 5) lack of racial/ethnic diversity in the workforce.[56]

From a workforce perspective the dental profession has the lowest per capita ratio in the growth of dentists compared to other health professions – 0.12 between 1995 and 2007 compared to physicians (1.17), nurse practitioners (9.44) or physician assistants (3.89).[57] Plus, dentistry is the least diverse of the health professions. The American Dental Association and the American Dental Education Association are purported to be committed to increasing diversity in the dental profession.[58]

Nationally and in Texas, dentistry is at a crossroads. With an increasing aging and minority-majority population, and oral health and dental care access needs, Texas' dental infrastructure will be stretched and challenged to effectively address these issues. A report conducted by the Texas Department of State Health Services illustrates that the current supply of general dentists will result in inadequate access to dental care.[59] The current Texas supply ratio of dentist is significantly less than the national average. Consequently, the steady decline in the U.S. supply of dentist, impacted by the disparity of retiring dentists versus graduating dentists, mirrored in Texas, will further exacerbate inadequate access to dental care, especially in rural and border areas.

What are the implications for the Hispanic community given its population growth, oral health and dental care access disparities and inadequate representation in dental school enrollment and practice? The key to addressing the access to and shortage of dentists in underserved areas begins with providing the tools for communities to nurture, educate, and recruit students from those areas into dentistry.

A. Impact of Federal and State-Level Policies to Dental School Diversity

Over the last decade, admissions policies and procedures have been shaped by state and federal policies and decisions on education. In 1996, the Federal Court Decision, Hopwood vs. Texas (*Hopwood Decision*) barred state public colleges from using race-conscious admissions, thereby adding further admission challenges.

According to the U.S. Commission on Civil Rights Report, "The Hopwood decision has had a lasting impact on the participation of minority groups in Texas institutions of higher learning, especially at its flagship institution."[60] Furthermore, "minority undergraduate and graduate enrollment and admissions largely, except for the race instance, declined at Texas' public

institutions."[61] Consequently, schools had to retool race-based outreach and recruitment strategies to increase minority enrollment in higher education. These strategies were reconstituted to reflect targeting the geographic areas of Texas in the hope of targeting minority students.

In response to the Hopwood Decision, the 75th Texas Legislature guaranteed (HB 788) high school students, who graduate in the 'Top 10%' of their class, automatic admissions to a Texas Public University of their choice. But research over the last decade has shown that guaranteeing student admissions did not guarantee students of color would enroll at flagship universities, especially for Blacks and Hispanics. "The elimination of affirmative action has discouraged minority students from applying to the selective universities."[62] The reduction in the use of affirmative action has negatively impacted both recruitment and ultimately access to health care for low-income, minority, and under/uninsured populations.[63]

The 75th session also passed HB 1678 which directed the Texas Higher Education Coordinating Board (HECB) to "develop and annually update a uniform strategy to identify, attract, enroll and retain students that reflect the population of the state" and "implement the uniform strategies and report annually to the Coordinating Board the manner in which the institution has implement the uniform strategy."[64] Under this charge, the development of "Closing the Gap by 2015" identified four key long-term (15 years) goals.

Goal 1: Close the gaps in participation rate across Texas to add 500,000 more students by making a recommendation for high school programs and requiring it for admissions to Texas public universities by 2008.

Goal 2: Close the gaps in success by increasing by 50% the number of degrees, certificates and other identifiable student success from high quality programs by making college and university enrollment and graduation reflect the population of Texas.

Goal 3: Close the gaps in excellence by substantially increasing the number of nationally recognized programs or services at colleges and universities in Texas by requiring colleges and universities to identify at least one program or service to improve to the level of national recognized excellence.

Goal 4: Close the gaps in research by increasing the level of federal science and engineering research funding to Texas institutions by 50% to $1.3 billion by retaining all overhead income from grants and contracts.[65]

During the 2008-2009 legislative session, appropriations for the HECB, was approximately $1.03 billion to implement their five mission directives that included $143 million for "Closing the Gaps-Health Professions" strategies.

