2009 – 2010

TEXAS STATE

HEALTH PLAN

UPDATE

Ensuring a Quality Health Care
Workforce for Texas

Statewide Health Coordinating Council

TEXAS STATEWIDE HEALTH COORDINATING COUNCIL
P.O. Box 149347
Austin, Texas 78714-9347

The Honorable Rick Perry
Governor of Texas
State capital
Austin, Texas 78711

Dear Governor Perry:

On behalf of the members of the Statewide Health Coordinating Council, we are pleased to forward the 2009 – 2010 Texas State Health Plan Update to you. The Council has chosen to study and evaluate non-traditional and innovative delivery models and the mix of qualified health professionals that would be required for these models.

As legislators and other health policy makers are faced with rapid changes in the health care delivery system, this update attempts to identify some of the opportunities and challenges in the non-traditional and innovative delivery models. Research by members and staff has resulted in an update on the regional simulation center training model, the healthcare workforce status and recommendations for consideration by policy makers.

Sincerely,

Ben G. Raimer

Ben G. Raimer, M.D., Chair
Statewide Health Coordinating Council

Enclosure

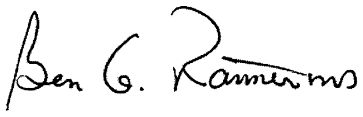
STATEMENT OF THE CHAIRMAN

The 1999-2004 *Texas State Health Plan* was the state's initial fundamental health workforce planning document. It was developed by the Statewide Health Coordinating Council (SHCC) in 1998 and envisioned a Texas in which all citizens were able to achieve their maximum health potential. However, ten years later, due to a myriad of factors and circumstances, Texas continues to be challenged to meet its current health care workforce needs and the anticipated needs for future generations.

Because of these challenges, SHCC members felt that it was necessary to consider a new approach in developing the 2005 – 2010 Texas State Health Plan. They chose to direct their efforts toward the study and evaluation of non-traditional and innovative delivery models and the mix of qualified health professionals that would be required for these models. This approach was in contrast with earlier SHCC activities that involved evaluating the number and types of health workers required to fulfill the requirements of the current traditional medical model. SHCC followed the same new approach in the development of the 2009-2010 Texas State Health Plan Update.

SHCC conducted an extensive assessment of health workforce issues that culminated in 2006 with the hosting of a Health Workforce and Health Information Technology Summit. In August 2008, SHCC continued this assessment by conducting a survey on the use of simulation centers in the training of Texas health professionals. Both the summit and the simulation survey support the need for fundamental system change within the health care delivery system, the method of training utilized in the initial and continuing education of health professionals and the policy environment that supports this type of training. Consequently, the 2009-2010 *Texas State Health Plan Update* continues to focus on innovative approaches to the recruitment and retention of health care professionals, the use of non-traditional models for their education and training, and new approaches needed in the regulation of the Texas health care workforce.

SHCC is committed to the belief that a healthy Texas can be a productive Texas and envision a Texas in which each person enjoys optimal health status, is informed, and is productive. We continue to believe that the recommendations included in the 2009-2010 *Texas State Health Plan* Update place Texas on the right track in preparing our state for its future.



Ben G. Raimer, M.D., Chairman
Texas Statewide Health Coordinating Council

Statewide Health Coordinating Council

Vision Statement

We envision a Texas in which all are able to achieve their maximum health potential – A Texas in which:

- Prevention and education are the primary approaches for achieving optimal health.

- All have equal access to quality health care.

- Local communities are empowered to plan and direct interventions that have the greatest impact on the health of all.

- We, and future generations, are healthy, productive and able to make informed decisions.

A Healthy Texas is a Productive Texas

2009 – 2010
TEXAS STATE HEALTH PLAN UPDATE
TEXAS STATEWIDE HEALTH COORDINATING COUNCIL
November 2008

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Foreword

The *Texas State Health Plan* is prepared every six years and updated biennially. The plan serves as a guide to help Texas decision makers formulate appropriate health policies and programs.

The Texas Statewide Health Coordinating Council, a 17-member council with 13 members appointed by the governor and four members representing specified state agencies, develops the plan. The Texas Health Planning and Development Act, Chapter 104 of the Health and Safety Code, is the enabling legislation for the Statewide Health Coordinating Council. Under the authority of Chapter 104, the governor, with the consent of the senate, appoints the 13 council members to staggered six-year terms. The heads of the four state agencies serve on the council or designate an individual to serve on their behalf.

The broad purpose of the Statewide Health Coordinating Council is to ensure that health care services and facilities are available to all Texans through health planning activities. Based on these planning activities, the council makes recommendations to the governor and the legislature through the *Texas State Health Plan*. The council provides overall guidance in the development of the *Texas State Health Plan*, submission of the plan to the governor, and promoting the implementation of the plan. The plan is due to the governor for adoption by November 1 of each even-numbered year. Staff in the Center for Health Statistics, with assistance from other program areas at the Texas Department of State Health Services, supports the council's activities.

The 75th Legislature amended Chapter 104 of the Health and Safety Code and focused the council's planning activities on the health professions workforce. The council produced the *1999–2004 Texas State Health Plan: Ensuring a Quality Health Care Workforce for Texas,* which was the fundamental plan for the previous six-year planning cycle. The *2005–2010 Texas State Health Plan,* which was presented to Governor Rick Perry in October of 2004, serves as the initial document and fundamental plan for the current six-year planning cycle and once again focuses on the Texas health workforce. For the purposes of this report, the *2005–2010 Texas State Health Plan* is referenced as the *State Health Plan.*

The *State Health Plan* outlines Texas' interests in issues concerning the workforce in the health professions. The 2009 – 2010 *Texas State Health Plan Update (2009-2010 Update)* is the

last biennial update to the *State Health Plan.* The plan includes three sections. Section One is a White Paper entitled: *How can Texas Maximize the use of Regional Interdisciplinary Simulation Centers in the Initial and Continuing Education of Texas Health Professionals, While Supporting Innovative Educational Research and Promoting Excellence in Health Professions Education, Patient Safety and Training Assessment?* Section Two is a report produced by the Health Professions Resource Center, Center for Health Statistics, Texas Department of State Health Services entitled: *Promoting Excellence Through Healthcare Workforce Planning in Texas.* Section Three is the 2009-2010 Update recommendations for the General Workforce, the Nursing Workforce and the Primary Care Workforce.

The *2009-2010 Update* will be presented to the governor on October 31, 2008. Copies of the plan will be distributed to state legislators, universities, licensing boards, professional associations, and other interested parties and will be posted on the Web site at http://www.texasshcc.org or http://www.dshs.state.tx.us/chs/shcc/default.shtm. The *State Health Plan* and the *2009-2010 Update* will serve as two of the state's fundamental documents for information on the health professions and workforce planning. The plan and updates include input from major stakeholders throughout the state, including professional associations, state agencies, employers of health professionals, educators of health professionals, and numerous other public and private entities.

Copies of the 2005-2010 Texas State Health Plan and the 2009 – 2010 Texas State Health Plan Update *can be downloaded from the Web site at* http://www.TexasSHCC.org or at http://www.dshs.state.tx.us/chs/shcc/default.shtm. *Printed copies of the documents are also available from the Texas Department of State Health Services, Center for Health Statistics, at a cost of $20 per copy. To order a document copy, call* (512) 458-7261.

Executive Summary

The workforce policy question the Statewide Health Coordinating Council (SHCC) addressed in the *1999–2004 Texas State Health Plan: Ensuring a Quality Health Care Workforce for Texas* is whether or not the current and future supply of health care professionals in Texas will be adequate to meet the current and future needs of the population. The *1999–2004 Texas State Health Plan* was the state's first fundamental health workforce-planning document incorporating policy, research, and a strategic plan with goals, objectives and strategies.

In early 2003, the SHCC began to consider the approach it would take during the current six-year planning cycle and the production of the *2005-2010 Texas State Health Plan.* Due to critical health workforce shortages and the challenges of changing demographics, the members felt that it was necessary to take a step back and consider a slightly different approach. Rather than continue to look only at the health workforce that would be required to fulfill the current traditional medical model, the SHCC decided to research innovative delivery models and the mix of health professionals required to ensure a quality health workforce under a non-traditional delivery model. This model would focus on "wellness" and on the implementation of evidence-based protocols.

In October 2004, the SHCC presented the *2005-2010 Texas State Health Plan* to Governor Rick Perry. This document, which presented innovative approaches to health workforce planning for Texas, continues to serve as the fundamental health workforce strategic plan for the state. The SHCC incorporated numerous recommendations utilizing information technology to ensure that Texas has a quality health care workforce for the present and future.

Identification of Issues

In order to establish a basis for the development of the *2009–2010 Texas State Health Plan Update* (*2009-2010 Update*), an extensive assessment of issues concerning the health workforce and the use of regional interdisciplinary simulation centers was conducted. The SHCC chose to approach the last biennial update from two perspectives. First, they

identified the most critical health workforce issues that remain unresolved from the previous six-year planning cycle: ongoing and increasing workforce shortages across numerous health professions, the demand for an expanded workforce required to care for a burgeoning aging and disabled populations, and the critical nursing shortage. The second issue was to identify ways in which regional interdisciplinary simulation centers could be used to support the health care workforce. This would include an assessment of how simulation centers could be used to prepare the current and future health professionals to practice safely and effectively in a technology-rich environment.

Section 1 of the *2009–2010 Update* will focus on a white paper that was written in response to simulation center survey that was sent to the Texas medical, dental, pharmacy and nursing programs in August 2008. The white paper is entitled, "How can Texas Maximize the use of Regional Interdisciplinary Simulation Centers in the Initial and Continuing Education of Texas Health Professionals, While Supporting Innovative Educational Research and Promoting Excellence in Health Educational Research and Promoting Excellence in Health Professions Education, Patient Safety and Training Assessment?"

Demographics

Changes in the rates and sources of population growth, increases in the non-Anglo population, aging of the population, and change in the household composition of Texas families are major demographic trends that will affect the future of health care delivery in Texas. Using the U.S. Census count for 2000, 53.1 percent of the Texas population was Anglo, 11.6 percent was Black, 32.0 percent was Hispanic, and 3.3 percent was Other. By 2004, it is estimated that those percentages changed in Texas to 49.9 percent Anglo, 11.4 percent Black, 34.9 percent Hispanic, and 3.8 percent Other. Based on the Texas State Data Center's population projection 1.0, in 2040 those numbers will be 23.9 percent Anglo, 8.0 percent Black, 59.2 percent Hispanic, and 8.8 percent Other.[1]

Although minority populations are growing at a tremendous pace, they remain seriously underrepresented in the health care professions. In Texas, while it is estimated that Hispanics constitute 34.9 percent of the population, they make up only 8.5 percent of registered nurses and only 11.2 percent of direct patient care physicians. Non-Hispanic

African Americans are estimated to constitute 11.4 percent of the population, yet make up only 7.6 percent of registered nurses and 4.3 percent of direct patient care physicians.[2]

The Texas population of those over age 65 is expected to double from 2000 to 2040. Other sources project that this population will triple during this time frame. Health care for persons over 65 is commonly projected to cost three times as much as for those under 65. The aging of the population and the increase in the Hispanic population pose numerous implications for the incidence of chronic disease. It is well documented that treatment for chronic diseases is the most costly aspect of medical care. Some project that 90 percent of Medicare expenditures are spent for the management of chronic disease. At the same time, the incidence of chronic disease is increasing in all age groups due to the obesity epidemic.

Texas is the second-largest state in the United States, second only to California, and continues to be the second-fastest growing state in population. Currently, about 22.8 million people live in Texas. The Texas population is increasing at a rate roughly twice that of the nation as a whole and is second only to California in population growth. Texas has the distinction of having one of the fastest growing youth (18 and under) populations as well as one of the fastest growing aging populations (60 and over). Forecasts predict that the Texas population will reach 35.8 million by 2030.[3] The projected rates of growth in the youth and elderly populations and in minority populations will result in increased demand for health services. This increase in demand and the special health care needs of these populations must be taken into consideration in the planning and preparation of the health care workforce.[4]

Status of the Texas Health Workforce

Section 2 provides detailed information on health professions that are licensed in Texas. In addition to reporting the supply of health professionals practicing in Texas in 2007 for each of these professions, this report also shows the trends in the supply of the various providers over the last two decades, and compares those trends with the national trends. While these comparisons may not indicate whether or not Texas has a shortage of health professionals, they do show where the supply of health professionals in Texas is above or below the national average and whether the supply of those professionals in Texas and the United

States has been increasing or declining over the years. Additional information about the individual professions is provided in Appendix B. Most of the data are presented as ratios and reflect the number of providers per 100,000 population. This allows comparisons to be made between areas with different populations, such as the United States and Texas or metropolitan counties and non-metropolitan counties. The provider-per-population ratio is a more accurate indicator of the supply of health providers in a given area than is the raw number of health providers. The higher the ratio, the greater the supply of health professionals available in an area for providing health care services.

Ratios are presented for Texas and the United States and for various geographic locations in Texas: metropolitan and non-metropolitan counties, border and non-border counties. The 43-county border area was defined by the state legislature and a map of this area is provided in Figure 2.1. The following is a summary of statistics presented in Chapter 2.

- Supply ratios vary according to geographic location:
    - Metropolitan county ratios are higher than non-metropolitan county ratios.
    - Non–border county ratios are higher than border county ratios.
    - Pharmacist ratios in non-metropolitan areas are decreasing more rapidly than pharmacist ratios in metropolitan areas.
- Over the past decade, Texas supply ratios have differed from U.S. average ratios as follows:
    - PC physician ratios in the United States have consistently exceeded the ratios of PC physicians in Texas; however, four years ago, the gap between the two began to widen. Metropolitan ratios are considerably larger than non-metropolitan ratios.
        - Supply ratios for pediatricians per 100,000 children and internal medicine physicians have been well below the United States supply ratios over the past 20 years.
        - Supply ratios for family practice physicians have been similar to United States ratios.

- Registered Nurse (R.N.) supply ratios in the United States have consistently exceeded the supply ratios in Texas for the past 20 years and will for the foreseeable future.
- Licensed Vocational Nurse (L.V.N.) ratios in the United States have consistently been lower than the Texas ratios for the past 20 years. In contrast with R.N. ratios, L.V.N. ratios in non-metropolitan areas in Texas are higher than ratios in metropolitan ratios.
- Medical Radiologic Technician ratios were below United States average ratios between 1994 and 2001; however, since that time Texas ratios have been increasing faster than United States ratios.
- The ratios for most of the other Texas-licensed health professions are below the United States average ratios.
- Dentist supply ratios in the United States have consistently exceeded the supply ratios in Texas for the past 20 years and the numbers both in the United States and Texas have remained virtually flat since 1998.
- Pharmacist ratios in non-metropolitan areas have been lower than the ratios in metropolitan areas for over 20 years. This gap is widening and the supply of pharmacists in non-metropolitan areas appears to be decreasing more rapidly than the supply in metropolitan areas.
- Psychiatrist supply ratios have remained flat in Texas since 1998 and are lower than in 1992.

Some counties in Texas have been chronically short of various health professions; other counties have never had various types of professionals employed in their area and may not have the population to support those professions. L.V.N. is the most widespread profession throughout the state, with only seven of 254 counties having no providers from this profession. In contrast, Certified Nurse-Midwife is the least widespread profession with 214 counties not having a representative from this profession.

As far as primary care providers are concerned, non-metropolitan areas have only 11 percent of the state's primary care physicians, but have 13.6 percent of the population. Metropolitan areas have 89 percent of the primary care physicians, but only 86.4 percent of the population. In addition, the growth rate of Nurse Practitioners (N.P.s) and Physician

Assistants (P.A.s) in Texas has greatly exceeded the growth rate of primary care physicians. Some of that increased growth rate of P.A.s can be attributed to their increased growth rate in non-metropolitan areas, compared to the rate in metropolitan areas:

- N.P.s increased their supply ratios at a rate eight times faster than physicians (185 percent compared to 23 percent);
- P.A.s increased their supply ratios at a rate nine times faster than physicians (207 percent compared with 23 percent).

Recommendations Regarding the State Health Workforce Initiatives

Section 3 of the 2009-2010 Update will focus on the SHCC recommendations to the legislature. Recommendations are suggested for the general workforce, the nursing workforce and the primary care workforce. The SHCC believes that recommendations being made are essential to fulfill workforce goals and thereby ensure a quality workforce for Texas.

Notes

1. Eschbach, K., Projected Proportion of Population by Race/Ethnicity in Texas, 2000-2040. Texas State Data Center data presented to the Texas Health Care Policy Council, Austin, TX.
2. Brian King, Texas Department of State Health Services, Center for Health Statistics, Health Professions Resource Center, data confirmed verbally to Bobby D. Schmidt, M.Ed., September 30, 3008; Austin, TX.
3. Texas State Data Center, University of Texas at San Antonio, Website statistics. Available online at: http://txsdc.utsa.edu .
4. Ibid.

SECTION 1

WHITE PAPER

How Can Texas Maximize the Use of Regional Interdisciplinary Simulation Centers in the Initial and Continuing Education of Texas Health Professionals While supporting Innovative Educational Research and Promoting Excellence in Health Professions Education, Patient Safety and Training Assessment?

A Paper Produced by the Statewide Health Coordinating Council

September 2008

White Paper: How can Texas Maximize the use of Regional Interdisciplinary Simulation Centers in the Initial and Continuing Education of Texas Health Professionals, While Supporting Innovative Educational Research and Promoting Excellence in Health Professions Education, Patient Safety and Training Assessment?

Introduction

The broad purpose of the Statewide Health Coordinating Council (Council) is to ensure that health care services and facilities are available to all Texans through health planning activities. Based on these planning activities the Council makes recommendations to the state leadership through the *Texas State Health Plan.* The State Health Plan outlines Texas' interests in issues concerning the workforce in the health professions.

Texas is a major provider of medical and health education through its system of publicly funded health science centers, universities and community and technical colleges. Texas is a major purchaser of health care services through the state's Medicaid program and other public health care programs, as well as a provider of such services through its system of publicly funded medical schools and hospitals. Texas has the responsibility for the health, safety and welfare of its residents.

The Council's charge has been expanded to also focus its planning activities on the health professions workforce. For the past decade the Council has studied trends in health professions workforce needs in the state. To assess the needs of the Texas health professions' workforce, the Council's first priority was to adopt standard terminology and to encourage the adoption of systems that permit the inventory and tracking of workforce trends. Rather than continue to look only at the health workforce that would be required to fulfill the requirements of the current traditional medical model, the Council decided to research and consider innovative delivery models and the mix of health professionals that would be required to ensure a quality health workforce under a non-traditional delivery model.

This report will provide additional information to the recommendations in the *Texas State Health Plan* and will explore the use of regional interdisciplinary simulation centers in the initial and continuing education of Texas health professionals, while supporting innovative

educational research and promoting excellence in health professions education, patient safety, and training assessment. The Statewide Health Coordinating Council has partnered with the Texas Health Care Policy Council, the Health Professions Resource Center, the Texas Center for Nursing Workforce Studies Advisory Committee, and academic institutions in medicine, dentistry, pharmacy and nursing to provide input and assess the information regarding this issue.

Simulation – What is it?

Simulation is a training and feedback method in which learners practice tasks and processes in lifelike situations using mannequins, or virtual reality, with feedback from instructors, observers, peers, actor-patients, and video cameras to assist in the improvement of skills.

The potential applications for using simulation as an educational and assessment tool are expanding as research begins to show promise for this valuable training tool. Simulation can be used to improve clinical decision making and psychomotor skills. Simulation reduces medical error through improved teamwork. Scenarios can be created to expose health professionals to rare but critical clinical situations that may require specialized training. Educators can reproduce the same curriculum or set of events for all students. Training can be conducted in a setting that minimizes the time pressures of a clinical setting. Students are able to make mistakes and learn from them without any risk to patients, and then use what they have learned in real-life situations. Simulation allows the learner to review and practice procedures as often as required to obtain proficiency without harming the patient.

Simulation centers enhance teaching-learning strategies by developing and maintaining proficiency in five core areas. These are delivering patient-centered care, working as part of interdisciplinary teams, practicing evidenced-based care, focusing on quality improvement, and using information technology. Simulation centers are training and assessment centers that include the following simulation technologies: standardized patients, electromechanical human patient simulators, virtual reality programs/simulators, computer assisted instruction, and telecommunication equipment to link laboratory to classroom.

Simulation centers are designed to replicate a clinical setting. The design can include areas or sections for intensive care (trauma modules), obstetrics (birthing simulator), medical/surgical, pediatrics, standardized patient room, apartment (homecare/community based/mental health simulation), multipurpose classroom (conference/lecture/debriefing area), computer classroom (virtual learning and computer assisted instruction program) and simulation control rooms. Cost of the simulation center will vary according to design of the facility and type of equipment purchased.

Survey of Simulation Centers in Texas Medical, Dental, Pharmacy and Nursing Schools

On August 11, 2008, an electronic survey was sent by email to the deans or directors of the medical, dental, pharmacy, and nursing schools in Texas requesting information about the availability and use of clinical simulation centers, evidenced-based research on simulation training and the cost of simulation training. The survey was sent to seven medical schools with two responses, three dental schools with one response, six pharmacy schools with one response, and seventy-five nursing schools with 45 responses.

The following information is a summary of the responses received.

Utilization: Of the institutions responding to the survey:

100% utilized the simulation center for the initial training of students

23% utilized the simulation center for continuing education of the graduates or others

33% utilized the simulation center for distant or web-based learning

13% utilized the simulation center for regional training

46% utilized the simulation center for interdisciplinary training (nursing/allied/Medical students)

66% do not currently share the simulation center with other organizations or community groups

Types of Equipment: Of the institutions responding to the survey:

16% use advanced patient simulators

14% use Computer generated scenarios

13% use simulated clinical environments

12% use IV catheter hand

10% use Partial task trainer

9% use simulated patient actors

9% use Video critique

7% use OB/GYN

5% use Video procedure stations

Faculty/Student Ratio: Of the institutions responding to the survey

56% use 1 – 10 ratios

25% use 1-5 ratios

10% use 1 -20 ratios

Hours per week simulation center used with course instruction:

54% use 15 – 20 hours per week

18% use 25 – 30 hours per week

10% use 30 – 40 hours per week

8% use 20 – 25 hours per week

5% use 40 – 50 hours per week

2% use 50+ hours per week

Funding Source:

23% combination of public, private and grant funding

15% public funding

12% private funding

12% Grant funding

Type of Credentials of Faculty:

46% Graduate level

32% Baccalaureate level

17% Doctorate level

Annual Budget:

Range of $5,000 to $500,000

Anticipated Annual Equipment Cost (Maintain/Replace:

Range of $500 to $300,000

Square Footage of Simulation Center:

Range of 750 sq.ft. to 14,000 sq.ft.

Impact Studies:

Several impact studies or success measurements were reported by those institutions that responded to the survey. These studies reveal that use of simulation in the training of health professionals both regionally and locally have an enormous amount of influence on the retention of what they have learned. These include:

- A study where a control group use of simulation for 50 percent of the clinical training – these students performed as well or better than students with traditional clinical training on standardized tests.
- Students have reported and faculty has verified that students are much more confident as they go to clinical rotations after simulation labs.
- There is a positive correlation between simulation use and clinical performance.
- Faculty and students report a faster adaptation to clinical care.
- A study on using simulations in lieu of 50 percent of clinical training produced statistical results that indicated as good or better student outcomes with 50 percent simulations than with 100 percent traditional training
- A study that demonstrated simulation resulted in a higher student critical and reflective thinking.

Outcome Variable Measurement (e.g., confidence, speed, accuracy, teamwork, etc.)

Institutions reported several outcome variables that are being measured. These measurements indicate that simulation training is allowing for a more proficient and prepared graduate. These include:

- The retention rate attributed to simulation is 90 percent for the skills course.
- There is a greater confidence and competence in specific clinical skills.
- Confidence rates measured in student evaluations have positive results over 80 percent of the time.
- Accuracy rate measured in skills testing results in a passing grade over 95 percent of the time.
- Faculty report that students have improved in critical clinical thinking skills.
- Teamwork, accuracy and confidence have all increased as a result of the simulation lab.
- Faculty has measured an increase in skills confidence and clinical problem identification.
- Students are more comfortable and confident with critical clinical thinking.
- Outcome results measured positively for realism, value of experience, critical thinking, incorporation of theory and safe learning experience.

Evidenced-Based Research:

Several organizations have initiated evidence-based research projects. Evidence-based research leads to best practices being incorporated into training programs and general and specialty practice settings. Evidence-based research that was reported as either recent or current research projects included:

- A study was done with generic AD and mobility students (licensed vocational nurses that were upgrading to registered nurses). The quasi-experimental design showed that there was no significant difference in performance. However, the students who had simulation performed better than those who did not. The biggest stumbling block to this regional simulation lab was scheduling of students. Many times evening hours is the only time available.
- Improving resuscitation team response to inpatient critical events by simulation
- Elucidation of human factors involved in team performance and effectiveness in critical clinical events and implementation into medical education, hospital regulations and policies

- Assessment of how simulation influences anxiety and confidence of health professionals
- Ob/Gyn boot camp using high fidelity human simulators: what is the role of simulation in Ob/Gyn residents' perceived competency, confidence in taking a leadership role, and stress hardiness?
- Development and validation of SimCom-T: an instrument for measuring medical team communication as a unit during team training and assessment
- Using simulation to teach clinical ethics, professionalism and cultural awareness to undergraduate and graduate medical learners
- Effects of simulation on residents' self assessments of technical and non-technical competencies

Policy Decision Suggestions for the Enhancement of the use of Simulation:

Many organizations suggested principles and/or opinions that could evolve into policy statements or recommendations. These include:

- There should be strategies for the sharing of faculty in regional interdisciplinary simulation centers across the state.
- There should be standardized faculty education related to the use of simulation.
- There should be a defined statement of the percentage of clinical training and simulated training that has been shown through evidence-based research to be the most effective for health care professionals.
- There should be evidenced-based, expert reviewed scenarios used in the simulation process.
- There should be increased funding for the health care professional team based regional training programs that use advanced technology, such as simulation in their training programs.

Conclusion

The education of the health professional workforce in Texas increasingly requires regional interdisciplinary training. Regional simulation centers located in health science

centers, universities, community and junior colleges and hospitals provide students with opportunities for self-directed and facilitated learning utilizing the latest educational technology. This can be realized through academia coordination, collaborative and innovative models of education, cooperation through the regionalization of simulation centers and the commitment of partnerships that can bring about creative funding that promotes excellence in health professions education, patient safety, and training assessment.

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SECTION 2

PROMOTING EXCELLENCE THROUGH HEALTHCARE WORKFORCE PLANNING IN TEXAS

A Report Produced by the
Health Professions Resource Center
Center for Health Statistics
Department of State Health Services
and the
Statewide Health Coordinating Council

February 2008

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INTRODUCTION

The importance of access to health care services cannot be overstated. Every person at some point in life will need access to one or more health providers. However, access to these providers could be adversely affected by factors beyond the person's control, such as provider acceptance of health plans, distance to the provider, and adequacy of the supply of providers. By reporting on demographic trends and the supply and distribution of health professionals by geographic region, researchers, legislators and state planners may better understand and influence access to health care services by Texans.

Statistics

The data in this chapter and the Appendix describe trends in the supply and distribution of various types of health care providers and compare these trends to national averages. The statistics are presented as narratives, tables, graphs, and maps. Most of the data are presented in the form of ratios: the number of providers in a given health profession divided by the population of the area being evaluated, multiplied by 100,000. These ratios were used to compare supply and distribution trends among various populations and areas over time. High ratios indicate there are more providers who are available to serve the population in an area; low ratios indicate there are not enough providers to serve the population. Although ratios are simplistic measures of provider supply adequacy, they are good indicators that, when observed over time, may be used to signal the need for conducting more extensive and comprehensive workforce studies.

Data and sources

Supply data for Texas were collected from state licensing boards. All statistics in this report were based on professionals who were actively practicing in Texas for a given year. The U.S. supply data shown in the graphs were obtained from the U.S. Bureau of Health Professions and some national professional organizations. U.S. data were not available for all professions, and for many professions, the most current U.S. data available were not as recent as the current Texas data. This is partially due to the fact that the U.S. Bureau of Health Professions no longer collects these data. For Texas, there were also some years where supply data were not available. The years for which actual data were used in this report are indicated on the graphs by data markers. The supply ratios for providers in each county for all available years may be found online at: http://www.dshs.state.tx.us/CHS/hprc/.

Texas population numbers used to calculate ratios were estimates provided by the Texas State Data Center at The University of Texas at San Antonio (TXSDC, http://txsdc.

utsa.edu/). Population numbers for the census years 1990 and 2000 were actual counts. The estimates for a given year may not necessarily match estimates in other reports or Web sites because estimates are revised periodically by the TXSDC. The population data used for national statistics were obtained from the U.S. Bureau of the Census.

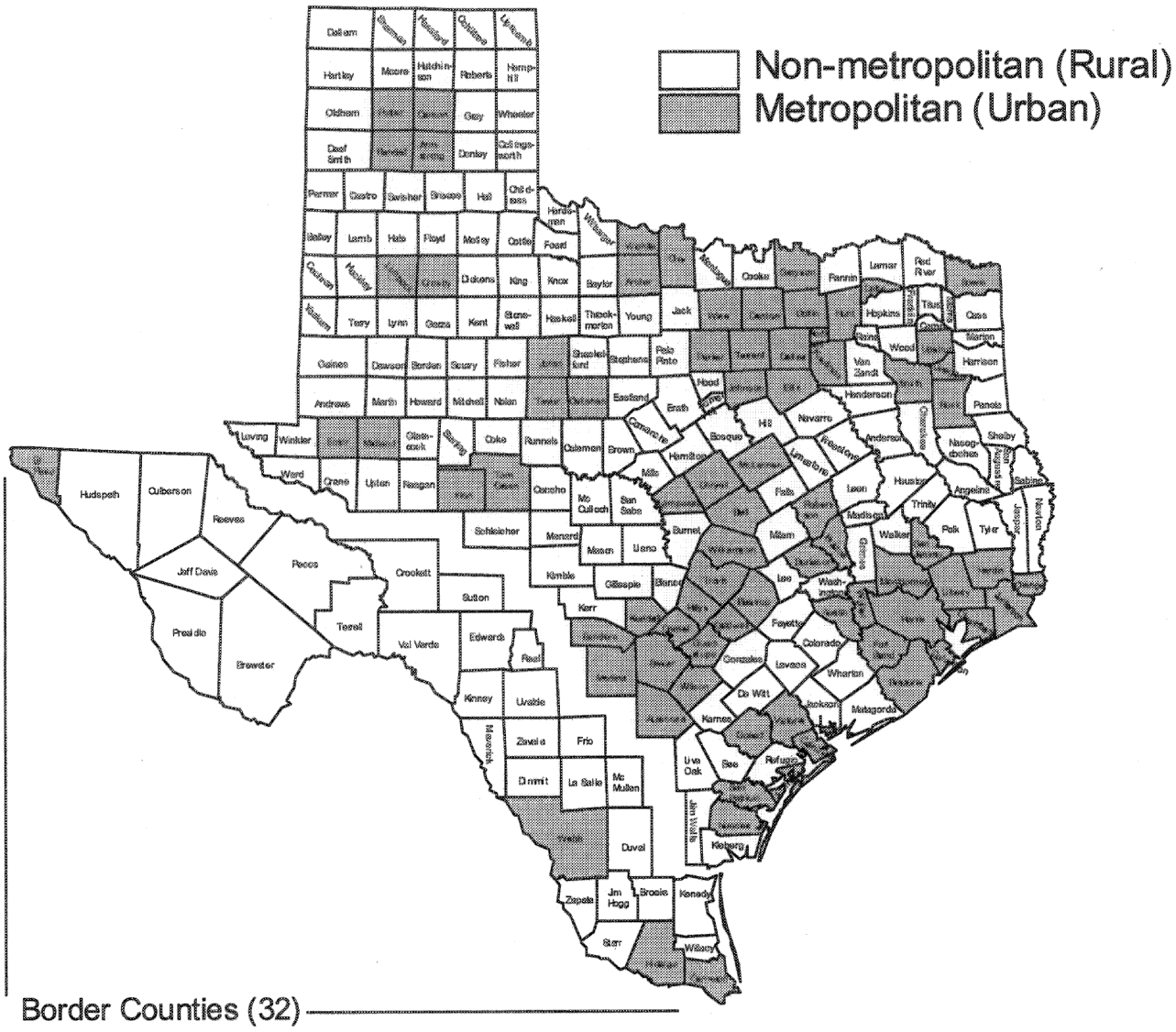
The classification of counties as either metropolitan (77 counties) or non-metropolitan (177 counties) was based on reports from the U.S. Office of Management and Budget. The identification of 32 Texas counties as border counties was based on Article 4 of the La Paz Agreement between the United States and Mexico (1983) (see Figure 1). Previous State Health Plans used the 43-county area for the border counties; therefore, the supply ratios for the border counties cannot be directly compared to those of previous reports. For many of the analyses presented in this chapter or the Appendix, the 254 counties were aggregated as border metropolitan, non-border metropolitan, border non-metropolitan, and non-border non-metropolitan counties. In 2007, 86.9 percent of the Texas population lived in metropolitan counties and 13.1 percent in non-metropolitan counties. Also, 78.1 percent of the state population lived in non-border metropolitan counties, 8.9 percent in border metropolitan counties, 1.6 percent in border non-metropolitan counties, and 11.4 percent in non-border non-metropolitan counties. Overall, 10.5 percent of the Texas population lived in the 32-county border area.

Health Professional Shortage Areas (HPSAs)

The designation of a county as a Health Professional Shortage Area for primary medical care, dental care, or mental health care indicates that the county has an inadequate number of specific health providers to serve the population in the county. There are several categories of HPSA designations: whole county, sub-county, facility, or special population. The Texas Primary Care Office administers the federal HPSA program for Texas in collaboration with the Health Professions Resource Center and the Shortage Designation Branch, Health Resources and Services Administration, Bureau of Health Professions, U.S. Department of Health and Human Services.

Lists of designated areas can be found at http://www.dshs.state.tx.us/CHS/hprc/hpsa.shtm. Detailed information about HPSA designations is presented for primary care physicians, dentists, and psychiatrists in this chapter and the Appendix.

Figure 1. Border and Metropolitan Counties in Texas, 2007.



2007 Population Statistics:

222 Non-Border Counties — 89.5 percent of total Texas Population
78.1 percent in metropolitan non-border counties
11.4 percent in non-metropolitan non-border counties

32 Border Counties — 10.5 percent of total Texas Population
8.9 percent in metropolitan border counties
1.6 percent in non-metropolitan border counties

Prepared by: Health Professions Resource Center, Center for Health Statistics,
Texas Department of State Health Services, October 4, 2007

MEDICAL PROFESSIONS

- **Physicians**
  - Direct patient care (DPC)
  - Primary care (PC)
  - Internal medicine
  - Pediatrics
  - Family practice/medicine
  - Obstetrics and Gynecology (Ob/Gyn)
  - Psychiatry — included in the section on Mental Health Professions
- **Physician Assistants**
- **Chiropractors**
- **Podiatrists**

DPC Physicians

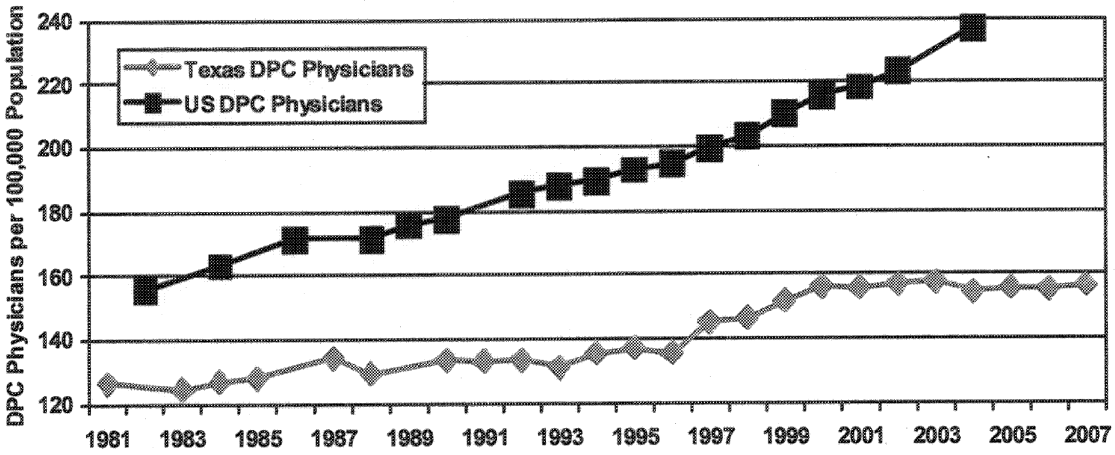
The term *DPC physician* includes both allopathic and osteopathic physicians who are licensed by the Texas Medical Board (TMB), but excludes physicians with a practice type of medical teaching, administration, research, or "not-in-practice." Other physicians who are excluded from the supply of DPC physicians in this report are those physicians who are affiliated with the federal government — including the armed forces, the Department of Veterans Affairs, or the U.S. Public Health Service — and fellows or residents in training. DPC physicians spend at least 50 percent of their time in the direct care of patients and are trained in one or more of the 70+ "general" or "specialist" specialties.

The supply of DPC physicians increased between 1998 and 2007 by an average of 933 per year. In August 2007, there were 37,177 DPC physicians actively practicing in Texas. However, over the years, Texas has consistently lagged behind the U.S. average in the ratio of DPC physician supply per 100,000 population, and the gap between the two appears to be increasing (Figure 2). The DPC physician supply ratios in Texas were fairly constant between 1981 and 1996. In 1997, the ratios for both metropolitan and non-metropolitan counties began to increase; however, they began to stabilize and decrease slightly after 2003 (Appendix, item 1). Non-metropolitan counties in Texas have had much smaller supply ratios than metropolitan counties throughout these two decades.

In 2007, there were 25 counties with no DPC physicians; and, there were four counties that did not have a DPC physician in 1998, but had at least one in 2007. DPC ratios decreased in 104 counties between 1998 and 2007. In general, the counties with the highest ratios were

those in Central or East Texas. The counties with lower ratios were generally located in the 32-county border area, West Texas, South Texas, and the Panhandle. Almost all of the counties with no DPC physicians were in these areas. The median age of DPC physicians was 49 years in 2007, compared with 48 years in 2000.

Figure 2. DPC Physicians per 100,000 Population: U.S. and Texas, 1981 to 2007.



Sources: Texas Medical Board; HRSA, Bureau of Health Professions; American Medical Association

PC Physicians

The term *PC physician* includes physicians who are trained in one of six specialties of the more than 70+ specialties included under the umbrella of DPC — family practice/family medicine, general practice, internal medicine, obstetrics and/or gynecology, general pediatrics, and geriatrics. Geriatrics was included as a primary care specialty starting in 2004, at the request of the Bureau of Shortage Designation's HPSA program. Of the 37,177 DPC physicians in Texas in 2007, 16,120 were PC physicians, an increase of 13 percent over the number practicing in Texas in 2000. In 2007, 13.0 percent of the over 23 million Texans were located in the 177 non-metropolitan counties and 86.9 percent in the 77 metropolitan counties. By comparison, only 10 percent of the PC physicians were practicing in non-metropolitan counties and 90 percent in metropolitan counties. Twenty-seven of the state's 254 counties had no PC physicians in 2007 and 19 counties had only one PC physician.

Sources of PC physicians

In 2007, less than one-half (47.1 percent) of the PC physicians practicing in Texas were trained in Texas schools. Supplementing this pool of Texas medical graduates were PC physicians who received their training in other states (26.2 percent) or other countries (26.6 percent). Due to the size of this in-migrating PC physician supply, this external source of physicians is very important to the health care delivery system in Texas.

Supply trends

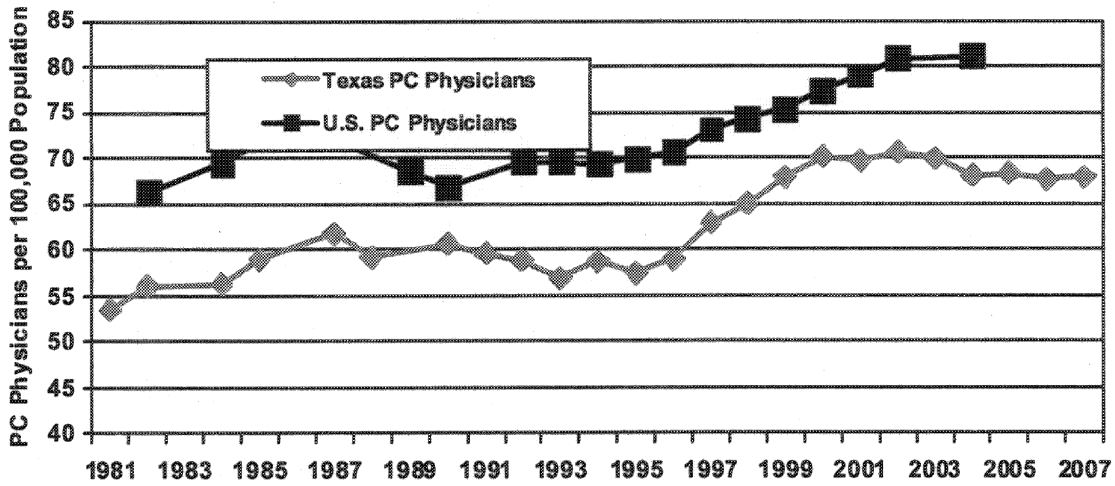
The PC physician supply increased by an average of 372 physicians per year between 1998 and 2007. Although the state's population also increased during this time, the PC physician ratios remained in the range of 65 to 71. Compared to a national benchmark ratio of 60 to 80, Texas remained in the lower range of the national benchmark; in 1996, Texas was even below the federal benchmark with a ratio of 59. The supply of PC physicians could be even more marginal since some of the physicians listed in the 2007 database practice only part-time. The total number of PC physicians available to some population groups could also be lower than the supply totals would suggest because some PC physicians limit their practices to paying or insured patients and others do not accept Medicaid patients. Thus, in some areas of the state, the "effective" physician supply is probably less than simple supply ratios would seem to indicate.