Just as strategic efforts to close the gap in Texas for health professions began, schools were dealt a blow with the elimination of federal funding to all 74 Health Careers Opportunity Program (HCOP) programs and 30 of 34 Center of Excellence (COE) programs nationwide. Established over 40 years ago, Title VII - HCOP and COE programs promoted and increased the representation of minorities and disadvantaged students in the health professions through pipeline and recruitment programs. During its tenure, HCOP programs outreached to half a

million students and were the centerpiece for many educational institutions program funding for expanding minorities and underrepresented groups into the health professions.

The three Texas Dental Schools were recipients of HCOP funding, and two (San Antonio and Houston) also received COE support. Given the federal and state budget cuts and inflation of costs, dental schools have changed, reduced, or eliminated diversity-focused programs. Consequently, this has made funding the major issue for school deans.[66] Juggling state fiscal conditions, barriers (revenues, facilities, and faculty) to increase class size, the limitations of the Top Ten Rule, degree reduction in the core sciences, and the state shortage of dentists poses a challenge to increase Hispanic dental school representation.

Nonetheless, the past three decades of experience to increase diversity in health professional schools, including dentistry, makes clear that developing and maintaining multi-pronged strategies is critical to any success.[67] Key components are:

1. Early elementary, secondary, and higher education pipeline interventions and collaborations that expose, motivate, and prepare candidates for dental school;
2. Admission policies that seriously consider and balance cognitive and non-cognitive factors;
3. School institutional policies and culture with committed leadership at the highest levels including explicit mission statements, action plans, and institutional policies that embrace diversity as critical to institutional excellence; and
4. A broader policy support environment from dentists, public representatives, and community leaders.

Additionally, dental school-based initiatives that target underrepresented students must include interview and applicant orientation programs, financial aid and scholarships along with alumni and community leadership involvement.[68] **How are Texas Dental Schools addressing the challenge to increase student diversity in enrollment and ultimately dental practice, particularly among Hispanics?**

B. Texas Dental Schools Diversity Commitment and Admission Process

University of Texas Health Science Center, Dental Branch at Houston (UTDB)

The first and oldest dental school in Texas, its accolades includes the appointment of the first Black Dental School Dean and first female Dean in Texas history. Given the leadership and the mission to provide the highest quality education programs through attracting and retaining high quality culturally diverse faculty, staff and students, the question remains, how well are they doing?

The UTDB recruitment and outreach strategies in recent years have focused on a few key areas. First, recruitment efforts have primarily been conducted through traditional mechanisms of school-based events with pre-dental student organizations in select college campuses, and a health professional advisor. The foci of college campus recruitment star the Texas senior flagship campuses (U.T. Austin and Texas A&M), plus the Historical Black Colleges and Universities, and Hispanic Serving Colleges and Universities in the state.

While the schools' HCOP and COE programs have been eliminated, the Robert Wood Johnson Foundation is providing grant support. As one of twelve funded sites nationally, the Summer Medical Dental Enrichment Program (SMDEP) provides a six-week summer preparatory program for undergraduate students who are pursuing enrollment to a medical or dental school. The SMDEP provides academic enrichment, MCAT and DAT preparation, application process and counseling support that will strengthen the students' competitiveness as candidates for admissions. The program enrolls 20 pre-dental students.

Secondly, UTDB also has a Dental Early Acceptance Program (DEAP) which provides 3-4 students early admittance acceptances if they have a 3.3 GPA and test at the national DAT mean and can submit quality letters of recommendation. Upon acceptance into the program, students are provided key support through prep DAT courses and mentoring while transferring to finish the last year in a dual credits program that will grant them a BA degree from UTDB.

The conventional admissions process for the UTDB is based on an admission team that reviews and processes over 1,200 applications for academic achievement, DAT scores, letters of evaluation, and non-cognitive skills. The UTDB invites over 250 applicants for interviews and approximately 80 are accepted.

In 2007, the UTDB matriculated 83 first-year students, of which, 16% (13) were Hispanics. Since 1997, the first-year enrollment of Hispanics has fluctuated between a low of 3% (2) in 1997 to a high of 18% (12) in 2001. The total number and class size of first-year students has ranged from a low of 59 in 1997 to a high of 93 in 2007. In 2007, Hispanics accounted for 15% (45) of total dental school enrollment of 300 students.