The PC physician average supply ratios in the U.S. (79.0 in 2000) have consistently exceeded the supply ratios in Texas (69.7 in 2000) for the past 20 years (Figure 3). Several years ago, the gap between the U.S. and Texas ratios began to widen, apparently due to stabilization in the Texas supply ratios.

The ratios in metropolitan and non-metropolitan counties were fairly constant between 1983 and 1996, with the non-metropolitan ratios being considerably smaller than the metropolitan ratios (Appendix, item 2). Beginning in 1997, the ratios in both areas began to increase; however, the ratios in both the metropolitan counties and non-metropolitan counties appeared to stabilize about six years ago. In 2007, 27 counties had no PC physicians; and, five counties did not have a PC physician in 1998, but had at least one in 2007. In general, the lowest supply ratios were associated with the 32 border counties, West Texas, and South

Texas. Almost all of the counties with no PC physicians were in these areas. The highest ratios were in Central or East Texas.

Figure 3. PC Physicians per 100,000 Population: U.S. and Texas, 1981–2007



Sources: Texas Medical Board; HRSA, Bureau of Health Professions; American Medical Association

Location

In 2007, there were fewer PC physicians per 100,000 people in non-metropolitan counties than in metropolitan counties. The ratio of 52.3 PC physicians per 100,000 population in non-metropolitan locations was well below the national benchmark of 60 to 80; however, the ratio in metropolitan areas (70.3) was in the mid-range of the national benchmark. This difference between metropolitan and non-metropolitan locations has been observed for years in Texas. The supply ratio also varied between border (50.7) and non-border areas (70), and very low PC physician supply ratios were observed in non-metropolitan non-border (54.5) and non-metropolitan border (36.1) locations (See Table 1).

Table 1. PC Physician Ratios for Non-metropolitan, Metropolitan, Border, and Non-border Locations, Texas, 2007

Location	Population	PC Physicians Per 100,000 population
Statewide	23,728,510	67.9
Metropolitan border	2,106,965	53.3
Metropolitan non-border	18,523,380	72.2
Non-metropolitan border	382,252	36.1
Non-metropolitan non-border	2,715,913	54.5

Data Sources: Texas Medical Board, August 2007; Population data: Texas State Data Center, Population Estimates & Projection Program, University of Texas at San Antonio.

Practice settings

In 2007, 36.7 percent of the PC physicians were employed in solo practices, 46.9 percent in partnership or group practices, 12.4 percent in hospitals, and 1.1 percent in Health Maintenance Organizations (HMOs). A small number of PC physicians (1.9 percent) did not report their practice settings.

Primary care specialties

In 1991, 45 percent of the Direct Care Physicians were primary care physicians, and 55 percent were non-primary care specialists. In 2007, the ratio was 43.4 percent primary care to 56.6 percent specialists. Three-fourths of the PC physicians in non-metropolitan counties were either family practice/medicine physicians (51.6 percent) or internal medicine physicians (22.2 percent). However, in metropolitan counties, two-thirds of the PC physicians were trained in family practice/medicine (32.0 percent) or internal medicine (29.5 percent). See Table 2 for more information.

Table 2. PC Physicians by Primary Specialty and Practice Location, Texas, 2007

PC Physicians by Specialty	2007 PC Physicians Total	% Metropolitan	% Non-Metropolitan
Family Practice/Medicine	5,481	84.8	15.2
General Practice	735	81.2	18.8
Internal Medicine	4,640	92.3	7.7
General Pediatrics	2,959	94.8	5.2
Obstetrics and Gynecology	2,274	94.2	5.8
Geriatrics	31	96.8	3.2
Total Primary Care	16,120	90.0	10.0

Source: Texas Medical Board, 2007.

Age

The median age of PC physicians in 2005 was 48 years; in 2000 it was 46. Female physicians tend to be younger, with a median age of 43, than male physicians, with a median age of 51. The ages of PC physicians also differed based on whether the physicians were practicing in non-metropolitan or metropolitan counties. The median age for PC physicians in metropolitan counties was 48 years and, in non-metropolitan counties, 51 years. The median ages for PC physicians in both the border and non-border counties were 48 years.

Gender

In 1997, 77.7 percent of the PC physicians were male; however, that percentage has steadily decreased to 66.1 percent in 2007. In 2007, one-third of the PC physicians in metropolitan and non-border counties (35.5 percent and 34.7 percent respectively) were female. However, only 19.3 percent of the PC physicians in non-metropolitan counties and 24.7 percent in border counties were female.

Male and female PC physicians also vary in their choice of a medical specialty. For example, a greater percentage of female PC physicians report pediatrics as their primary specialty (28.8 percent) than do male PC physicians (13 percent) (Table 3). The two most prevalent specialties in non-metropolitan counties, family practice and internal medicine (Table 2), are not as well represented among female PC physicians (52.4 percent of females are practicing in these two specialties) as among male PC physicians (68.1 percent).

Table 3. PC Physicians by Primary Specialty and Gender, Texas, 2007

Physicians by Specialty	2007 PC Physician Total	% Male	% Female
Family Practice/Medicine	5,480	37.0	28.3
General Practice	735	5.8	2.2
Internal Medicine	4,634	31.1	24.1
General Pediatrics	2,957	13.0	28.8
Obstetrics and Gynecology	2,273	13.0	16.3
Geriatrics	31	0.2	0.3
Total	16,110	100.0	100.0

Note: Excludes those records that did not report Gender (10 records)
Source: Texas Medical Board, 2007

Race-Ethnicity

In 2007, the majority (59.4 percent) of the state's PC physicians were white, down from 71.7 percent in 1997 (Table 4). Although over a decade ago Hispanics made up the largest minority population of PC physicians, Asian–Pacific Islanders were the largest by 1997, and the gap between the two has continued to grow. The PC physician workforce that was non-Hispanic African-American in 2007 was about 55 percent of the percentage of this group in the general population, and the PC physician workforce that was Hispanic in 2007 was about 38 percent of the percentage of Hispanics in the general population.

Table 4. Race and Ethnicity Trends for PC Physicians, Texas, 1997 and 2007

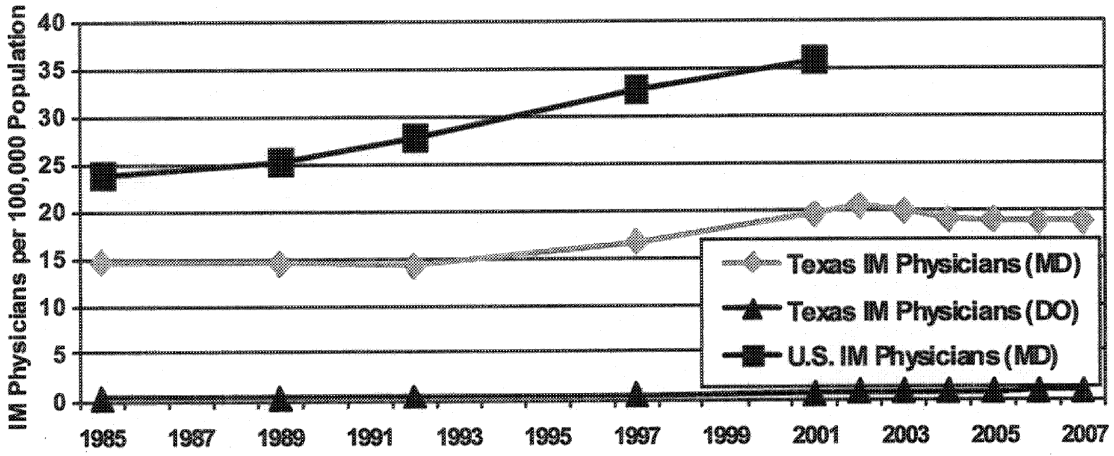
Race/Ethnicity	1997		2007	
	PC Physicians (%)	Population (%)	PC Physicians (%)	Population (%)
White	71.7	57.9	59.4	47.3
Black	3.9	11.6	6.2	11.3
Hispanic	11.9	28.0	12.2	37.0
Asian / Pacific Islander	12.3	2.4	19.9	4.1
American Indian / Alaskan Native	0.2		0.3	

Data sources: Texas Medical Board, 1997 and 2007; Texas population: Texas State Data Center

Internal Medicine (IM)

In Figure 4, the supply of IM physicians in Texas is separated into Doctor of Osteopathy (DO) and Medical Doctor (MD) trend lines because national data were not available for DOs. As shown in the graph, the IM supply ratios for MDs in Texas have been lower than the U.S. average ratios for the past two decades. The ratios for DOs have remained stationary. The median age for IM physicians was 46 years in 2007, compared with 45 in 2000.

Figure 4. Internal Medicine Physicians per 100,000 Population, U.S. and Texas, 1981–2007

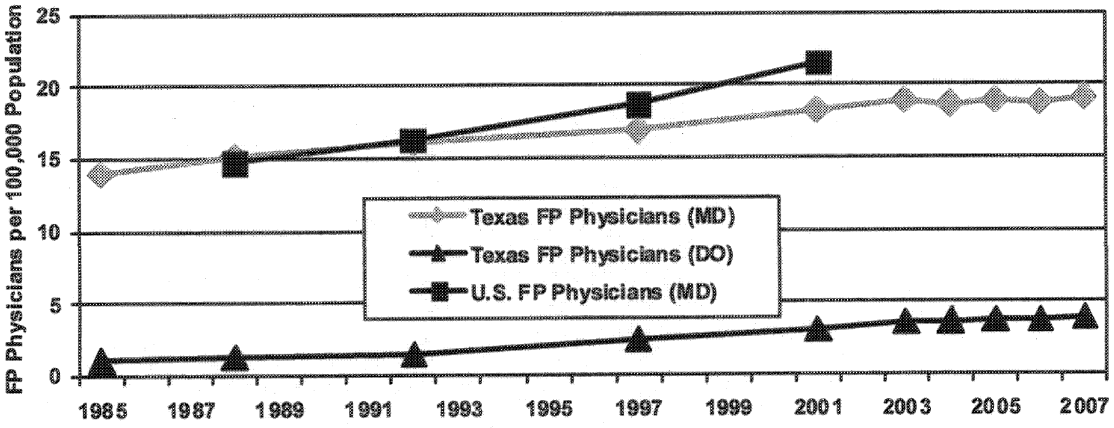


Sources: Texas Medical Board (MD and DO); American Medical Association (U.S. MD); HRSA, Bureau of Health Professions

Family Practice/Medicine (FP)

The Texas Medical Association reports that in Texas, physicians are beginning to use the term "family medicine" rather than "family practice." As both terms are currently in use, these data reflect those physicians who indicated either as their primary specialty. In Figure 5, the supply of FP physicians in Texas is separated into DO and MD trend lines because national data were not available for DOs. Prior to 1992, the FP ratios in the United States and Texas were about the same; however, after 1992, the gap between the U.S. average ratios and the Texas ratios for FP physicians widened, with the Texas ratios consistently falling behind the U.S. ratios in magnitude. The FP ratios for MDs have increased about the same as the ratios for DOs. The median age for FP physicians was 48 years in 2007, compared with 46 years in 2000.

Figure 5. Family Practice Physicians per 100,000 Population, U.S. and Texas, 1981–2007

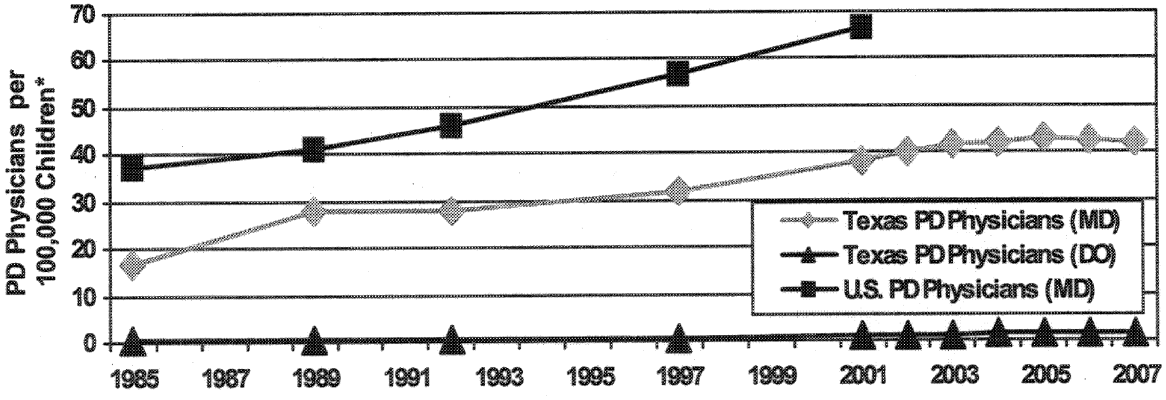


Sources: Texas Medical Board (MD and DO); American Medical Association (U.S. MD); HRSA, Bureau of Health Professions

Pediatrics (PD)

In Figure 6, the supply of PD physicians in Texas is separated into DO and MD trend lines because national data were not available for DOs. The PD supply ratios for MDs in Texas per 100,000 children have been lower than the U.S. average ratios for the past two decades, but have been increasing since the mid-'90s. The PD supply ratios for DOs have remained fairly constant. The median age for PD physicians was 46 in 2007, compared with 45 in 2000.

Figure 6. PD Physicians per 100,000 Children (0–18 years), U.S. and Texas, 1985–2007

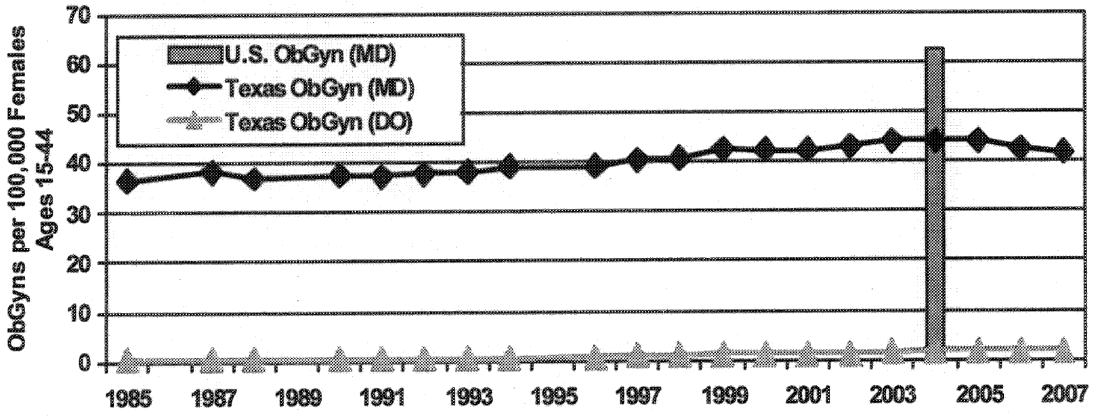


Sources: Texas Medical Board (MD and DO); American Medical Association (U.S. MD); HRSA, Bureau of Health Professions

Obstetrics and Gynecology (Ob/Gyn)

Physicians may have a specialty of Gynecology only, Obstetrics only, or Obstetrics and Gynecology. The data in this report reflect the total of those three specialties. In Figure 7, the supply of Ob/Gyns in Texas is separated into DO and MD trend lines to be consistent with previous graphs for FP, IM, and PD physicians. However, national Ob/Gyn supply ratio trends were not available for this graph, although the national ratio in 2004 was 62.5. Ob/Gyn supply ratios for MDs have decreased slightly recently after increasing for the past two decades, but the ratios for DOs have remained fairly constant. The median age for Ob/Gyns was 49 years in 2007, compared with 48 in 2000.

Figure 7. Ob/Gyn Physicians per 100,000 Females Ages 15–44, Texas, 1985–2007



Source: Texas Medical Board; American Medical Association

HPSAs

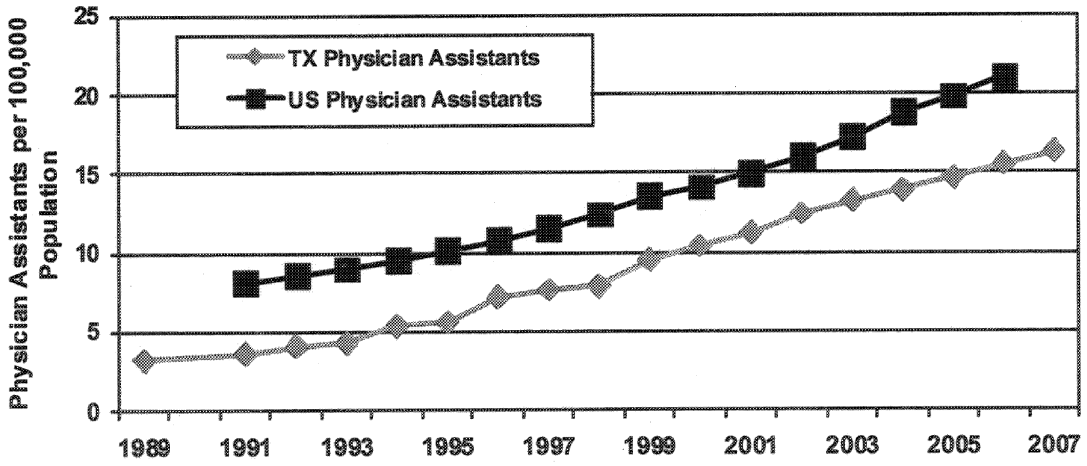
PC physician ratios are the primary indicators used by the U.S. Department of Health and Human Services to determine if geographic areas or population groups are experiencing shortages of PC physicians and if they qualify as federal shortage areas. In January 2008, 72.8 percent of the counties in Texas had either whole (113) or partial-county/special population (72) HPSA designations (Appendix, item 24). Forty-eight percent of the non-metropolitan counties had "whole county" HPSA designations, and 59.4 percent of the border counties had whole county designations. Most of the partial-county HPSA designations were located in metropolitan counties. It should be noted that many of these federally designated PC physician shortage areas are also experiencing shortages of other health professionals, such as nurses, allied health professionals, and mental health providers.

Physician Assistants (PAs)

According to the 2006 TMB licensure data, there were 3,862 PAs licensed to practice in Texas; 89.4 percent of them practiced in metropolitan counties; 8.8 percent practiced in border counties. The supply ratios of PAs per 100,000 population for the United States have been consistently higher than the ratios for Texas (for example, 14.1 vs. 10.4 respectively, in 2000). Both the U.S. and Texas ratios have been rising at a comparable rate (Figure 8). The ratios for the non-metropolitan areas were higher than those for the metropolitan areas from 1994 to 2002 (Appendix, item 3); however, the metropolitan areas have sustained a steady increase since that time while the ratios for the non-metropolitan areas have fluctuated. In 2003, the ratios for the metropolitan areas surpassed those of the non-metropolitan areas.

Thirty counties that did not have a PA in 1997 had one or more in 2007. In 2007, there were 62 counties with no PAs. The counties with the highest supply ratios were in West Texas and the Panhandle, as were most of the counties that had no PAs. Over the past decade, most of the counties with the greatest percent of increase in supply ratios have been in West Texas and the Panhandle. Seventy-eight counties experienced a decrease in their supply ratios during that time. In contrast with physicians, the average ratios in the border and non-border counties were similar to each other.

Figure 8. Physician Assistants per 100,000 Population, U.S. and Texas, 1989–2007



Sources: Texas Medical Board, American Academy of Physician Assistants

Age, gender, and race-ethnicity

In 2007, three-fourths (74.5 percent) of the PAs were white, followed by Hispanic PAs at 13.5 percent of the total (Table 5). There were substantially more female PAs than male PAs in 2007, a reversal from 2000, when males slightly outnumbered females, 50.4 percent to 49.6 percent, respectively. The median age of PAs in the state in 2007 was 40 years, down from 41 years in 2000. The median age of PAs in non-metropolitan counties was several years greater than the median age of PAs in metropolitan counties (46 years versus 39 years, respectively). The median age of PAs in border counties was 38 years, 2 years more than that of PAs in non-border counties. A disparity in age and gender exists among PAs based on their practice location: 58.3 percent of the PAs in metropolitan counties were female, but only 46.3 percent in non-metropolitan counties were female. In the border counties, 48.1 percent of the PAs were female, compared to 57.9 percent in the non-border counties.