For all enrolled dental students, UTDB also hosts an array of retention programs that include tutoring programs, upper class advising and counseling and student organizations. With very little scholarships available and the first-year tuition for In-state Residents at $11,888 and Non-Resident at $24,988, students look outside the school for financing.

Texas A&M Academic Health Science Center, Baylor College of Dentistry (BCD)

The BCD is the single largest provider of oral health care services in the Dallas/ Fort Worth metroplex. The area is the second largest and diverse Metropolitan Statistical Area in Texas. The BCD espouses a commitment to diversity that reflects the changing demographic face of Texas, dedication to higher education and innovative dental research, as well as increasing access to oral health through community service.

Among the three dental schools visited and interviewed for this descriptive study, the Baylor College of Dentistry has the most integrated plan and comprehensive dental pipeline program for increasing diversity in dentistry. Their success in recruiting and admitting students of diverse backgrounds is reflective of the BCD's philosophy and leadership. As important, is their financial commitment to diversity which is budgeted into BCD operations and allocated from Baylor's endowment.

The diverse outreach strategies and partnership developed along the educational pipeline by the Offices of Recruitment and Admissions and Student Development appears to be leading to a significant increase in enrollment growth of Hispanics. The BCD maintains written agreements with HBCUs and HSCUs.

The BCD's Admission Selection Process is touted as well-round and committed to a students' 'whole file' review process. This approach seeks to identify, interview and admit the most qualified candidates reflecting the diversity of Texas. Candidates are vetted through a focus on academic performance reviews, DAT scores and non-cognitive skills such as knowledge of the dental profession, motivation, leadership, community service and volunteer activities and communication skills.

Upon acceptance, student support services provide tutoring for 1st and 2nd year students who achieve less than 74% on quizzes, exams and labs and access to the 18 student organizations from an array of focus areas including the Hispanic Dental Association.[69] The first-year tuition for In-state residents at BCD, the cheapest in the state, was $8,568 and $24,988 for non-residents.

To attract students from underserved areas into dentistry, BCD established the "Bridge to Dentistry: Awareness to Graduation" program. This comprehensive health careers pipeline program, under the watch of the Office of Student Development, integrates students at all levels of the educational pipeline, (elementary school to Post Baccalaureate) from underserved areas. The Bridge to Dentistry provides career awareness activities, summer enrichment programs for high school and college students that increase their competitiveness for admission to dental school and hands-on mentoring/shadowing with faculty, current students, and alumni.

Project Dental Awareness, a component of Bridge to Dentistry, has annually worked with 4 to 5 Elementary Schools in Dallas Independent School District, where 90% of the student population is largely students of color from underserved areas. Dental career awareness and activities are conducted for Pre-K through 3rd grade. The programs continue to go back to the same schools yearly to identify students who have an interest in dentistry and participating in the Future Dentist Club (4th-6th grade). Campus visits are also a key component for the career awareness for students of all ages and annually provide 500-700 students with dental career exposure.

The *Summer Pre-dental Enrichment Program (SPEP)* is a summer program for disadvantaged high school and college students to prepare, support, and counsel students into dentistry. The high school SPEP programs include:

- *SPEP 10th*- Summer enrichment programs for a week for rising 10th graders (10 students), (includes daily labs).
- *SPEP 11th*- Summer enrichment programs for a week for rising 11th graders (10 students), (includes daily labs).
- *SPEP 12th*- Summer enrichment programs of 5-6 weeks for 12th graders (21 students) interested in dentistry with an expanded program that includes: labs, prep SAT, service learning, and shadowing dentists.
- New to BCD's programs is an initiative that links High School and College by offering students a program setting to take AP classes at a local community college in the

sciences-biology course, while still in high school. This initiative accepts 10 students for the 6 week program.

- *SPEP Collegiate* is an eight week program for 25 Texas college residents who are interested in dentistry by providing 60 hours of course work, clinic rotation, DAT preparation and seminars. The majority of SPEP participants are students of color from underserved areas.

Unlike the Early Admission Program at UTDB and UTHSC-SA, the Post-Baccalaureate Program is an academic year at the University of North Texas for students who applied and were rejected to gain admissions at BCD. The Post-Baccalaureate Program incorporates prep-courses for DAT and 30 upper division credit hours to satisfy the academic requirement for admission. In the 2007 academic year, 13 of 16 program students completed the program and matriculated in dental school in the fall of 2008.

In 2007, the BCD matriculated 95 first-year students, of which, 27% (26) were Hispanics. Since 1997, the first-year enrollment of Hispanics has fluctuated between a low of 3% (2) in 1998 to a high of 27% (26) in 2007. The total number and class size of first-year students has ranged from a low of 79 in 1997 to a high of 95 in 2007. In 2007, Hispanics accounted for 16% (62) of the total dental school enrollment of 377 students.

University of Texas Health Science Center – San Antonio Dental School (UTHSC-SA)

Established in 1969, the UTHSC-SA Dental School enrolled the first class of 16 in 1970. The newest dental education institution in Texas, the entering class for the dental school has grown to approximately 93 students. Similar to the UTDB, the Dental School is under a centralized structure for student recruitment. Within this structure, the Health Science Center Recruitment Committee, chaired by the campus Dean of Academic Administration meets quarterly with all the schools (medicine, dentistry, nursing, allied health, etc.) to plan and share resources and problems regarding recruitment efforts.

After the 2007 budget cuts to HCOP and COE programs, the UTHSC-SA integrated most programs, with a much more limited program capacity, under the Office of Recruitment and Science Outreach.[70] Consequently, any targeted outreach strategy for increasing specific health professions programs were incorporated into broader based outreach strategy for all the schools, inclusive of the dental school.

The Office of Recruitment and Science Outreach provides educational experiences to teach, motivate and guide high school, college and pre-professional students interested in pursing health science careers. As an educational liaison, they seek to: 1) increase awareness of health profession opportunities; 2) increase awareness of specific opportunities at the UTHSC-SA; 3) build and strengthen partnerships with community and educational organizations; and 4) increase community awareness of scientific endeavors and accomplishment of the UTHSC-SA. The Office of Recruitment and Science Outreach reports it has provided outreach to more than 14,000 students in South Texas through a range of programs that include:

- *Campus Visits*- Two hours visitations of all UTHSC-SA schools
- *Open Houses*- School specific, three to five hour visitation with current students, review school's facilities, and provided more in-depth experience information from faculty and staff
- *Summer Initiatives for Undergraduates and High School Students*- provides promising students with paid research positions, mentoring and seminar series
- *Science Expo and Allied Health Fair* – day long event that provides insight into health careers through practical an interactive sessions, admissions information, and lectures
- *Speakers' Bureau*- provides assistance in finding speakers for events from the UTHSC-SA schools
- *Prep-Course Scholarship*- provides scholarship tickets for Kaplan prep-course in students' local area for the GRE, MCAT, and DAT. But due to lack of participation, this program will most likely return to an on-site six week summer intensive program.[71]
- *Med Ed*- An academic program that seeks to encourage and recruit high school students from South Texas into health care professions by providing information and opportunities to prepare students for higher education in an allied health study.
- *Whittier Science Academy*- An academy to increase student's awareness of the health sciences with students from the San Antonio Independent School District.
- *Teach Partnership*- A summer institute that works in partnership with science teachers to provide learning opportunities for teaching new enrichment science activities to use in the classroom setting.

The admissions and recruitment of prospective dental students and the primary assistance for tutoring and student organizational events are the responsibility of the Office of Student Affairs at the UTHSC-SA Dental School. Off-campus recruitment visitations are primarily conducted by the Associate Dean of Student Affairs of the Dental School. The Dean of the Dental School is also increasing efforts to integrate alumni participation throughout the state in the recruitment of underrepresented students by hosting dinner meetings throughout Texas with prospective students, alumni, and the health advisory committee composed of faculty advisors. The health advisors represent the HBCUs and HSCUs with whom the dental school maintains active agreements to assist in the identification of underrepresented students who are interested in dentistry and the Dual Degree/ Early Acceptance (3+4) Program.