Table 5. Distribution of PAs by Gender and Race-Ethnicity, Texas, 2007

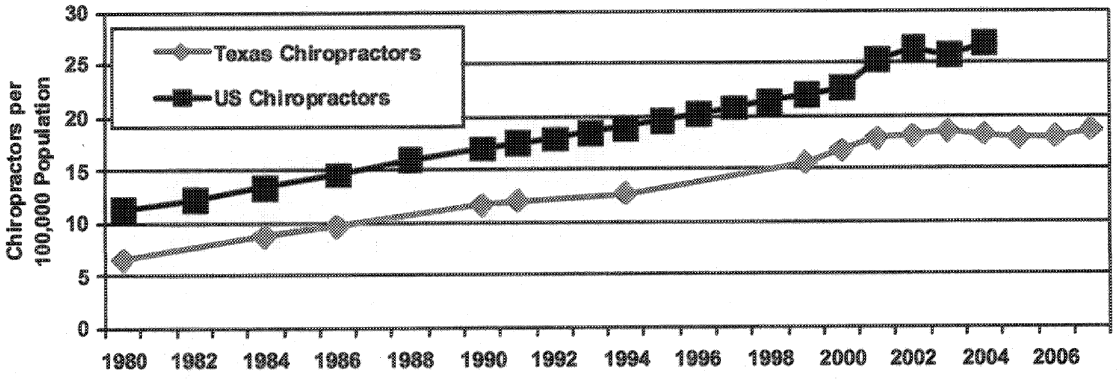
Characteristic	Variable	Percent
Gender	Male	43.0
	Female	57.0
Race-Ethnicity	White, not Hispanic	74.5
	Black	5.6
	Hispanic	13.5
	Asian-Pacific Islander	5.9
	American Indian – Alaskan Native	0.6

Source: Texas Medical Board, 2007.

Chiropractors

There were 4,424 chiropractors in Texas in 2007. The supply ratio of chiropractors per 100,000 population in the US has consistently exceeded the supply ratios in Texas (Figure 9). And, prior to the late 1980s, the ratio was higher in non-metropolitan counties than in metropolitan counties (Appendix, item 4). Since that time, the ratios for chiropractors in metropolitan counties have greatly increased and have exceeded the rates for non-metropolitan counties. In 2007, there were 76 counties in the state that did not have a chiropractor. Thirteen counties that did not have a chiropractor in 1999 had at least one in 2007. However, 13 counties that had chiropractors in 1999 had no chiropractors in 2005. The highest supply ratios were concentrated in the central part of the state, and also around Dallas and Houston. The general trend appears to be a shift of chiropractors away from non-metropolitan counties to metropolitan counties.

Figure 9. Chiropractors per 100,000 Population, U.S. and Texas, 1980–2007

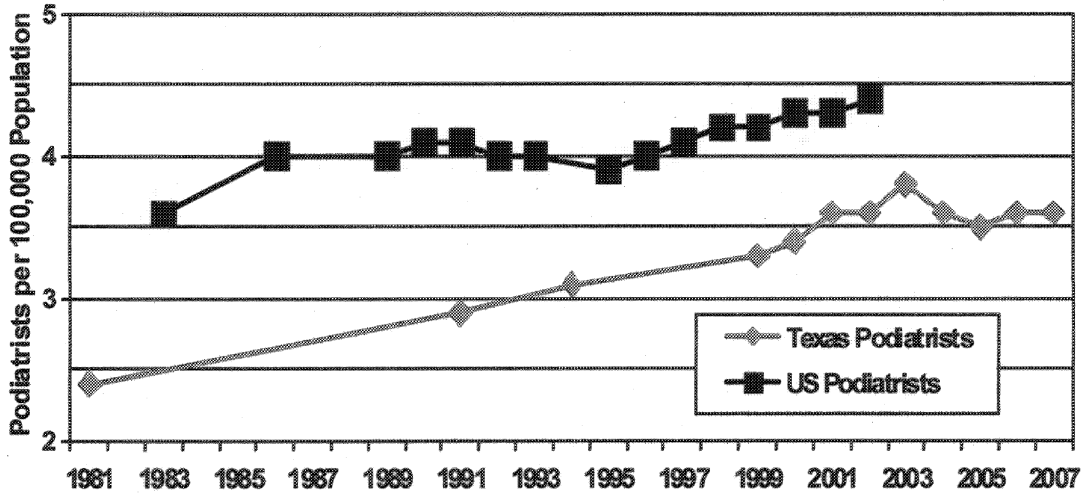


Sources: Texas Board of Chiropractic Examiners; HRSA, Bureau of Health Professions; Federation of Chiropractic Licensing Boards

Podiatrists

There were 865 podiatrists in Texas in 2007. There are no schools of podiatry in Texas and only seven accredited schools nationally. That may partially explain why Texas lags behind the United States in podiatrist supply ratios. The gap had decreased slightly in the last few years, but the Texas ratios began fluctuating in 2004, leading to a net decrease (Figure 10). The ratios are greater in metropolitan areas than in non-metropolitan areas (Appendix, item 5). The highest concentration of podiatrists is in the Central Texas area, with smaller ones in the North Texas and Harris County areas. There are very few podiatrists in West Texas, South Texas, and the Panhandle. The non-metropolitan border counties have higher average ratios than the non-metropolitan non-border counties. Central Texas and North Texas, around the Dallas-Fort Worth area, experienced the largest growth rate in ratios from 1999 to 2007. Seventeen counties that did not have a podiatrist in 1999 had one in 2007, while six counties lost all of their podiatrists over that time. In 2007, Texas had 169 counties without a podiatrist. The median age for podiatrists was 44 years in 2007, the same as in 2000.

Figure 10. Podiatrists per 100,000 Population, U.S. and Texas, 1981–2007



Sources: Texas State Board of Podiatric Medical Examiners, 1981–2007; HRSA, Bureau of Health Professions

NURSING PROFESSIONS

- **Registered Nurses**
- **Advanced Practice Nurses**
  - Nurse practitioners
  - Certified nurse midwives
  - Certified Registered nurse anesthetists
  - Clinical nurse specialists
- **Licensed Vocational nurses**

Registered Nurses (RNs)

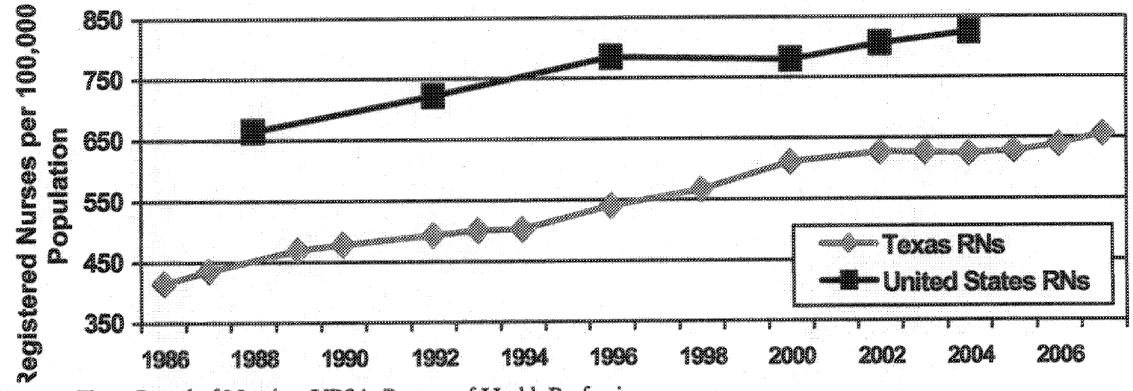
All of the RNs included in the statistics for this chapter and the Appendix held active licenses and were employed either part-time or full-time in nursing. Although some RNs were employed as teachers or administrators and may not provide direct patient care, they were included in the overall supply totals for Texas RNs.

Supply

According to the Board of Nursing (BON) licensure file for 2007, there were 155,858 active RNs practicing in Texas — 86.5 percent were employed full-time and 13.5 percent were employed part-time in nursing. The 155,858 RNs give Texas a supply ratio of 656.8 RNs per 100,000 population. The Texas supply ratios have been below the U.S. supply ratios for years (for example, 611.9 vs. 780.4 respectively in 2000). The National Sample Survey of Nurses reported a ratio of 824.6 for the U.S. in 2004, compared to a ratio of 624.5 for Texas that year. The gap between U.S. and Texas ratios has been slightly increasing in recent years (Figure 11).

Metropolitan counties have consistently had a much higher ratio of nurses than the non-metropolitan counties (Appendix, item 6). There were only five counties that did not have an RN in 2007 but those five counties had a combined population of only 8,542 people. Since 1998, 134 of Texas' 254 counties have seen an increase in the supply ratio of RNs; only two counties did not have an RN in 1998, but one of them had one in 2007. Although the border counties continue to have much lower supply ratios than the rest of Texas, the ratios in those counties are increasing at a rate comparable to the rest of the state.

Figure 11. Registered Nurses per 100,000 Population, U.S. and Texas, 1986–2007



Sources: Texas Board of Nursing; HRSA, Bureau of Health Professions

Gender

In 2007, the RN workforce in Texas was predominantly female; only 9.8 percent of the nurses were male. This represents only a slight increase in the male representation in the RN workforce from 2000, when 8.4 percent of the RNs were male.

Position type and employment field

A majority (64.2 percent) of the RNs who were actively employed as nurses in Texas were working in hospitals — the others being primarily employed in home health (6.2 percent), physicians' or dentists' offices and clinics (4.4 percent), school or college health clinics (4.0 percent), nursing homes or extended care facilities (3.0 percent), business or industry (2.3 percent), community and public health (1.7 percent), freestanding clinics (2.1 percent), schools of nursing (1.6 percent), self-employed or in private practice (0.9 percent), temporary agencies (0.7 percent), military installations (0.7 percent), rural health clinics (0.3 percent) or in other employment fields (6.8 percent). Also, the employment field was unknown for 0.8 percent of the RNs.

Since the majority of RNs worked in hospitals in 2007, most were employed in hospital-related positions, such as head nurse, staff nurse, or general duty nurse (Table 6). Advanced practice nurses accounted for 5.3 percent of all nursing positions for active nurses in Texas.

Table 6. Distribution of actively employed RNs in Texas by position type, 2007.

Position Type	Number	Percent
Head Nurse, Staff Nurse, General Duty Nurse, or Assistant	100,890	64.7
Administrator/ Supervisory/ Assistant	15,846	10.2
School / Office Nurse	9,329	6.0
Nurse Practitioner	4,858	3.1
Faculty/Educator	3,616	2.3
Consultant	2,294	1.5
Nurse Anesthetist	1,922	1.2
Clinical Nurse Specialist	1,198	0.8
Researcher	1,165	0.7
In-service / Staff Development	949	0.6
Certified Nurse Midwife	248	0.2
Other	12,413	8.0
Unknown	1,130	0.7

Source of data: Texas Board of Nursing, September 2007

Education — basic and highest degrees

In 2007, one-third (34.5 percent) of the active RNs listed as their *basic degree* the baccalaureate degree in nursing (BSN), 45.5 percent listed associate degree in nursing (ADN), and 19.4 percent listed diploma in nursing. Other RN degree types (masters in nursing, enroute to masters, RN undergraduate, and VN/VP program) accounted for 0.4 percent of the RNs, and a small number of nurses did not give their basic degree. The majority listed ADN as their *highest degree* (39.5 percent) followed by the BSN degree (36.2 percent), and the diploma in nursing (9.8 percent). Only 6.8 percent had a master of science in nursing and 0.3 percent, a doctorate in nursing. Some RNs had their highest degree in a field other than nursing (7.4 percent).

Of those nurses with a diploma degree, 20.6 percent had progressed to a BSN, 5.3 percent to an MSN, and 0.4 percent to a doctorate in nursing. Of those nurses with ADN as their basic degree, 9.6 percent progressed to a BSN, 3.0 percent to a MSN, and 0.09 percent to a doctorate in nursing. By comparison, of those nurses with a BSN as their basic degree, 11.6 percent advanced to MSN and 0.6 percent advanced to a doctorate in nursing.

Work area

The most common work areas for active RNs in Texas were medical-surgical (14.6 percent), intensive care–critical care (11.6 percent), operating/recovery care (7.6 percent), and obstetrics and gynecology (7.5 percent) (Table 7).

Table 7. Distribution of active RNs in Texas by their work area, 2007.

Work Area	Number	Percent
Medical / Surgical	22,747	14.6
Intensive Care / Critical Care	18,005	11.6
Operating / Recovery Care	11,908	7.6
Obstetrics and Gynecology	11,750	7.5
Pediatrics	9,296	6.0
Emergency Care	9,260	5.9
Home Health	8,690	5.6
General Practice	6,717	4.3
Neonatology	6,194	4.0
Geriatrics	5,560	3.6
Oncology	4,671	3.0
Psychiatric / Mental Health / Substance Abuse	4,595	2.9
Community / Public Health	4,381	2.8
Rehabilitation	2,690	1.7
Anesthesia	1,945	1.2
Occupational/Environmental	1,034	0.7
Other	24,616	15.8
Unknown	1,799	1.2

Source: Texas Board of Nursing, September 2007

Job satisfaction, retention, and re-entry into nursing

The Regional Center for Health Workforce Studies at the Center for Health Economics and Policy (CHEP) conducted a research study in 2006 on Registered Nurses (RNs) in Texas. The following reflects the results of the 2006 CHEP study of 454 RNs on factors that affect retention and re-entry of nurses in the nursing workforce:

- While 84 percent of the RNs reported general satisfaction with their work, 65.3 percent reported serious exhaustion and 45 percent reported frustration.
- Almost 36 percent of the RNs reported that, on most days, they often have more work than they can safely handle.

- A major issue affecting retention and re-entry of nurses in the workforce has to do with the nursing workload involved in caring for an increasingly aged, severely ill, and obese patient population along with increasing paperwork and physical and interpersonal stressors.
- The most frequently reported work environment problems in Texas include:
    - The burden of paperwork is increasing (reported by 79 percent of the responding RNs).
    - Increase in the number of patients assigned (72 percent of the responding RNs). Since 2004, patient workload increased 22 percent.
    - Severity of patient illness (63 percents of responding RNs).
    - Increase in RN turnover (58 percent of responding RNs).
- Ergonomics, lifting and availability of equipment within the work place continue to be key issues as it affects comfort, safety, efficiency and productivity. Only 33 percent of the RNs perceived that they have adequate help with physical demands in the workplace.
- Respondents in this study indicated that they needed more help from administrators in managing workload effectively, minimizing perceived harassment (RNs reported more harassment from patients than from physicians), improving support for patient care, and providing training for new technologies.[1]

Aging of the Registered Nurse Workforce

The aging of the RN workforce will have an impact on future nursing workforce trends. RNs from the baby boomer generation entered nursing in large numbers in the 1960s and 1970s and represent the largest cohort of RNs today. In conjunction with this, a declining percentage of young RNs are entering the workforce.

The overall RN workforce in Texas continues to age. The median age of RNs in 2007 was 47 years, compared to 44 years in 2000. The median ages for nurses in border counties was 43 years and non-border counties was 47 years. The median age of RNs in non-metropolitan nurses was older on average (49 years) than metropolitan nurses (46 years). According to the Bureau of Labor Statistics, the national median age for RNs was 43 years.[2] These trends

show that the median age of RNs continues to increase and that the Texas RN workforce is older than the national RN workforce.

Of the 155,858 RNs actively working in nursing in 2007, 41.2 percent of these nurses are 50 years of age or older. This means that 11.4 percent of these nurses can start retiring now and the remaining 29.8 percent will be retiring in the next three to twelve years. So that by the year 2020, there will be a loss of 41.2 percent of the current RN workforce due to a large cohort of nurses retiring. According to the Bureau of Health Professions (2005), "three factors contribute to this aging of the RN workforce: (1) the decline in number of nursing school graduates, (2) the higher average age of recent graduating classes, and (3) the aging of the existing pool of licensed nurses."[3]

In the 2006 CHEP study, the RNs who were surveyed indicated the following work plans:

- The percent of RNs working at more than one job increased from 9 percent in 2004 to 13 percent in 2006.
- Fifty-five (55) percent of all RNs are primary wage earners; on the Border, 50 percent of the RNs are primary wage earners.
- RNs age 56 and above intend to retire at age 66.
- The percentage of border RNs intending to decrease work hours for the next year increased from 16 percent in 2004 to 17 percent in 2006.[4]

In the 2007 BON master file, there were 3,616 RNs who held active licenses, were employed full- or part-time in nursing, and indicated "faculty or educator" as the position they held at the time of license renewal. Out of the 3,616 RN faculty or educators, there were 2,016 who worked in schools of nursing. The median age of faculty or educators who worked in schools of nursing was 55 years of age.

In a study done in 2006 on schools of nursing in Texas, the following age-related trends among faculty have an impact on the capacity of schools of nursing to produce more graduates over the next 20 years (Texas Center for Nursing Workforce Studies, 2007): [5]

- Trends show an additional increase in the median age of nurse faculty, from 51 in 1999 to 54 in 2004. In 2006, the median age was 53.

- The nurse faculty workforce in Texas continues to have a higher median age than the RN workforce as a whole.
- The median age of 53 for Texas nurse faculty in 2006 was higher than the national median age of 51.5 for RN faculty as reported in 2007 by the American Association of Colleges of Nursing.[6]
- In 2004, there were only 136 faculty members in Texas who were under 40 years old. The trends over a ten-year period show that there has been no significant increase in recruitment of younger faculty members.

According to an article published in the March/April 2002 issue of *Nursing Outlook,* the average age of nurse faculty at retirement was 62.5 years.[7] The National League for Nursing reports that almost two-thirds of all full-time nurse faculty members are likely to retire in the next five to 15 years.[8] The loss of these experienced faculty members would cripple the educational system if there are not enough nurse educators to replace faculty as they retire.

Advanced Practice Nurses (APNs)

The term APN includes all nurses recognized by the BON as nurse practitioners, nurse midwives, nurse anesthetists, and clinical nurse specialists. The APN specialties are based on the types of practice or target populations of the practice, such as pediatrics, family, school health, women's health, oncology, and psychiatry–mental health.

Nurse Practitioners (NPs)

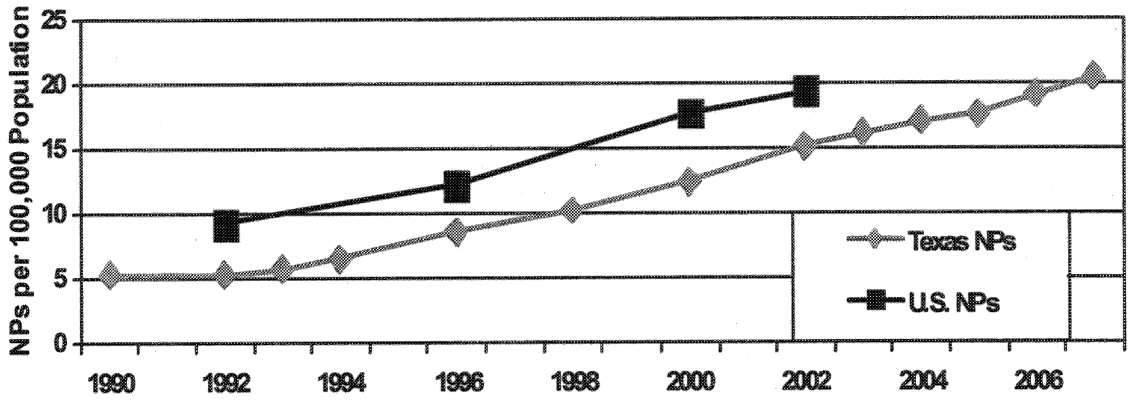
NPs have been granted authorization by the Board of Nursing to practice based on their advanced education and experience. NPs practice both under the authority of their nursing license and in collaboration with physicians. Some functions, such as prescribing medication, can be performed only in collaboration with a physician under written protocols.

The data for NPs were obtained from the 2007 RN master licensing file. The "position type" on the file has variables for *administrator, school nurse, researcher, nurse practitioner, clinical nurse specialist, nurse anesthetist,* and *nurse midwife,* among others. For this report, an RN record was selected as an NP record based on the position type of "nurse practitioner." An APN may be certified in multiple position types, but can only choose one "position type" when completing renewal forms. In 2007, there were 4,858 active NPs practicing in Texas. The

importance of NPs in the delivery of health care is indicated by their increasing supply; the ratios increased by 65.3 percent between 2000 and 2007.

The supply ratios of NPs per 100,000 population in Texas have lagged behind the U.S. average supply ratios for decades (Figure 12). The National Sample Survey reported a ratio of 27.7 in 2004, compared with a Texas ratio of 17.1 that year. In contrast with the trends for many health professions in Texas, the highest NP supply ratios were in certain counties in the Panhandle and in areas west of Central Texas. However, most of the 60 counties that did not have an NP in 2007 were also in these areas, along with South Texas. Overall, the average ratios of NPs in metropolitan counties were higher than in non-metropolitan counties, and the gap has been increasing (Appendix, item 7). Fifty counties that did not have an NP in 1998 had at least one in 2007. In 2007, the median age for NPs was 48 years, compared with 46 in 2000.

Figure 12. Nurse Practitioners per 100,000 Population, U.S. and Texas, 1990–2007



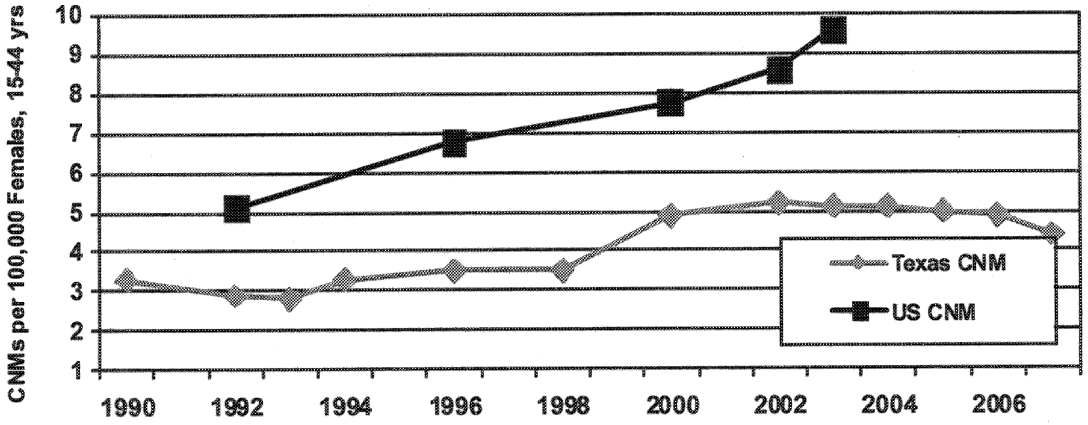
Sources: Texas Board of Nursing; HRSA, Bureau of Health Professions

Certified Nurse-Midwives (CNMs)

CNMs have been granted authorization by the Board of Nursing to practice based on advanced education and experience. CNMs provide obstetrical and gynecological care for women during pregnancy, childbirth, and the postpartum period. In Texas, there are two types of midwives: Direct-entry Midwives and CNMs. Direct-entry Midwives are non-RNs who successfully complete a course on midwifery and successfully pass the state-approved comprehensive written exam as required by the Texas Midwifery Board. Certified Nurse Midwives' educational preparation requires an RN background. They are regulated by the Texas Board of Nursing.

In Texas, in 2007, there were 248 CNMs. The data for CNMs were obtained from the 2007 RN master licensing file (for position types, see "Nurse Practitioners," above). An RN record was selected as a CNM record based on the position type of "nurse midwife." An APN may be certified in multiple position types, but can only choose one "position type" when completing renewal forms. CNMs were primarily located in the metropolitan areas of Texas and their ratios have decreased by 10.2 percent between 2000 and 2007 (see Figure 13). The Texas supply ratio of CNMs per 100,000 female population of childbearing age (ages 15 through 44) has lagged behind the U.S. supply ratio since 1992, when national statistics first became available. The National Sample Survey reported a ratio of 11.6 in 2004, compared with a Texas ratio of 5.1 that year. In 2007, there were 213 counties that did not have a CNM. In 2007, the median age of CNMs was 51 years, compared with 46 in 2000.

Figure 13. Certified Nurse Midwives per 100,000 Females Ages 15–44, U.S. and Texas, 1990 –2007

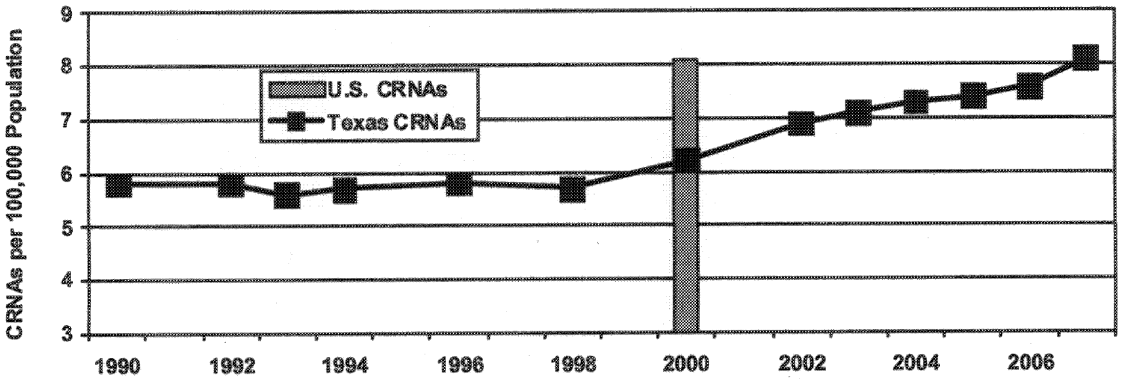


Sources: Texas Board of Nursing; HRSA, Bureau of Health Professions

Certified Registered Nurse Anesthetists (CRNAs)

In 2007, there were 1,922 CRNAs practicing in Texas. They were primarily located in the metropolitan areas of Texas (Appendix, Item 9). Their ratios increased by 28.6 percent between 2000 and 2007 (see Figure 14). U.S. statistics for Figure 14 were available only for the year 2000. The Texas ratio in 2000 was below the national average. In 2007, there were 122 counties that did not have a CRNA. In 2007, the median age of CRNAs was 50 years, compared with 48 in 2000.

Figure 14. Certified Registered Nurse Anesthetists per 100,000 Population, Texas, 1990–2007 (national statistics not available, except for 2000)

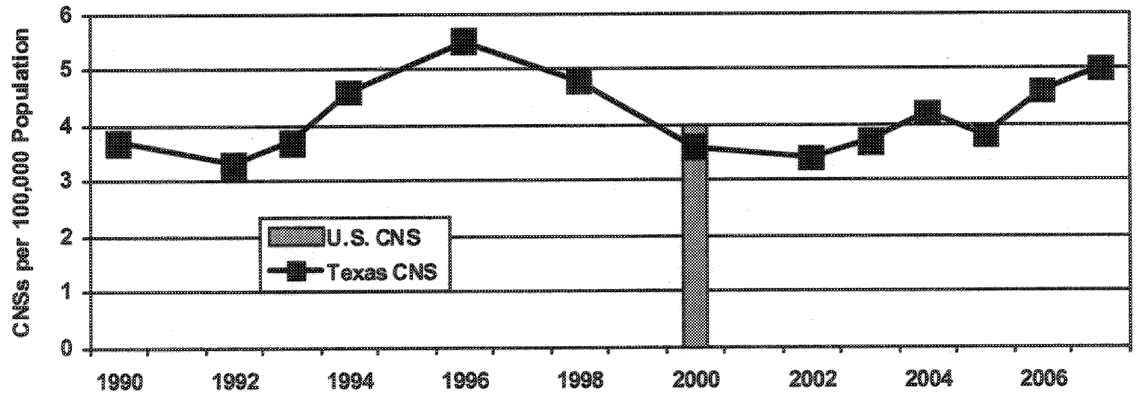


Sources: Texas Board of Nursing; HRSA, Bureau of Health Professions

Clinical Nurse Specialists (CNS)

There were 1,198 CNSs practicing in Texas in 2007. They were primarily located in the metropolitan areas of Texas. Their ratios increased by 38.9 percent between 2000 and 2007, however, the 2007 ratio is still below those of the mid-1990s (see Figure 15). U.S. statistics were not available except for the year 2000; however, the Texas and U.S. supply ratios for that year were similar in magnitude. In 2007, there were 167 counties in Texas that did not have a CNS, but 31 counties that did not have a CNS in 1998 had at least one in 2007. In 2007, the median age for CNSs was 51 years, compared with 49 in 2000.

Figure 15. Clinical Nurse Specialists per 100,000 Population, Texas, 1990 through 2007 (national statistics not available, except for 2000)



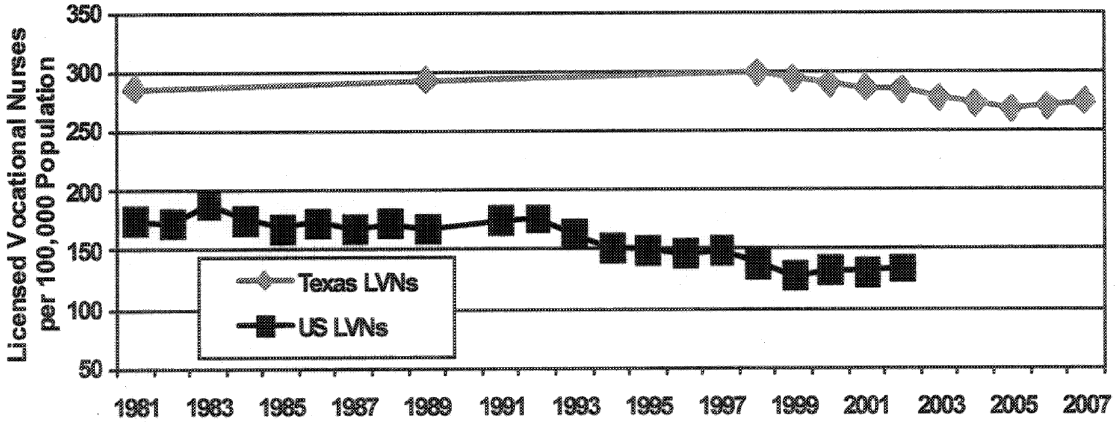
Sources: Texas Board of Nursing; HRSA, Bureau of Health Professions

Licensed Vocational Nurses (LVNs)

LVNs provide nursing care under the direction of a registered nurse, a physician, or another authorized health care provider. According to the Texas Board of Nursing (BON) licensure file, there were 65,230 active LVNs practicing in Texas in 2007, a supply ratio of 274.9 LVNs per 100,000 population. The LVN profession is among the few health professions in Texas where the supply ratios (290.2 in 2000) exceed the U.S. average ratios (132.6 in 2000) (Figure 16). However, the ratios for Texas have shown an overall decline since 1998, while the U.S. ratios seemed to stabilize in the late 1990s and early 2000s. The general trend in both the United States and Texas has been toward a decline in the supply of LVNs.

In contrast with most other professions, the ratios for LVNs are higher in non-metropolitan counties than metropolitan counties (Appendix, item 11). The trend has been toward the increased use of LVNs in non-metropolitan counties relative to the use of RNs. The supply ratios of LVNs are lower in both the metropolitan border counties and the metropolitan non-border counties than in the rest of the state. In 2007, there were six counties that did not have an LVN. None of the three counties that did not have an LVN in 2000 had one in 2007, and in that time, 96 counties have experienced growth in the supply of LVNs relative to the population; however, 155 counties experienced a decrease in the supply ratios. In 2007, the median age of LVNs was 45 years, compared with 44 in 2000.

Figure 16. Licensed Vocational Nurses per 100,000 Population, U.S. and Texas, 1981–2007



Sources: Texas Board of Nursing; HRSA, Bureau of Health Professions

DENTAL PROFESSIONS

- **Dentists**
- **Dental Hygienists**

Dentists

Most dentists are general dentists, which would, using the physician analogy, be the equivalent to PC physicians. For the purpose of this report, the term *general dentists* will include dentists within the specialties of public health, pediatric, and general dentistry. Also, in this chapter, statistics are reported only for active general dentists who are non-federal, non-administrative, and who are not residents-in-training.

In 2007, there were 8,671 dentists in private practice in Texas. The supply ratios of dentists per 100,000 population have remained fairly constant over the last two decades and have lagged behind the U.S. average ratios (Figure 17). In 2005, the American Dental Association reported a ratio of 45.5 for the U.S., while Texas had a ratio of 35.7.

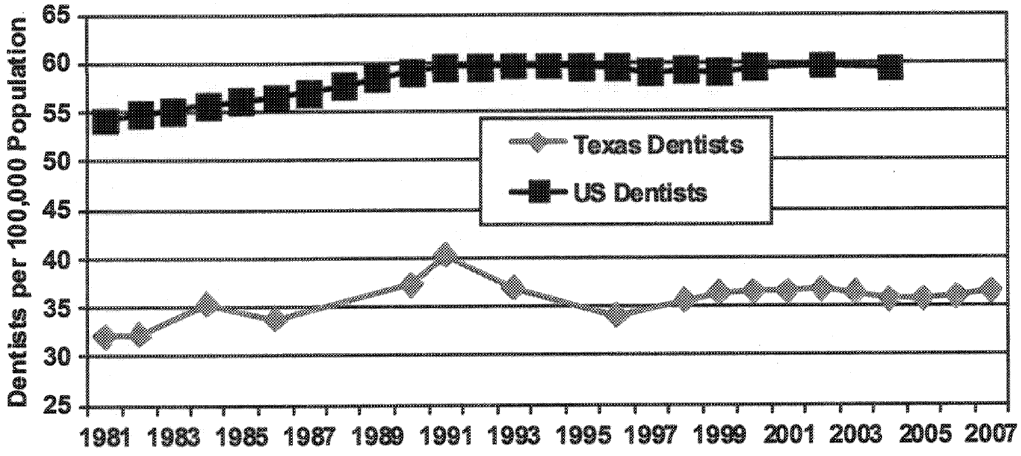
In 2007, the supply ratio for dentists in Texas was 36.5 per 100,000 population (Appendix, item 12). There were more dentists employed in metropolitan counties (ratio of 38.5) than in non-metropolitan counties (ratio of 23.5). The average supply ratio of dentists in border counties fell far short of the ratio in non-border metropolitan counties, and the gap between metropolitan and non-metropolitan counties has been widening over the years. In 2007, there were 47 counties with no dentists. Between 1998 and 2007, 133 counties experienced a decline in their ratios, while only 11 counties experienced an increase in ratios of 50 percent or greater, which is considerably less than for most other health professions. Only four counties that did not have a dentist in 1998 had gained one in 2007.

Age and Gender

In 2007, three-quarters (74.6 percent) of the dentists were males and 52.6 percent of the dentists statewide were below the age of 50 years. In 2007, the median age was 49 years, compared with 46 years in 2000. In 2007, the median age of a male dentist in Texas was 52 years, and of a female dentist, 38 years (Appendix, item 12). In non-metropolitan counties, approximately one in ten dentists were females (12.1 percent), compared to one out of four

dentists in metropolitan counties (26.6 percent). In the border counties, 19.7 percent of the dentists were female, while 25.7 percent in the non-border counties were female.

Figure 17. Dentists per 100,000 Population: U.S. and Texas, 1981–2007



Sources: Texas State Board of Dental Examiners 1981–2007; HRSA, Bureau of Health Professions; American Dental Association

Dental HPSA

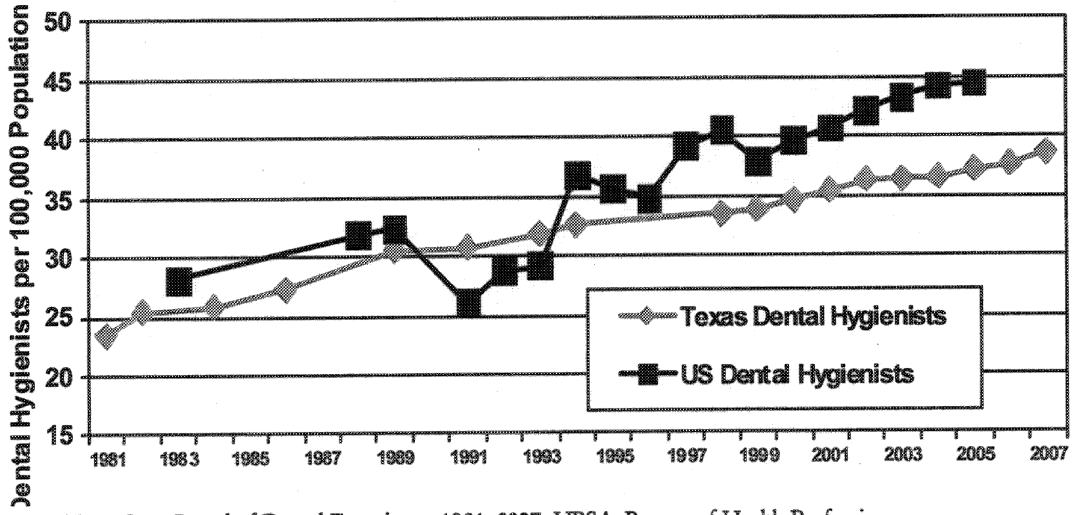
In January 2008, 111 counties in Texas had some type of HPSA designation, which indicated that the area or population group was experiencing a shortage of dentists. Eighty-two of those designations were for whole counties (Appendix, item 25).

Dental Hygienists

"These health professionals perform services and procedures in the dental office of his/her supervising dentist or dentists who are legally engaged in the practice of dentistry in this state or under the supervision of a supervising dentist in an alternate setting" (Texas Occupations Code, Chapter 262). They are eligible for licensure after graduating from a community college (two-year program) or from a three or four-year university program. The supply ratios of dental hygienists per 100,000 population have steadily increased in Texas since 1981 (Figure 18). The supply ratios for Texas have lagged behind the U.S. average ratios for most of the past two decades.

There were 9,188 dental hygienists practicing in Texas in 2007. Because dental hygienists often practice in combination with dentists in Texas, their geographic distribution is often linked to that of dentists. Thus, the ratios for dental hygienists were much higher in metropolitan than in non-metropolitan counties in 2007 (Appendix, item 13). Most of the border counties have very low supply ratios. In 2007, there were 57 counties with no dental hygienists, and 47 counties with no dentists. Between 1998 and 2007, 96 counties experienced a decline in their ratios, while the ratios for 49 counties more than doubled; this includes 14 counties that did not have a dental hygienist in 1998 but that had one in 2007. Between 1998 and 2007, 10 counties lost all of their dental hygienists, and 9 counties lost all of their dentists - including three counties that lost all of both. The median age of dental hygienists in 2007 was 42 years, compared to 40 in 2000.

Figure 18. Dental Hygienists per 100,000 Population, U.S. and Texas, 1981–2007



Sources: Texas State Board of Dental Examiners, 1981–2007; HRSA, Bureau of Health Professions.

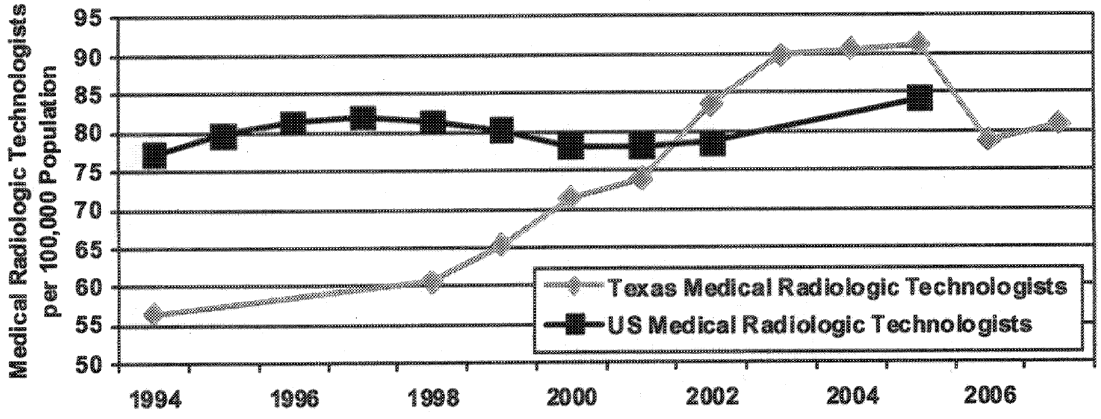
ALLIED HEALTH PROFESSIONS

- **Medical Radiologic Technologists**
- **Occupational Therapists**
- **Optometrists**
- **Pharmacists**
- **Physical Therapists**
- **Respiratory Care Practitioners**

Medical Radiologic Technologist (MRT)

MRTs are certified by the Professional Licensing and Certification Unit at the Texas Department of State Health Services. They administer radiation to persons for medical purposes under the direction of a practitioner. The definition includes diagnostic radiography, nuclear medicine, and radiation therapy. There were 19,204 MRTs practicing in Texas in 2007. During the 1990s, the supply ratios of MRTs per 100,000 population in Texas lagged behind the U.S. average supply ratios; however, however, the Texas ratios have fluctuated dramatically since 2005. In 2002, the Texas ratios surpassed those of the United States (Figure 19). Non-metropolitan counties had lower supply ratios than did metropolitan counties and, in general, the border counties had lower ratios (57.0 overall) than did the rest of the state (Appendix, item 14). In 2007, there were 37 counties with no MRTs; most of these were in West Texas, South Texas, and the Panhandle. Since 1998, ratios have grown in counties distributed throughout the state, including some of the border counties, although many of the border counties had no MRTs or a decrease in ratios. Thirteen counties that did not have an MRT in 1998 had at least one in 2007. However, eight counties that had MRTs in 1998 did not have any in 2007. As it was in 2000, the median age of MRTs in 2007 was 41 years.