Similar to UTDB, the Dual Degree/Early Acceptance (3+4) Program, qualifies students who have at least three years of specialized curriculum 3.4 GPA, score at least 18 on DAT, and submitted a formal dental application into their program that allows students to apply credits earned during dental school to a BA degree while attaining a dental degree. The program accepts between 5 to 15 students annually, mostly Hispanics from south and south-central Texas.

The Dental School admits students on the basis of their competitiveness of undergraduate GPA, evaluation by advisors or professors, extramural achievements, non-cognitive skills and interviews. With an Admissions Review Committee of approximately 20 individuals comprised of the Dean, faculty, students, and private dentists, they process 1,000 online applications and interview 270-300 applicants. Applicants invited for an interview experience a day long event of student interactions, tours and interviews.

Upon acceptance, the retention programs for all enrolled students include tutoring, faculty review sessions, broad-based counseling in study skills and time management, emergency loans, and faculty advisory support. Students at UTHSC-SA Dental School have a variety of opportunities to connect with any of the six dental student organizations, and the outreach and mentoring program with fellow students.

The above programs are part of health careers pipeline interventions at the UTHSC-SA. But due to limited staff resources, the program does not track students who identify an interest in its health professional schools. It is left up to the students to stay connected. The Office also does not work closely with alumni as a tool to increase interest in the health professions or their schools.

The current 2007-2008 UTHSC-SA Dental School Tuition for in-state residents is $11,125 and for nonresidents is $21,925. With little to no scholarship money available for dental students, approximately $120,000 is the required amount to be invested for a dental education at the UTHSC-SA.

In 2007, the SA Dental School matriculated 92 first-year students, of which 8% (7) were Hispanics. Since 1997, the first-year enrollment of Hispanics has fluctuated between a low of 6% (5) in 1997 to a high of 22% (19) in 2000. The total number and class size of first-year students has ranged from a low of 74 in 1998 to a high of 93 in 2007. In 2007, Hispanics accounted for 16% (59) of the total dental school enrollment of 371 students.

Summary

The preceding exploration of Texas dental schools efforts to increase the enrollment of students of color, particularly Hispanics, was not exhaustive. Nonetheless, it is apparent that the Baylor College of Dentistry has the most comprehensive approach and appears to be the most successful. It serves as an example of leadership and commitment throughout the school administration, faculty and staff to increase the diversity of student enrollment, graduation, and practice. It also demonstrates a conceptual understanding of the educational pathway issues and makes the financial commitment for collaboration and career program interventions throughout the pathway.

As communities across the nation experience the health challenges of the 21st century, addressing oral health disparities must be a priority. Increasing the representation of Hispanics in dental school enrollment and practice must be achieved in order to make significant improvements in their oral health and overall well-being. Research has amply demonstrated that dentists from racial and ethnic groups are more likely to treat minority and underserved populations than non-minority dentist.[72]

Fundamentally, the three dental schools are competing for the "most qualified" student from a predominantly static applicant pool. One question arises from this exploration: why have the central schools not come together to formulate a statewide framework and strategic plan? This would best be developed through a transparent process with collaborative partners. including, the involvement of a broad-based constituency from the most underserved communities impacted by dental professional shortages and oral health disparities.

Finally, exploring strategies to increase the number of Hispanics in dentistry is a long-term investment that involves multifaceted components. The case for diversity is supported because it provides advanced educational and professional opportunity, as well as improving public health, it engages civil rights concerns, and certainly provides business and compensation gains.

VII. CONCLUSION

Hispanic representation in dental education and practice has not made any significant improvements over the past decade. The growth of the population and the degree to which it is impacted by oral health and dental care access disparities demands renewed and aggressive attention to this lack of progress.

Hispanics and the dental profession are faced with tremendous challenges. The challenges encompass the critical need to increase the representation of Hispanics in dentistry such that they will have a positive impact on addressing oral health and dental care access disparities. It is important to begin a dialogue among a broad-base of stakeholders to delineate ideas and workable policy strategies and resources to address these issues. The stakeholders should encompass dental educators, dentists, public officials, health delivery organizations, public school and higher education representatives, and community organizations.