Figure 19. Medical Radiological Technologists per 100,000 Population: U.S. and Texas, 1994–2007



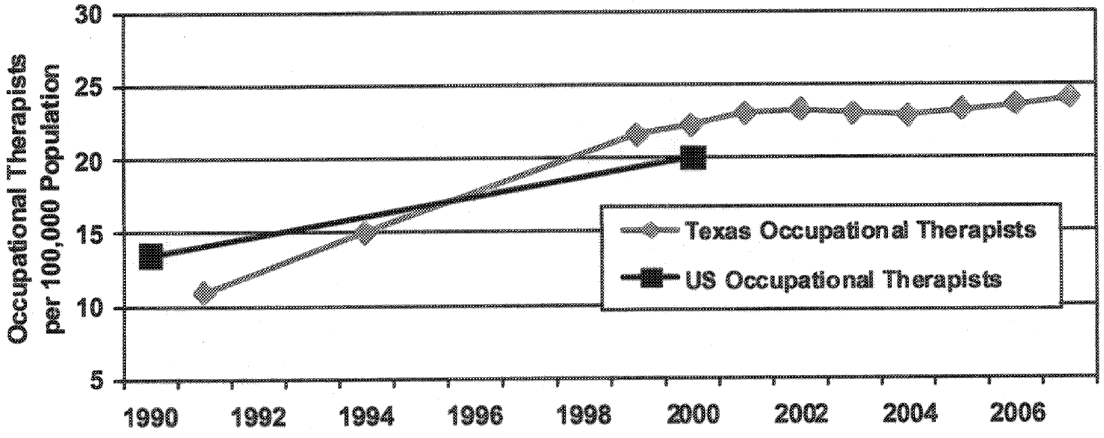
Sources: Texas Department of State Health Services, Professional Licensing and Certification Unit 1994–2005; American Registry of Radiologic Technologists

Occupational Therapists (OTs)

The supply ratios of OTs per 100,000 population in Texas have risen steadily over the last decade. And, in the late 1990s, the state ratios have been higher than the U.S. average ratios, but US data from HRSA wasn't available after 2000 (Figure 20).

There were 5,729 OTs practicing in Texas in 2007. The ratios for OTs were higher in the metropolitan areas than in the non-metropolitan areas, but the ratios were generally lower for the border counties than in the rest of the state (Appendix, item 15). Since 2000, 80 counties have experienced an increase in their OT ratios; however, in 2007, there were 97 counties that did not have an OT. Twenty-one counties that did not have an OT in 2000 had at least one in 2007. The median age for OTs in 2007 was 40 years, compared with 37 in 2002.

Figure 20. Occupational Therapists per 100,000 Population, U.S. and Texas, 1990-2007



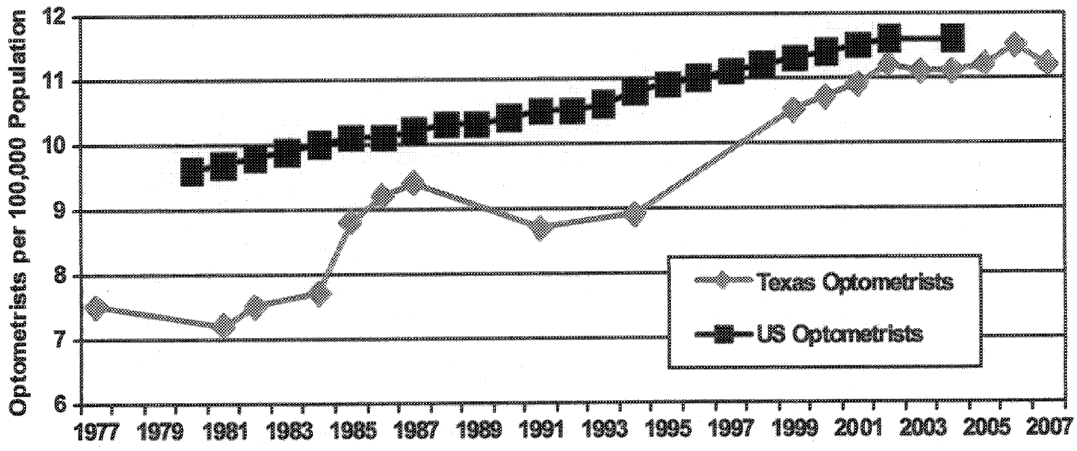
Sources: The Executive Council of Physical Therapy & Occupational Therapy Examiners; HRSA, Bureau of Health Professions

Optometrists

The University of Houston College of Optometry is the only accredited school of optometry in Texas. The ratios of optometrists per 100,000 population in Texas have lagged behind the U.S. supply ratios for over two decades, although the gap appears to be narrowing (Figure 21).

In 2007, there were 2,668 optometrists practicing in Texas. Optometrists are more likely to practice in metropolitan counties than non-metropolitan counties, but this hasn't always been the case (Appendix, item 16). Prior to 1984, the ratios for non-metropolitan counties were higher than those for metropolitan counties. However, since that time, the metropolitan county ratios have surpassed those of the non-metropolitan counties and the gap between the two has been steadily widening. In 2007, there were 109 counties that did not have an optometrist. Seven counties that did not have an optometrist in 2000 had a least one in 2007; however, eight counties that had optometrists in 2000 did not have any in 2007. In several areas of Texas, notably the lower Panhandle area and portions of West Texas, a patient would have to travel through several counties to reach an optometrist. The border counties have very low supply ratios and several counties have no optometrists. The median age in 2007 was 42 years, the same as in 2000.

Figure 21. Optometrists per 100,000 Population, U.S. and Texas, 1977–2007



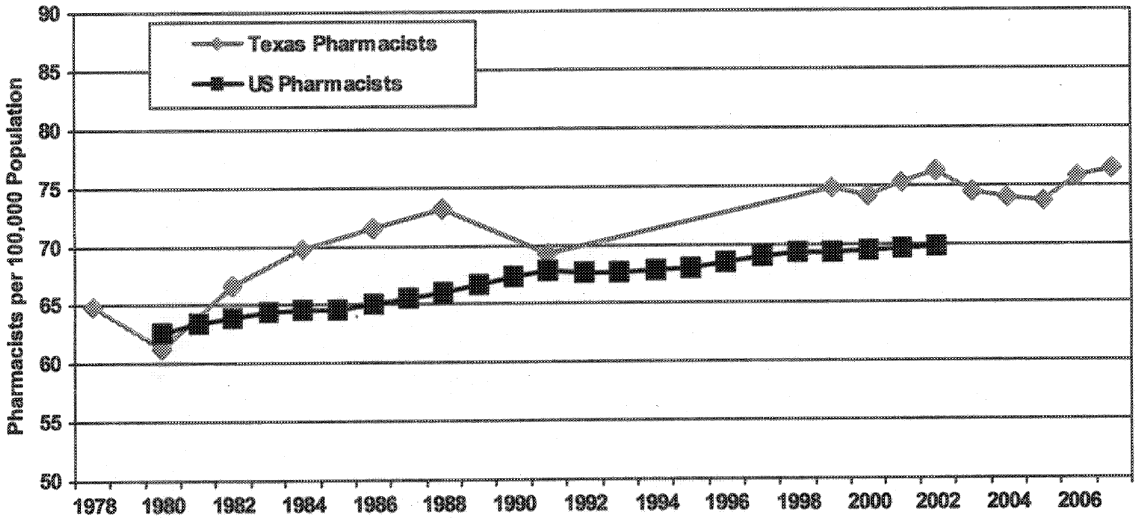
Sources: Texas Department of State Health Services, Professional Licensing and Certification Unit; HRSA, Bureau of Health Professions; U.S. Department of Labor, Bureau of Labor Statistics

Pharmacists

The state ratio of pharmacists per 100,000 population exceeded the U.S. average supply ratio from 1982-2002, the last year HRSA data was available. Since the mid-1990s, the supply ratios for Texas have been fairly static (Figure 22).

The ratios for pharmacists are higher in the metropolitan counties than in the non-metropolitan counties (Appendix, item 17). However, the ratios are the lowest for the border counties. In 2007, there were 24 counties that did not have a pharmacist. Between 2000 and 2007, 138 counties in Texas have experienced a decline in the ratios. However, two counties that did not have a pharmacist in 2000 had at least one in 2007. The median age in 2007 was 46 years, compared with 44 in 2000.

Figure 22. Pharmacists per 100,000 Population, U.S. and Texas, 1978–2007



Sources: Texas State Board of Pharmacy; HRSA, Bureau of Health Professions

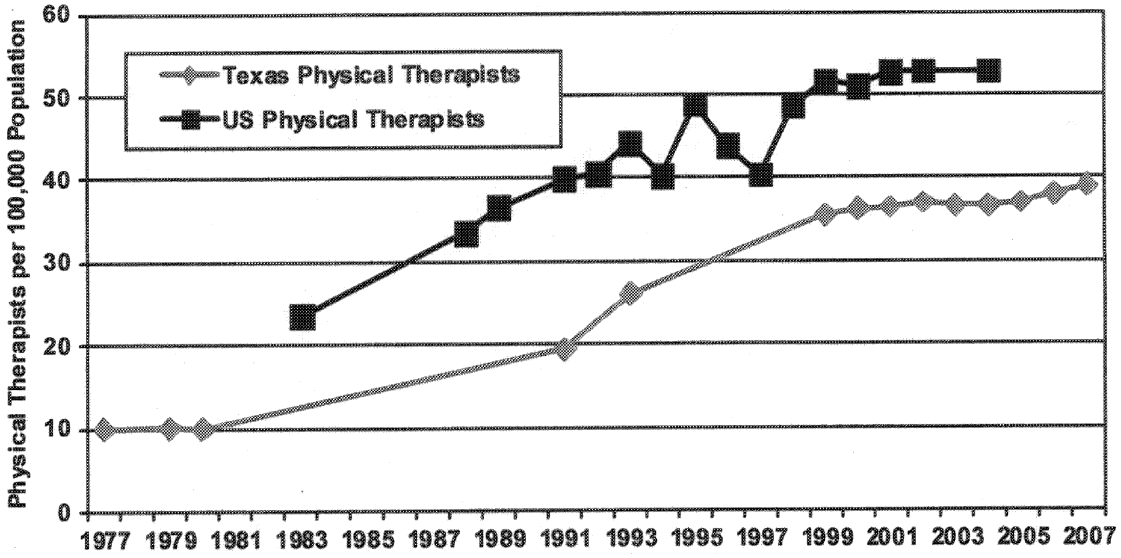
Physical Therapists (PTs)

There are no bachelor's degree programs for PTs in the U.S.; the only entry level PT degree is a master's degree. The state requires that PTs hold a bachelor's degree in any major, and at least a master's degree from an accredited PT program; they must also pass a national exam administered by the Executive Council of Physical Therapy and Occupational Therapy Examiners. There are ten accredited PT educational programs in the state.

The supply ratios for PTs per 100,000 population in Texas have increased over the past 30 years; however, the Texas supply ratios have consistently lagged behind the U.S. average; and, the rate of increase in Texas has decreased over the last few years, with the ratio showing only small increases since 1999 (Figure 23).

There were 9,240 physical therapists practicing in Texas in 2007. The supply ratios are generally higher in metropolitan counties, with the exception of the border counties, which generally have much lower ratios (Appendix, item 18). In 2007, 47 counties did not have a PT. Between 2000 and 2007, the ratios increased in 119 counties, scattered across the state. Twenty-one counties that did not have a PT in 2000 had at least one in 2007. The median age in 2007 was 40 years, compared with 37 in 2001.

Figure 23. Physical Therapists per 100,000 Population, U.S. and Texas, 1977–2007



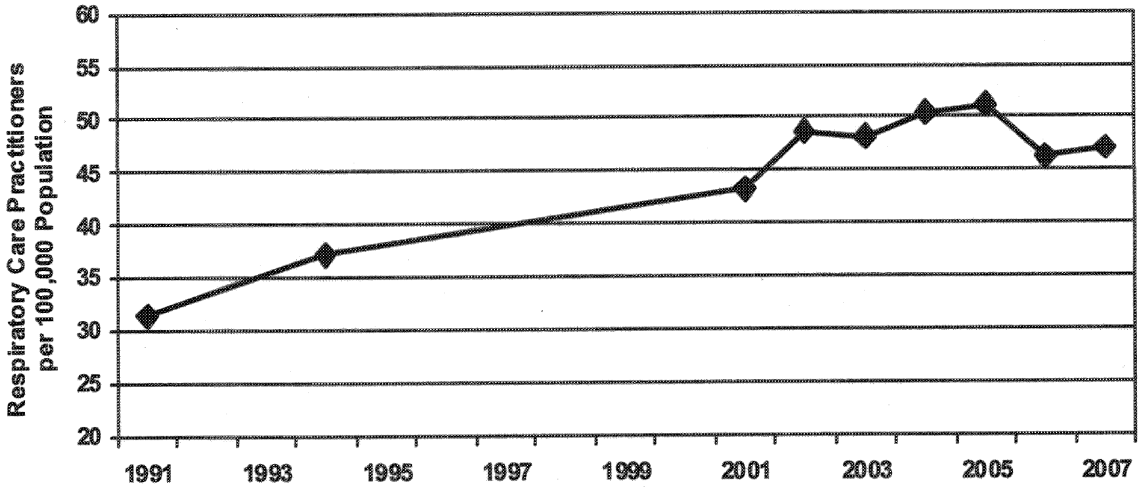
Sources: The Executive Council of Physical Therapy & Occupational Therapy Examiners; HRSA, Bureau of Health Professions

Respiratory Care Practitioners

The Professional Licensing and Certification Unit at the Texas Department of State Health Services issues licenses to respiratory care practitioners in Texas. The ratios of respiratory care practitioners per 100,000 population have risen overall since 1991, but the trend line has fluctuated in recent years (Figure 24). The non-metropolitan counties had much lower ratios than the metropolitan counties, and the gap is increasing (Appendix, item 19). Data on gender and race-ethnicity were not available.

In 2007, there were 11,666 respiratory care practitioners in Texas. While some areas of Texas have an adequate number of respiratory care practitioners, other areas - such as the non-metropolitan, West Texas, South Texas, and the Panhandle areas - had lower supply ratios. Most of the counties with no respiratory care practitioners were in these areas. In 2007, there were 56 counties with no respiratory care practitioners, compared to 67 in 2001. However, eight counties that had respiratory care practitioners in 2001 did not have any in 2007, while 19 counties that did not have a respiratory care practitioner in 2001 had at least one in 2007. In 2007, the median age was 43 years, compared with 40 years in 2001. National supply ratios for respiratory care practitioners were not available.

Figure 24. Respiratory Care Practitioners per 100,000 Population, Texas, 1991-2007



Source: Texas Department of State Health Services, Professional Licensing and Certification Unit

MENTAL HEALTH PROFESSIONS

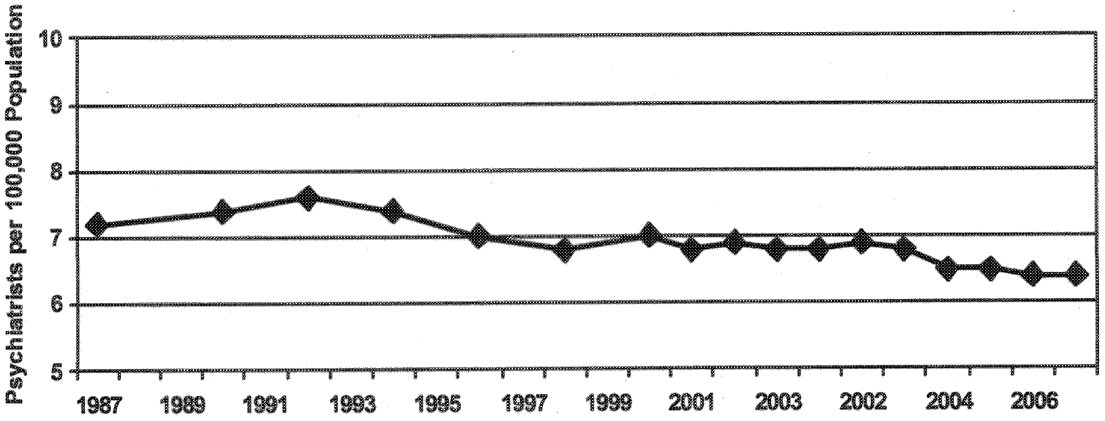
- **Psychiatrists**
- **Psychologists**
- **Social Workers**
- **Licensed Professional Counselors**
- **Advanced Practice Nurses**

Psychiatrists

There were 1,510 psychiatrists licensed by the Texas Medical Board in August 2007. In addition to physicians practicing in the specialty of psychiatry, physicians with a specialty of child psychiatry (192 of the 1,510) were included in this report on "psychiatrists" to comply with the HPSA definition of "general" psychiatry. The ratio of psychiatrists per 100,000 population began to increase around 1986, stabilized for several years, then, in about 1992, began to decline. From 1996 to 2003, the ratios stabilized again, but in 2004 the ratios again began to decline (Figure 25). National supply ratios for psychiatrists were not available.

Two-thirds (65.9 percent) of Texas' psychiatrists were male in 2007; and, 60.5 percent of the psychiatrists were over 50 years of age; the median age was 54 years, compared with 52 in 2000. The supply ratios for psychiatrists per 100,000 population were the largest in metropolitan counties. Metropolitan border counties had lower supply ratios than did metropolitan non-border counties, but the non-metropolitan border counties had higher ratios than did the non-metropolitan non-border counties. (Appendix, item 20).

Figure 25. Psychiatrists per 100,000 Population, Texas, 1987–2007



Source: Texas Medical Board

Mental Health HPSAs

In January 2008, there were 184 whole counties designated by the U.S. Department of Health and Human Services as mental health HPSAs in Texas, and two counties designated as partial-county HPSAs. Two counties had a "low-income population" HPSA designation (Appendix, item 26).

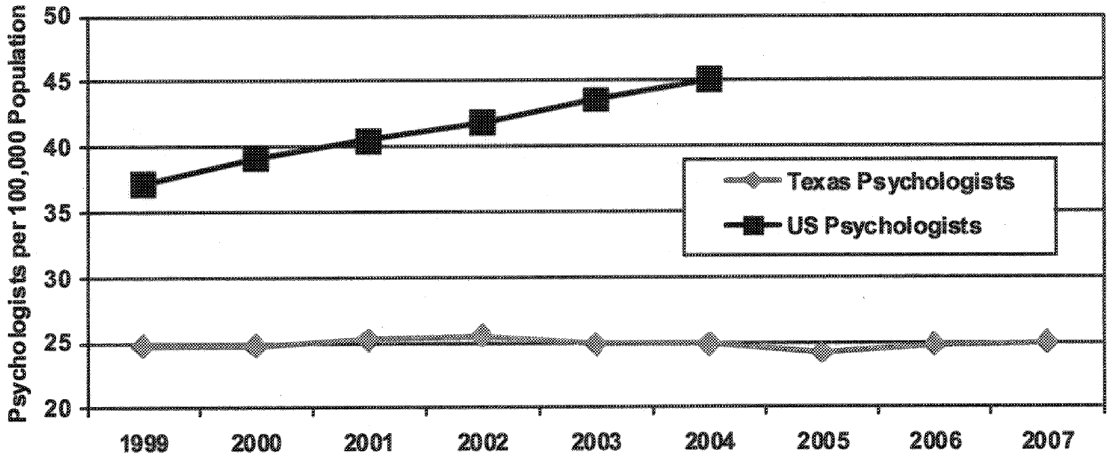
Psychologists

In Texas, there are four categories of licensees recognized by the Texas State Board of Examiners of Psychologists (TSBEP): Licensed Psychologist (LP), Provisionally Licensed Psychologist (PLP), Licensed Specialist in School Psychology (LSSP), and Licensed Psychological Associate (LPA). A psychologist may hold more than one of these licenses. The statistics in this report represent an unduplicated count of these four license types; therefore, there were 5,942 psychologists practicing in Texas in 2007. Only psychologists' license numbers and mailing address were available for analysis in 2007 because the TSBEP is one of only a few boards that do not collect age, gender and race-ethnicity data on its licensees. Of the four categories, licensed psychologists were in greatest supply in 2007. Since 1999, the available data indicates that the psychologist supply ratios have been higher for the United States than for Texas (Figure 26).

The psychologist supply ratios have been holding fairly steady since 1999, running between 24.2 and 25.5. The supply ratios have been greater in Texas metropolitan counties than in

non-metropolitan counties over the past seven years (Appendix, item 21). In 2007, the largest concentration of counties with high ratios was in Central Texas. The border counties, Panhandle counties, and West Texas counties had very low ratios; many of these counties did not even have a psychologist. Also, very few of the counties in those areas had an increase in supply ratios between 2000 and 2007. Since 2000, 78 counties had a decrease in the supply ratios, while 83 counties had an increase. In 2007, 108 counties did not have a psychologist. Twenty-four counties that had no psychologists in 2000 had at least one in 2005, but sixteen counties that had a psychologist in 2000 had none in 2007.

Figure 26. Psychologists per 100,000 Population, U.S. and Texas, 1999–2007



Sources: Texas State Board of Examiners of Psychologists, 1999–2007; U.S. Bureau of the Census
Note: Actual U.S data were used only for 1999; data for 2000-2004 were interpolated by HPRC staff using available data for past years and a linear regression model.