The challenges themselves are encased in an environment described as being at a "cross-roads" requiring major reform of dental education and the profession itself, as well as the critical need to address the persistent oral health and dental care disparities that exist.

This environment is mirrored in Texas. Nonetheless, institutions, organizations, and individual must rise to meet the challenges and give renewed attention to increase our capacity to annually graduate more dentists, reduce the dental workforce shortages, and continually improve and eliminate oral health and dental care access disparities. Increasing the number of Hispanic dentist and leadership must be an integral part of this effort.

This descriptive study is intended as a resource to begin a dialogue on these issues. The study does not specifically make recommendations; instead it is intended to be a catalyst for developing a contingency of Hispanics and Non-Hispanics, dental professionals, educators, public officials and others to begin developing policy discussions and recommendations to address the many questions raised here.

BIBLIOGRAPHY

1 Future of Dentist, Today's Vision: Tomorrows Reality, American Dental Association, 2001

[2] Oral Health in American, A Report from the Surgeon General, Department of Health and Human Services, 2000

[3] Disparities in "oral health care" and in "oral health" are not the same. An oral health care disparity refers to differences in coverage, access, or quality of care that is not due to health needs. Oral health disparity refers to a higher burden of oral illness, injury, disability, or possible mortality experienced by one population group in relation to another. The two concepts are related in that disparities in oral health care can contribute to oral health disparities, and the goal of the use of oral health services is to maintain and improve a population's health. However, other factors are also determinants of a population's health, e.g., income, behavior, genetics, etc.

[4] U.S. Census Bureau, Current Population Survey, 2006

[5] Ibid

[6] Out of Order Out of Time: The State of the Nation's Health Workforce, Association of Academic Health Centers, 2008

[7] Dental Health: Nurturing the Healthcare System's Neglected Stepchild, Henry J. Kaiser Foundation Health Cast, July 25, 2008. Comments from Jack Bresch, Director, American Dental Education Association

[8] State Financing of Dental Education: Impact on Supply of Dentist, Journal of Dental Education, 2003, Volume 67, No. 12

[9] The Economic Impact of Dentistry, Journal of the American Dental Association, 2004; 135

[10] U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, and Occupational Employment Statistics Survey

[11] Legislative Appropriate Request: Fiscal 2010 and 2011, Texas A & M Health Science Center, August 2008

[12] Legislative Appropriate Request: Fiscal 2010 and 2011, University of Texas Health Science Center at Houston, August 2008

[13] Legislative Appropriate Request: Fiscal 2010 and 2011, University of Texas Health Science Center at San Antonio, August 2008

[14] Dental Education At The Crossroads: Challenges and Change, Institute of Medicine, National Academy Press, 1995

[15] The Future of Dentistry, American Dental Association, 2001

[16] Dental Work Force Strategies During a Period of Change and Uncertainty, Journal of Dental Education, Volume 65, Number 12, December 2001

[17] Adequacy of Current and Future Dental Workforce, American Dental Association, 2005

[18] The Future of Dentistry, Dental Economics, Part 1 of 4 Series, November 2004

[19] Primary Care Professionals, Recent Supply Trends, Projections, and Valuation of Services, Testimony before the Committee on Health, Labor, and Pensions, U.S. Senate, by A. Bruce Steinwald, Director Health Care, General Accounting Office, February 12, 2008

[20] The Coming Crisis in Access to Oral Health Care, Spec Care Dentist 25(6), 273-274, 2005

(C) La Fe Policy Research and Education Center

[21] Improving the Oral Health Status of All Americans: Roles and Responsibilities of Academic Dental Institutions: The Report of the ADEA President's Commission, Journal of Dental Education, May 2003

[22] The Dental Workforce: Questions and Answers, Journal of American Dental, September 2002, Volume 133, Comments from Kimberly A. Harms, DDS

[23] Hearing on Addressing Health Care Workforce Issues, U.S. Senate Committee on Health, Education, Labor and Pensions, Testimony by James Q. Swift, D.D.S., President, American Dental Education Association, February 12, 2008

[24] U.S. Census Bureau, 2007 Current Population Survey.