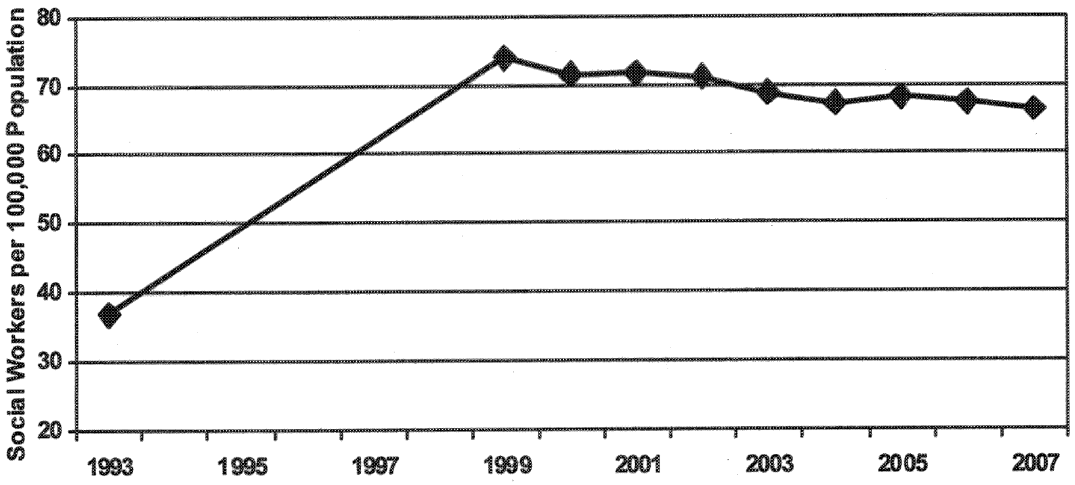
Social Workers

The Professional Licensing and Certification Unit at the Texas Department of State Health Services issues licenses to social workers in Texas. The ratios of social workers per 100,000 population over the last nine years have been fairly constant; however, the overall trend appears to be favoring a slight decline in the magnitude of the ratio (Figure 27). The non-metropolitan counties had much lower ratios than the metropolitan counties (Appendix, item 22). Data on gender and race-ethnicity are not available.

In 2007, there were 15,743 social workers in Texas. While some areas of Texas have an adequate number of social workers, other areas - such as the non-metropolitan, West Texas, South Texas, and the Panhandle areas - had lower supply ratios. Most of the counties with

no social workers were in these areas; only five counties with no social workers were located east of I-35. In 2007, there were 37 counties with no social workers, compared to 36 in 2000. However, fourteen counties that had social workers in 2000 did not have any in 2007, while fifteen counties that did not have social workers in 2000 had at least one in 2007. In 2007, the median age was 48 years, compared with 45 years in 2001. National supply ratios for social workers were not available.

Figure 27. Social Workers per 100,000 Population, Texas, 1993–2007



Source: Texas Department of State Health Services, Professional Licensing and Certification Unit

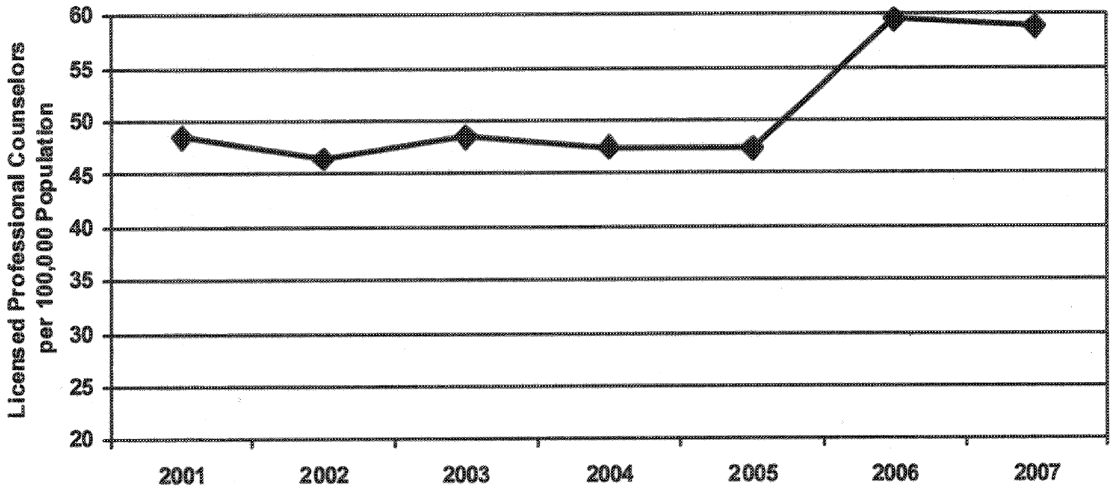
Licensed Professional Counselors

The Professional Licensing and Certification Unit at the Texas Department of State Health Services issues licenses to professional counselors in Texas. The ratios appeared to increase significantly in 2006, but this was due to a new methodology in which interns are now included in the numbers (Figure 28). The non-metropolitan counties had much lower ratios than the metropolitan counties (Appendix, item 23).

In 2007, there were 13,967 Licensed Professional Counselors practicing in Texas. In 2007, there were 47 counties with no Licensed Professional Counselors, compared to 49 in 2001. Between 2001 and 2007, the supply ratios for 68 counties declined and thirteen of them lost all of their licensed professional counselors. Fifteen counties that did not have a counselor in 2001 had at least one in 2007. The median age in 2007 was 51 years, the same as in 2001. However, the median age in 2005 was 54; a significant factor in the decrease is the addition

of the interns to the database; the median age for the non-intern Licensed Professional Counselors was 53 in 2007.

Figure 28. Licensed Professional Counselors per 100,000 Population, Texas, 2001–2007



Source: Texas Department of State Health Services, Professional Licensing and Certification Unit

Advanced Practice Nurses (APNs)

The Texas Board of Nursing recognizes APNs in various clinical practice areas. Nurse Practitioners (NPs) may be recognized in one of 12 clinical areas. In 2007, there were 136 NPs with Psychiatric / Mental Health / Substance Abuse recognitions, an increase from 2000, when there were 49 NPs with P/MH/SA recognitions. The median age of these nurses in 2007 was 51 years, compared with 48 years in 2000. Clinical Nurse Specialists may be recognized in one of 14 clinical areas. In 2007, there were 155 CNSs with P/MH/SA recognitions, a decrease from 2000, when there were 186 CNSs with P/MH recognitions. In 2007, the median age of these nurses was 57 years, compared with 52 years in 2000.

Notes

1. Regional Center for Health Workforce Studies at the Center for Health Economics and Policy, The University of Texas Health Science Center at San Antonio (2005). *Health and Nurses in Texas. In Their Own Words: 2004 Survey of Texas Registered Nurses.*

2. Center for Health Workforce Studies, School of Public Health, University at Albany. (December 2005). *The Impact of the Aging Population on the Health Workforce in the United States.*

3. Bureau of Health Professions in Health Resources and Services Administration, U.S. Department of Health and Human Services. (July 2002). *Projected Supply, Demand, and Shortages of Registered Nurses: 2000-2020.*

1. Reineck, C. and Furino, A. Regional Center for Health Workforce Studies at the Center for Health Economics and Policy. Health and Nurses in Texas – In Their Own Words: 2006 Survey of Texas Registered Nurses, (The University of Texas Health Science Center at San Antonio, Texas: Spring 2007).

5. Kishi, A., Ponder, A., Wiebusch, P., Pickens, S. and Gunn, B. Texas Center for Nursing Workforce Studies. *Professional Nursing Education in Texas – Demographics and Trends 2006,* (Austin, Texas: October 2007), pp. 21-22. Available online at http://www.dshs.state.tx.us/chs/cnws/Npublica.shtm

6. American Association of Colleges of Nursing. *Nursing Faculty Shortage Fact Sheet,* (Washington DC: March 7, 2007), p. 1.

7. Ibid.

8. National League for Nursing. *Nurse Faculty Support Continues to Fall Short,* (New York City: July 24, 2006), p. 1.

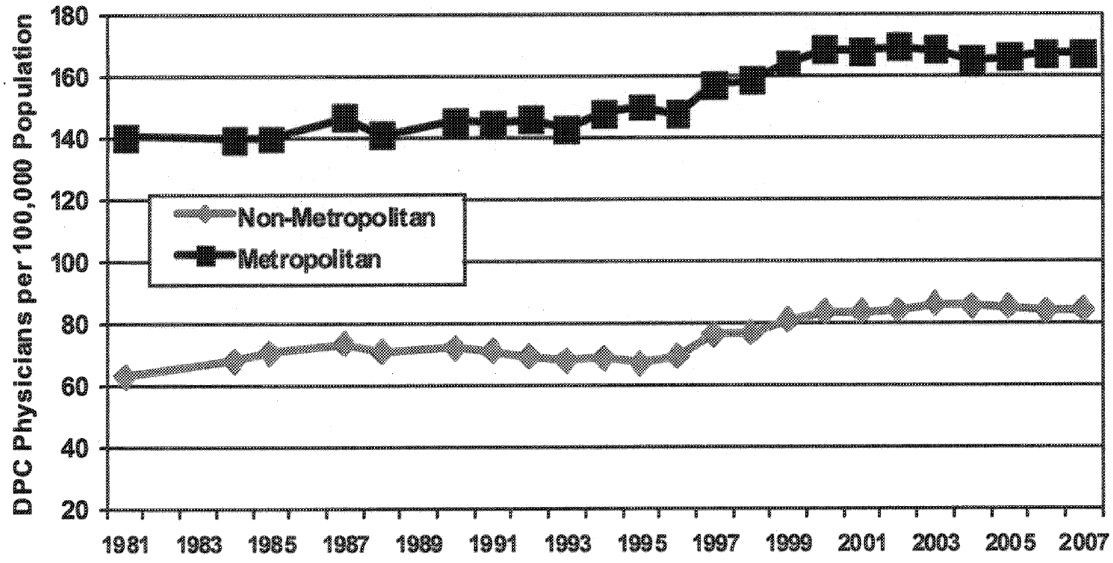
Appendix

Health Workforce Data

Appendix Item 1

Direct Patient Care Physicians

DPC Physicians per 100,000 Population, Metropolitan and Non-Metropolitan Counties, Texas, 1981–2007



Source: Texas Medical Board
Source for *metropolitan–non-metropolitan* definition: Office of Management and Budget
Figures include all licensed, active, non-federal, non-resident in training physicians

<u>2007 Texas Direct Patient Care Physician Facts:</u>

White	66.0%	Male	75.2%	Median Age Male	51
Black	4.6%	Female	24.8%	Median Age Female	44
Hispanic	11.5%				
Other	17.9%				

Number of counties with no direct patient care physicians – 25

	Providers/100,000 Population
Border Metropolitan	107.7
Non-Border Metropolitan	174.3
Border Non-Metropolitan	51.8
Non-Border Non-Metropolitan	89.3

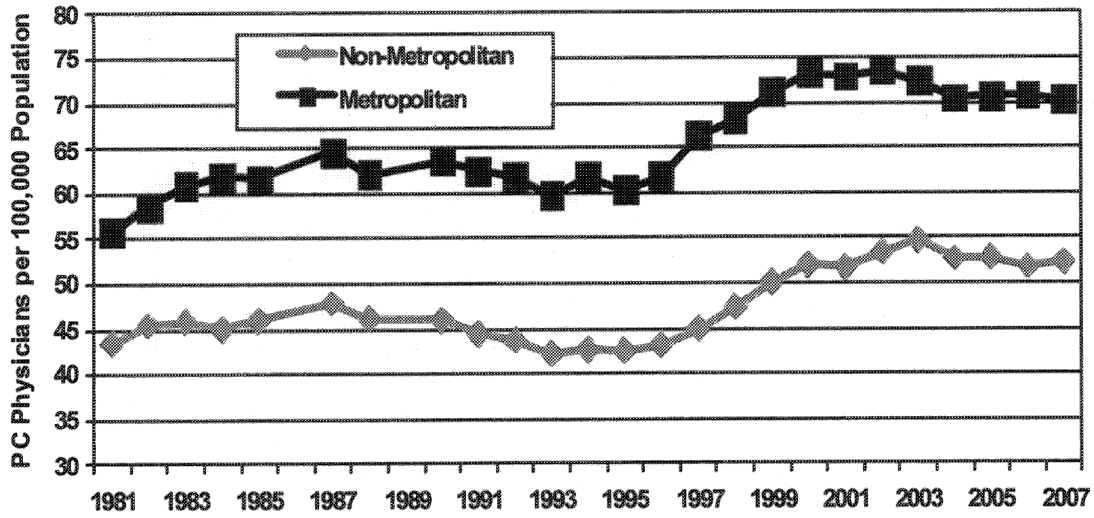
<u>Trends:</u>

Year	Number	Providers/100,000 Population
1990	22,711	133.7
1995	25,683	137.2
2000	31,769	156.2
2005	35,811	155.7
2007	37,177	157.6

Appendix Item 2

Primary Care Physicians

PC Physicians per 100,000 Population, Metropolitan and Non-Metropolitan Counties, Texas, 1981–2007



Source: Texas Medical Board
Source for *metropolitan–non-metropolitan* definition: Office of Management and Budget
Figures include all licensed, active, non-federal, non-resident in training physicians

2007 Texas Primary Care Physician Facts:

White	59.4%	Male	66.1%	Median Age Male	48
Black	6.2%	Female	33.9%	Median Age Female	42
Hispanic	14.2%				
Other	20.2%				

Number of counties with no primary care physicians – 27

	Providers/100,000 Population
Border Metropolitan	53.3
Non-Border Metropolitan	72.2
Border Non-Metropolitan	36.1
Non-Border Non-Metropolitan	54.5

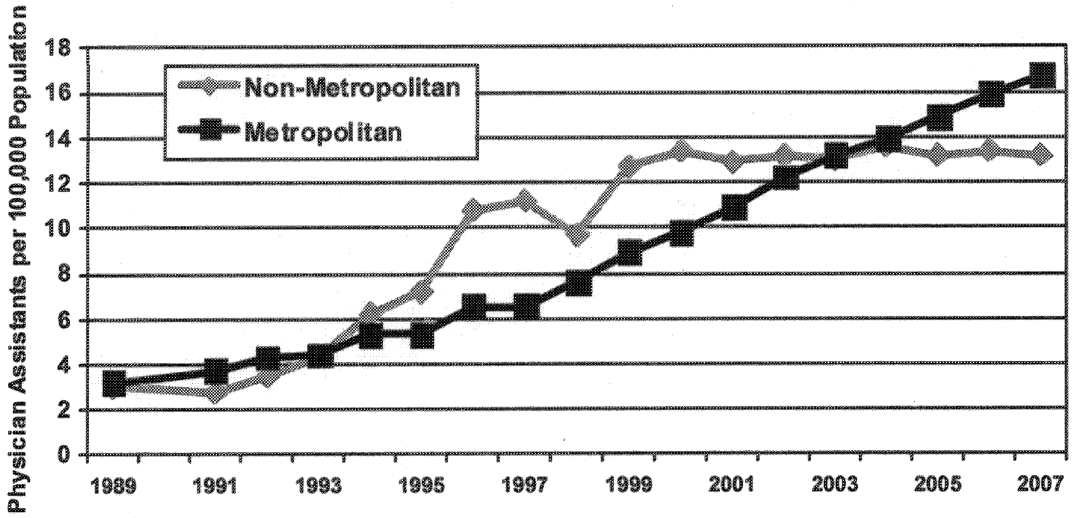
Trends:

Year	Number	Providers/100,000 Population
1990	10,308	60.7
1995	10,763	57.5
2000	14,268	70.1
2005	15,718	68.3
2007	16,120	67.9

Appendix Item 3

Physician Assistants

Physician Assistants per 100,000 Population, Metropolitan and Non-Metropolitan Counties, Texas, 1989–2007



Source: Texas Medical Board
Source for *metropolitan–non-metropolitan* definition: Office of Management and Budget
Figures include all licensed, active, in-state physician assistants

2007 Texas Physician Assistant Facts:

White	74.5%	Male	43.0%	Median Age Male	46
Black	5.6%	Female	57.0%	Median Age Female	36
Hispanic	13.5%				
Other	6.5%				

Number of counties with no physician assistants – 62

	Providers/100,000 Population
Border Metropolitan	13.3
Non-Border Metropolitan	17.1
Border Non-Metropolitan	15.2
Non-Border Non-Metropolitan	13.0

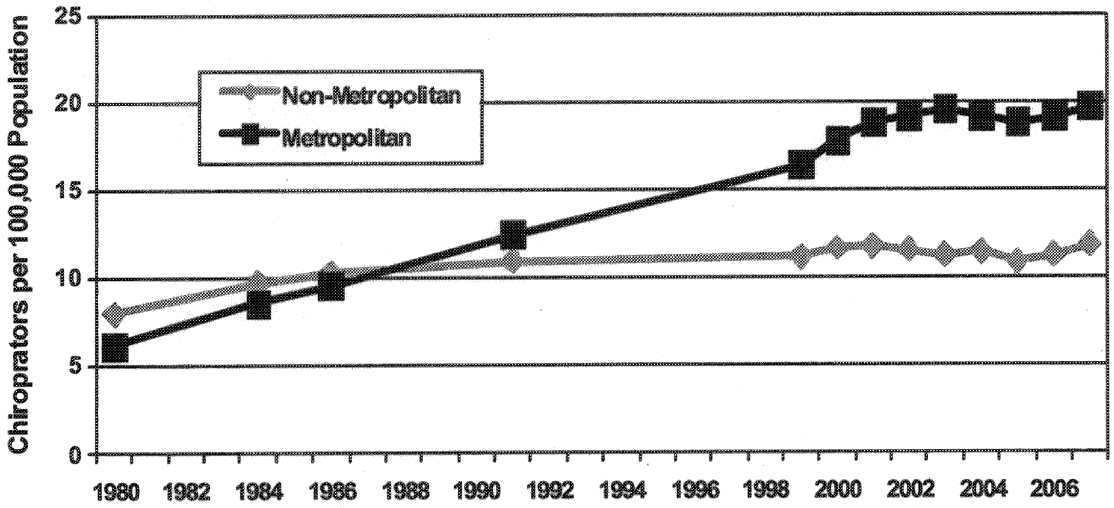
Trends:

Year	Number	Providers/100,000 Population
1991	622	3.6
1995	1,052	5.6
2000	2,106	10.4
2005	3,375	14.7
2007	3,862	16.3

Appendix Item 4

Chiropractors

Chiropractors per 100,000 Population, Metropolitan and Non-Metropolitan Counties, Texas, 1980–2007



Source: Texas Board of Chiropractic Examiners
Source for *metropolitan–non-metropolitan* definition: Office of Management and Budget
Figures include all licensed, active, in-state chiropractors

2007 Texas Chiropractor Facts:

Race-ethnicity data not available

Male	76.9%	Median Age Male	43
Female	23.1%	Median Age Female	39

Number of counties with no chiropractors – 76

	Providers/100,000 Population
Border Metropolitan	8.4
Non-Border Metropolitan	20.9
Border Non-Metropolitan	4.2
Non-Border Non-Metropolitan	13.0

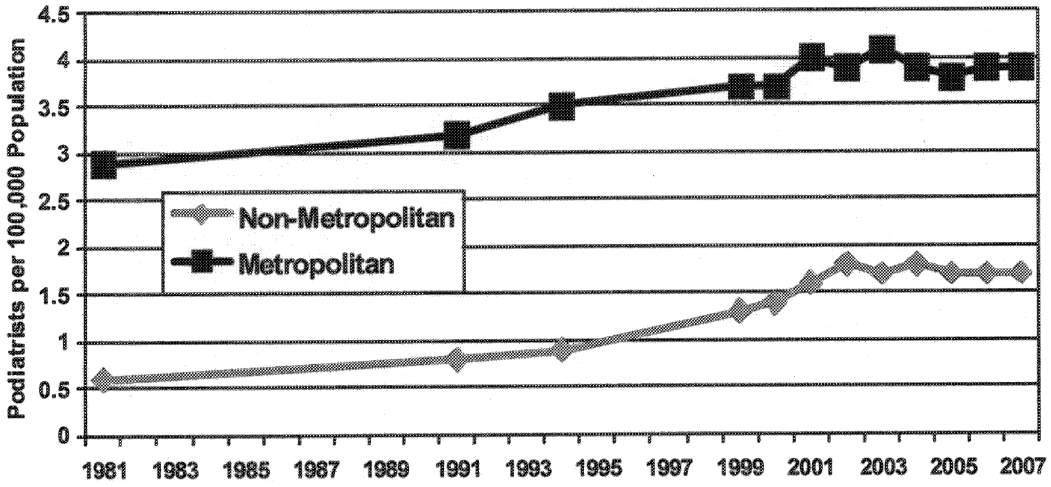
Trends:

Year	Number	Providers/100,000 Population
1990	1,972	11.6
1994	2,325	12.7
2000	3,426	16.8
2005	4,091	17.8
2007	4,424	18.6

Appendix Item 5

Podiatrists

Podiatrists per 100,000 Population, Metropolitan and Non-Metropolitan Counties, Texas, 1981–2007



Source: Texas State Board of Podiatric Examiners
Source for *metropolitan–non-metropolitan* definition: Office of Management and Budget
Figures include all licensed, active, in-state podiatrists

2007 Texas Podiatrists Facts:

Race-ethnicity data not available

Male	80.6%	Median Age Male	47
Female	19.4%	Median Age Female	39

Number of counties with no podiatrists – 169

	Providers/100,000 Population
Border Metropolitan	2.5
Non-Border Metropolitan	4.1
Border Non-Metropolitan	1.3
Non-Border Non-Metropolitan	1.7