[25] Texas State Data Center, Projections Show Rapid Population Growth, Diversification, and Aging, but also increasing disparities in the levels and distribution of the growth, June 208

[26] U.S. Census Bureau, 2007 Current Population Survey.

[27] Ibid

[28] U.S. Census Bureau, Health Insurance:2007

[29] Trends in Oral Health Status: U.S. 1988-1994 and 1999-2004, Data from the Continuous National Health and Nutrition Examination Survey, Vital and Health Statistics, Series 11, No. 248, April 2007

[30] National Health Care Disparities Report, Agency for Healthcare Research and Quality, December 2007; and Disparities in Dental Insurance Coverage and Dental Care Among U.S. Children: The National Survey of Children's Health, Pediatrics, 2008 (121); and Periodontal Disease in Hispanic Americans With Type 2 Diabetes, Periodontal, April 2008; and Access to Dental Care Among Hispanic or Latino Subgroups: United States, 2000 -2003, Center for Disease control, Advance Data, No. 354, May 12, 2005; and Oral Health and Use of Dental Services Among Hispanics, Journal of Public Health Dentistry, 2002, 62 (2)

[31] Testimony to U.S. Senate Committee On Health, Education, Labor and Pensions, James Q. Swift, DDS, American Dental Education Association, February 21, 2008

[32] Giving Policy Some Teeth: Routes To Reducing Disparities In Oral Health, Health Affairs 27, No.2, March/April 2008

[33] Oral Health and Dental Care, Women's Health USA 2007, DHHS/HRSA, Maternal and Child Health Bureau

[34] Access to Affordable Dental Care: Gaps for Low-Income Adults, The Kaiser Commission on Medicaid and the Uninsured, July 2008

[35] Summary Health Statistics for U.S. Adults: National Health Interview Survey, 2005, Center for Disease Control, Vital and Health Statistics, Series 10, No. 232, December 2006

[36] Racial and Ethnic Disparities in Medical and Dental Health, Access to Care, and Use of Services in U.S. Children; and Disparities in Dental Insurance Coverage and Dental Care Among U.S. Children: The National Survey of Children's Health, Pediatrics, 2007 (119) and 2008 (121) respectively

[37] Filling An Urgent Need: Improving Children's Access To Dental Care in Medicaid and SCHIP, The Kaiser Commission on Medicaid and the Uninsured and National Academy for State Health Policy, July 2008

[38] Medicaid: Extent of Dental Disease in Children Has Not Decreased, and Millions are estimated to Have Untreated Tooth Decay, General Accounting Office, September 2008

[39] Oral Health in Texas, Texas Department of State Health Services, 2007

[40] The Oral Health of children: A Portrait of States and the Nation 2005, The National Survey of Children's Health, U.S. DHHS/HRSA, Maternal and Child Health Bureau, 2007; Keep American Smiling: 2003 Oral Health Report Card, and A State of Decay: The Oral Health of Older Americans 2003, Reports from Oral Health in America, Campaign for Oral Health Parity 2005

[41] Linda Frew v. Albert Hawkins, U.S. District Court for Easter District of Texas, August 19, 2005

[42] Filling An Urgent Need: Improving Children's Access To Dental Care in Medicaid and SCHIP, The Kaiser Commission on Medicaid and the Uninsured and the National Academy for State Health Policy, July 2008

[43] National Oral Health Surveillance System, Center for Disease Control, 2004

[44] The Growing Challenge of Providing Oral Health Care Services To All Americans, Health Affairs, Volume 21, No. 5, 2002

[45] Reforming Dental Health Professions Education: A White Paper, Journal of Dental Education, November 2004

[46] Texas Board of Dental Examiners (TBDE), 2007. Notes: The "10,748 dentists" is derived from the list provided by TBDE and includes only those classified as "active", have at least one address in Texas, and are not classified as "faculty", "military", "resident", or retired.

[47] Ibid

[48] Ibid

[49] Notes: The TBDE does not maintain an identifier for the race or ethnicity of licensed dentist. The "Spanish surname" method was used to identify how many of the dentist in Texas with an active license are Latino. The LAST NAME of the dentists was compared with a list, created by the U.S. Census Bureau (Technical Working Paper, March 1996). The process resulted in identifying **955** dentists as Latinos from the 12,215 surnames that are "heavily Hispanic". A similar method was used in The Rise and Fall of the Latino Dentist Supply in California: Implications for Dental Education, Journal of Dental Education, February 2007. **Nine** dentists, whose names were not on the list, were categorized as Latino because they have a traditional alternative spelling to a surname on the list. The addition of these names brought the total of Latinos to **961**. Of the 961, **10** are women whose FORMER LAST NAME is not a "Spanish surname" and their current LAST NAME is. Another **38**, of the 961, are women who's FORMER LAST NAME is a "Spanish surname" while their current LAST NAME is not.
The location of practice, economic region and metropolitan statistical area, was configured using COUNTY 1, if not available, COUNTY 2 was used. If there was no's county name identified than the county containing the CITY was used.

[50] Texas's Economic Regions are designated by the office of the Texas Comptroller of Public Accounts. http://www.window.state.tx.us/

[51] Texas Board of Dental Examiners (TBDE), 2007

[52] Fox, Karen. *Forum looks at increasing diversity in dental profession*. May 26, 2006. Accessed from http://www.ada.org/prof/resources/pubs/adanews/adanewsarticle.asp?articleid=1928 August 2008

[53] Texas Board of Dental Examiners (TBDE), 2007

[54] Texas Dept of State Health Services, Highlights: The Supply of General Dentist in Texas- 2006, March 2007

[55] Texas Board of Dental Examiners (TBDE), 2007

[56] Out of Order Out of Time: The State of the Nation's Health Workforce, Association of Academic Health Centers, 2008

[57] Testimony, U.S. Committee on Health Education, Labor, and Pensions, U.S. Senate, A. Bruce Stainwald, Director Health Care, General Accountability Office, February 12, 2008

[58] Increasing Diversity in the Dental Profession, American Dental Association, Outreach Forum, April 26, 2006; and Underrepresented Minority Dental School Enrollment: Continue Vigilance Required, Journal of Dental Education, Volume 68, No. 10, 2005

[59] Texas Dept of State Health Services, Highlights: The Supply of General Dentist in Texas- 2006, March 2007

[60] Toward An Understanding of Percentage Plans in Higher Education: Are they Effective Substitutions for Affirmative Actions, U.S. Office of Civil Rights, 2000

[61] Ibid

[62] Schmidt, Peter, The Chronicle of High Education, Educational Equality, Politics and Policy in Texas, 3/30/08

[63] Race-Neutral Versus Race-Conscious Workforce Policy To Improve Access to Care, Health Affairs, Volume 27, No.1, January/February 2008

[64] A Uniform Recruitment and Retention Strategy, Texas Higher Education Coordinating Board- Access and Equity Division, April 20, 2000

[65] Closing the Gaps- the Texas Higher Education Plan 2015, Texas Higher Education Coordinating Board,

[66] Dental Education at the Crossroads: Challenges and Changes, Marilyn J. Field, Editor; Committee on the Future of Dental Education, Institute of Medicine, 2005

[67] Disparities In Human resources: Addressing the Lack of Diversity In The Health Professions, Health Affairs, Volume 27, No.2, March/April 2008

[68] Effective Recruitment and Retention Strategies for Underrepresented Minority Students: Perspectives from Dental Students, Journal of Dental Education, October 2003

[69] Texas A&M Health Science Center Baylor College of Dentistry, website-www.tambcd.edu

[70] Dr. Denee Thomas, UTHSC-SA Dental School, Interview, 7/17/2008

[71] UTHSC-SA, Office of Recruitment and Science Outreach Brochure

[72] Race-Neutral Versus Race-Conscious Workforce Policy To Improve Access to Care, Health Affairs, Volume 27, No.1, January/February 2008; and Disparities In Human resources: Addressing the Lack of Diversity In The Health Professions, Health Affairs, Volume 27, No.2, March/April 2008; and The Need for Diversity in the Health Professions, Journal of Dental Education, Volume 67, No. 9, September 2003; and Disparities in Patient Experiences, Health Processes and Outcomes: The Role of Patient-Provider Racial, Ethnic, and language Concordance, The Commonwealth Fund, July 2004