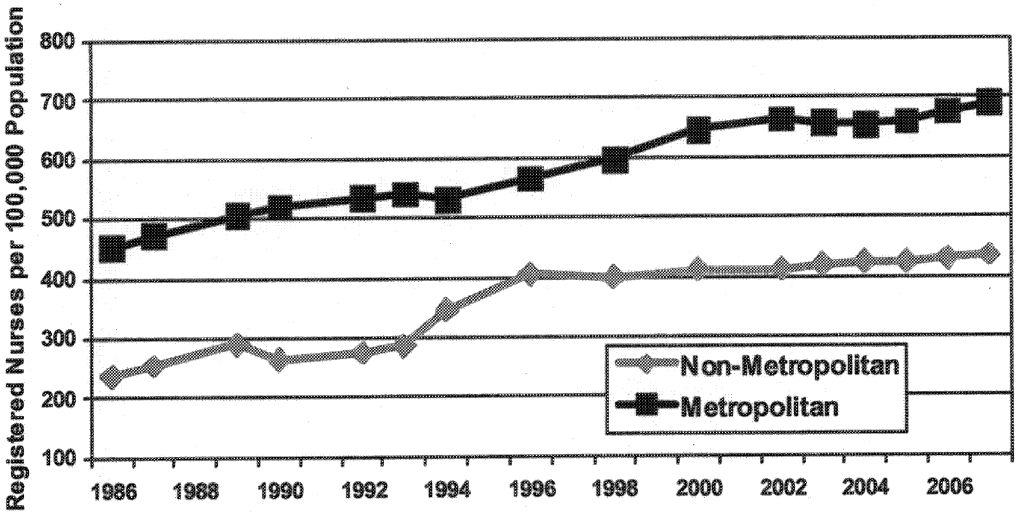
Trends:

Year	Number	Providers/100,000 Population
1991	496	2.9
1994	567	3.1
2000	682	3.4
2004	807	3.6
2007	865	3.6

Appendix Item 6

Registered Nurses

Registered Nurses per 100,000 Population, Metropolitan and Non-Metropolitan Counties, Texas, 1986–2007



Source: Texas Board of Nursing
Source for *metropolitan–non-metropolitan* definition: Office of Management and Budget
Figures include all licensed, active, in-state registered nurses

2007 Texas Registered Nurse Facts:

White	72.2%	Male	9.8%	Median Age Male	44
Black	8.1%	Female	90.2%	Median Age Female	47
Hispanic	9.4%				
Other	10.3%				

Number of counties with no registered nurses – 5

	Providers/100,000 Population
Border Metropolitan	468.9
Non-Border Metropolitan	715.3
Border Non-Metropolitan	224.5
Non-Border Non-Metropolitan	465.1

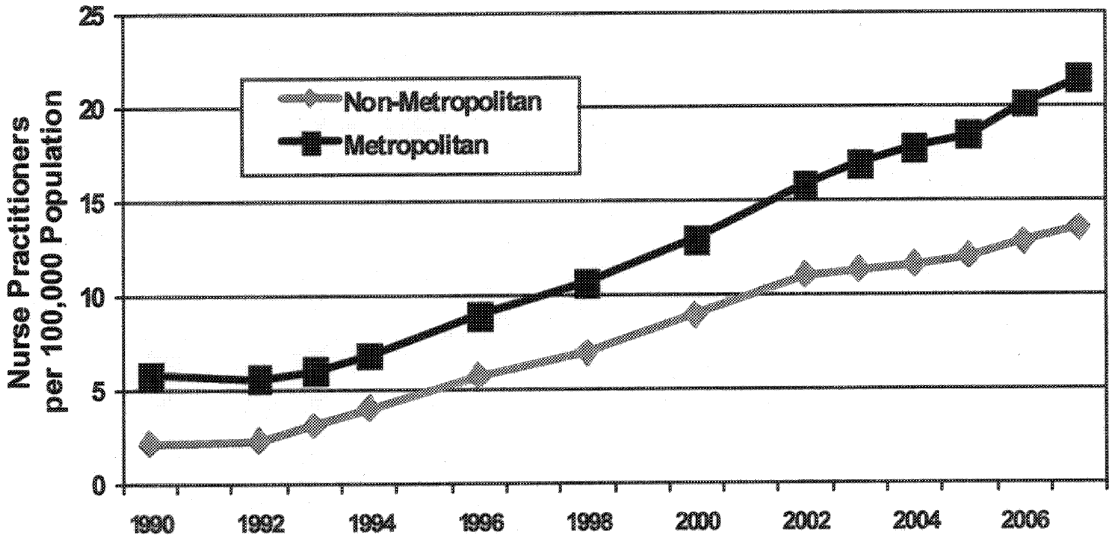
Trends:

Year	Number	Providers/100,000 Population
1990	81,320	478.7
1996	103,358	540.3
2000	124,495	611.9
2005	144,602	628.6
2007	155,858	656.8

Appendix Item 7

Nurse Practitioners

Nurse Practitioners per 100,000 Population, Metropolitan and Non-Metropolitan Counties, Texas, 1990–2007



Source: Texas Board of Nursing
Source for *metropolitan–non-metropolitan* definition: Office of Management and Budget
Figures include all licensed, active, in-state nurse practitioners

2007 Texas Nurse Practitioner Facts:

White	81.7%	Male	8.6%	Median Age Male	44
Black	5.5%	Female	91.4%	Median Age Female	48
Hispanic	7.7%				
Other	5.1%				

Number of counties with no nurse practitioners – 60

	Providers/100,000 Population
Border Metropolitan	14.2
Non-Border Metropolitan	22.3
Border Non-Metropolitan	8.1
Non-Border Non-Metropolitan	14.4

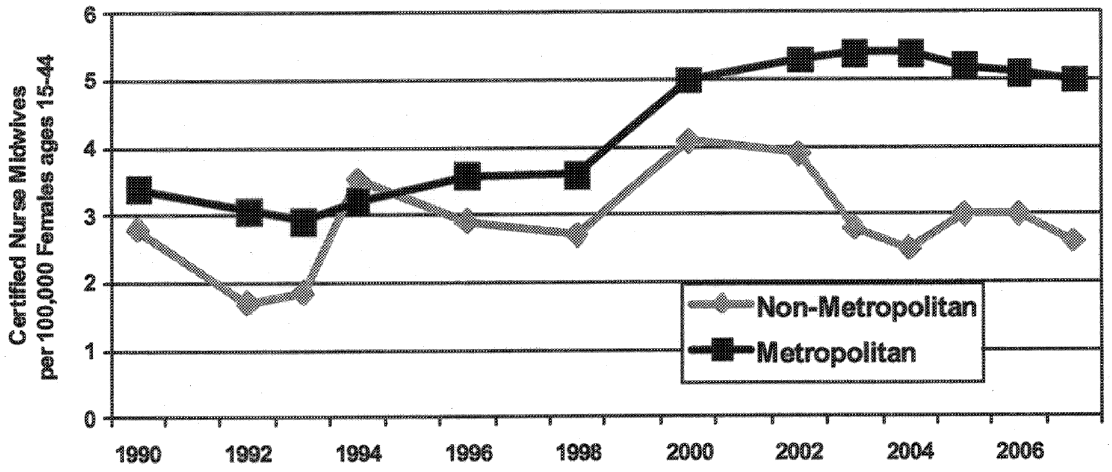
Trends:

Year	Number	Providers/100,000 Population
1991	964	5.6
1996	1,633	8.6
2000	2,517	12.4
2005	4,066	17.7
2007	4,858	20.5

Appendix Item 8

Certified Nurse Midwives

Certified Nurse Midwives per 100,000 Females ages 15–44, Metropolitan and Non-Metropolitan Counties, Texas, 1990–2007



Source: Texas Board of Nursing
Source for *metropolitan–non-metropolitan* definition: Office of Management and Budget
Figures include all licensed, active, in-state certified nurse midwives

<u>2007 Texas Certified Nurse Midwife Facts:</u>

White	86.7%	Male	0.8%	Median Age Male	49.5
Black	6.0%	Female	99.2%	Median Age Female	51.0
Hispanic	4.8%				
Other	2.4%				

Number of counties with no certified nurse midwives – 213

	Providers/100,000 Females Ages 15–44
Border Metropolitan	7.0
Non-Border Metropolitan	4.8
Border Non-Metropolitan	3.9
Non-Border Non-Metropolitan	2.4

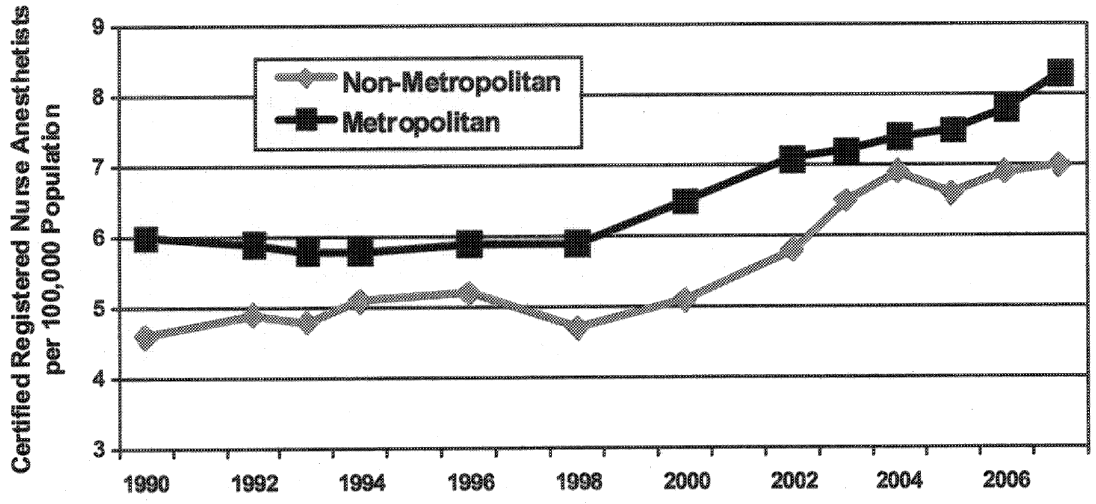
<u>Trends:</u>

Year	Number	Providers/100,000 Females Ages 15–44
1990	135	3.3
1996	155	3.5
2000	231	4.9
2005	244	5.0
2007	248	4.8

Appendix Item 9

Certified Registered Nurse Anesthetists

Certified Registered Nurse Anesthetists per 100,000 Population, Metropolitan and Non-Metropolitan Counties, Texas, 1990–2007



Source: Texas Board of Nursing
Source for *metropolitan–non-metropolitan* definition: Office of Management and Budget
Figures include all licensed, active, in-state certified nurse anesthetists

2007 Texas Certified Registered Nurse Anesthetist Facts:

White	88.5%	Male	45.9%	Median Age Male	51
Black	4.0%	Female	54.1%	Median Age Female	49
Hispanic	3.4%				
Other	4.1%				

Number of counties with no certified registered nurse anesthetists – 122

	Providers/100,000 Population
Border Metropolitan	7.2
Non-Border Metropolitan	8.4
Border Non-Metropolitan	4.7
Non-Border Non-Metropolitan	7.3

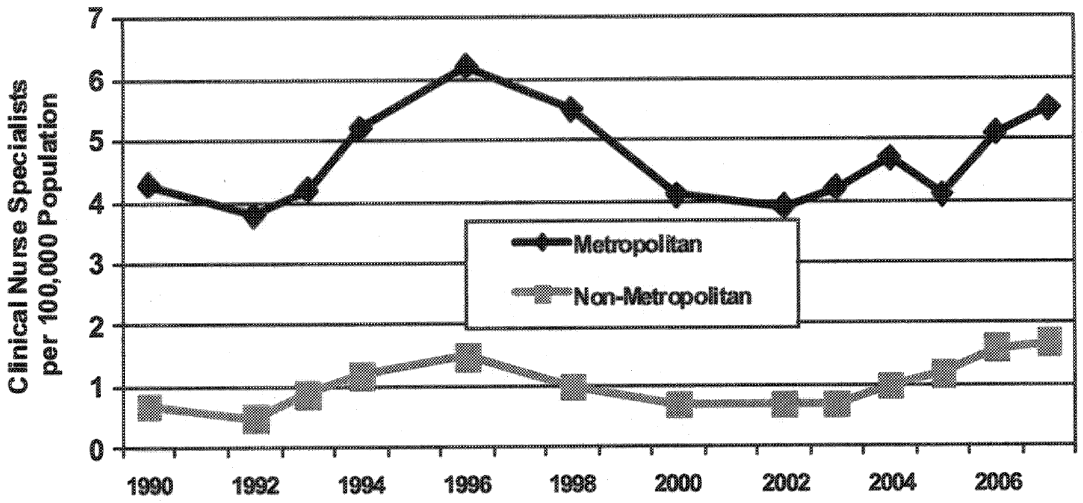
Trends:

Year	Number	Providers/100,000 Population
1990	983	5.8
1996	1,108	5.8
2000	1,274	6.2
2005	1,701	7.4
2007	1,922	8.1

Appendix Item 10

Clinical Nurse Specialists

Clinical Nurse Specialists per 100,000 Population, Metropolitan and Non-Metropolitan Counties, Texas, 1990–2007



Source: Texas Board of Nursing
Source for *metropolitan–non-metropolitan* definition: Office of Management and Budget
Figures include all licensed, active, in-state clinical nurse specialists

2007 Texas Clinical Nurse Specialist Facts:

White	80.0%	Male	10.4%	Median Age Male	49
Black	6.4%	Female	89.6%	Median Age Female	52
Hispanic	8.4%				
Other	5.2%				

Number of counties with no clinical nurse specialists – 167

	Providers/100,000 Population
Border Metropolitan	2.1
Non-Border Metropolitan	5.9
Border Non-Metropolitan	1.0
Non-Border Non-Metropolitan	1.8

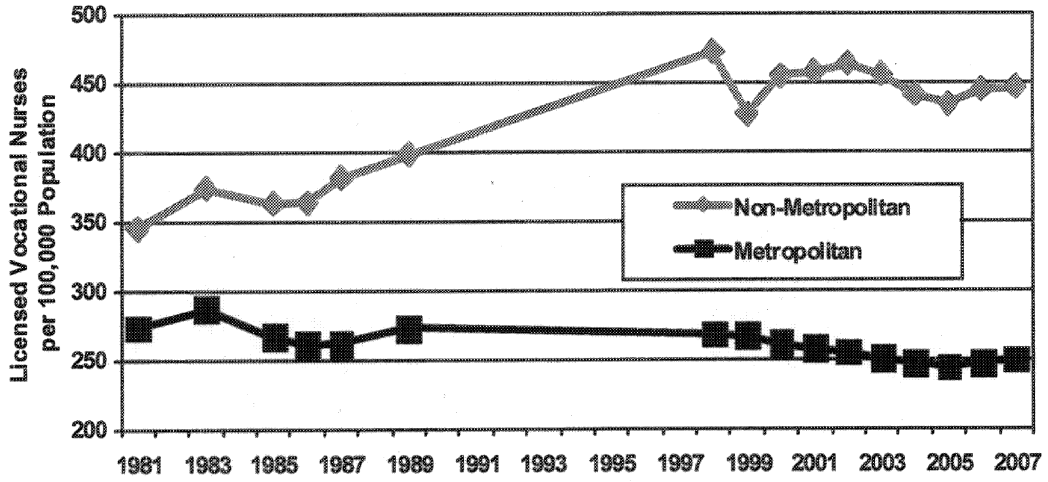
Trends:

Year	Number	Providers/100,000 Population
1990	631	3.7
1996	1,055	5.5
2000	724	3.6
2005	864	3.8
2007	1,198	5.0

Appendix Item 11

Licensed Vocational Nurses

Licensed Vocational Nurses per 100,000 Population, Metropolitan and Non-Metropolitan Counties, Texas, 1981–2007



Source: Texas Board of Nursing
Source for *metropolitan–non-metropolitan* definition: Office of Management and Budget
Figures include all licensed, active, in-state licensed vocational nurses

2007 Texas Licensed Vocational Nurse Facts:

White	58.2%	Male	9.6%	Median Age Male	42
Black	19.3%	Female	90.4%	Median Age Female	46
Hispanic	19.4%				
Other	3.1%				

Number of counties with no licensed vocational nurses – 6

	Providers/100,000 Population
Border Metropolitan	197.4
Non-Border Metropolitan	255.0
Border Non-Metropolitan	293.3
Non-Border Non-Metropolitan	467.9

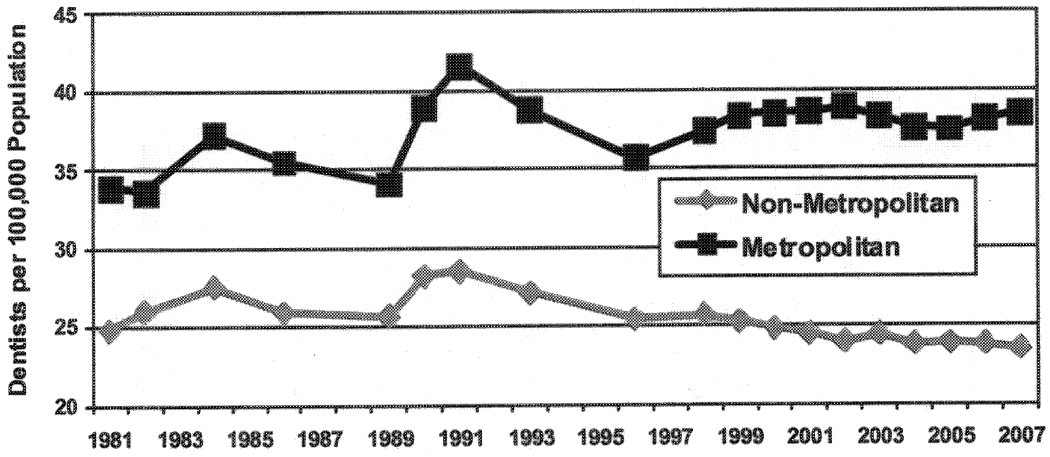
Trends:

Year	Number	Providers/100,000 Population
1989	49,389	293.9
1998	58,795	299.2
2000	59,034	290.2
2005	61,886	269.0
2007	65,230	274.9

Appendix Item 12

Dentist

Dentists per 100,000 Population, Metropolitan and Non-Metropolitan Counties, Texas, 1981–2007



Source: Texas State Board of Dental Examiners
Source for *metropolitan–non-metropolitan* definition: Office of Management and Budget
Figures include all licensed, active, in-state, non-federal dentists

2007 Texas Dentist Facts:

Race-ethnicity data not available

Male	74.6%	Median Age Male	52
Female	25.4%	Median Age Female	38

Number of counties with no dentists – 49

	Providers/100,000 Population
Border Metropolitan	15.7
Non-Border Metropolitan	41.1
Border Non-Metropolitan	11.8
Non-Border Non-Metropolitan	25.2

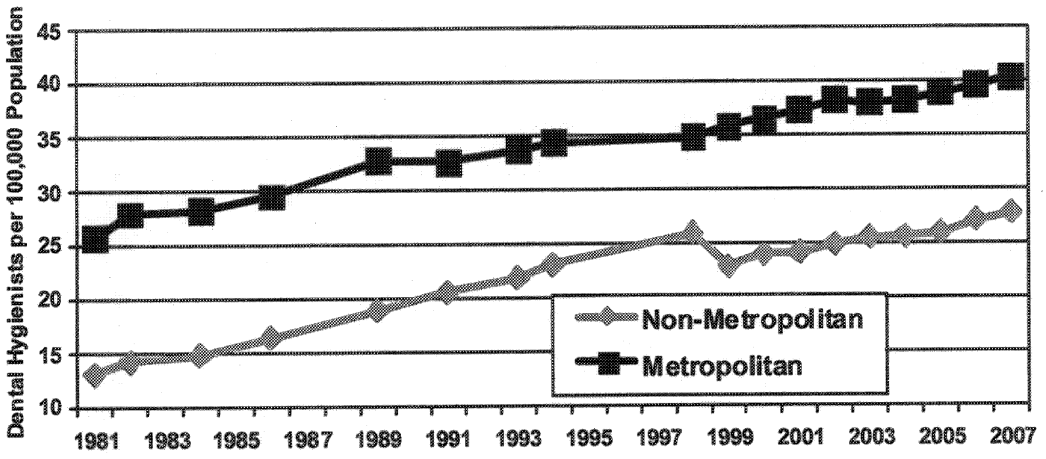
Trends:

Year	Number	Providers/100,000 Population
1990	6,320	37.2
1996	6,518	34.1
2000	7,417	36.5
2005	8,213	35.7
2007	8,671	36.5

Appendix Item 13

Dental Hygienists

Dental Hygienists per 100,000 Population, Metropolitan and Non-Metropolitan Counties, Texas, 1981–2007



Source: Texas State Board of Dental Examiners
Source for *metropolitan–non-metropolitan* definition: Office of Management and Budget
Figures include all licensed, active, in-state, dental hygienists

2007 Texas Dental Hygienist Facts:

Race-ethnicity data not available

Male	1.5%	Median Age Male	38
Female	98.5%	Median Age Female	42

Number of counties with no dental hygienists – 57

	Providers/100,000 Population
Border Metropolitan	18.6
Non-Border Metropolitan	42.8
Border Non-Metropolitan	8.4
Non-Border Non-Metropolitan	30.5

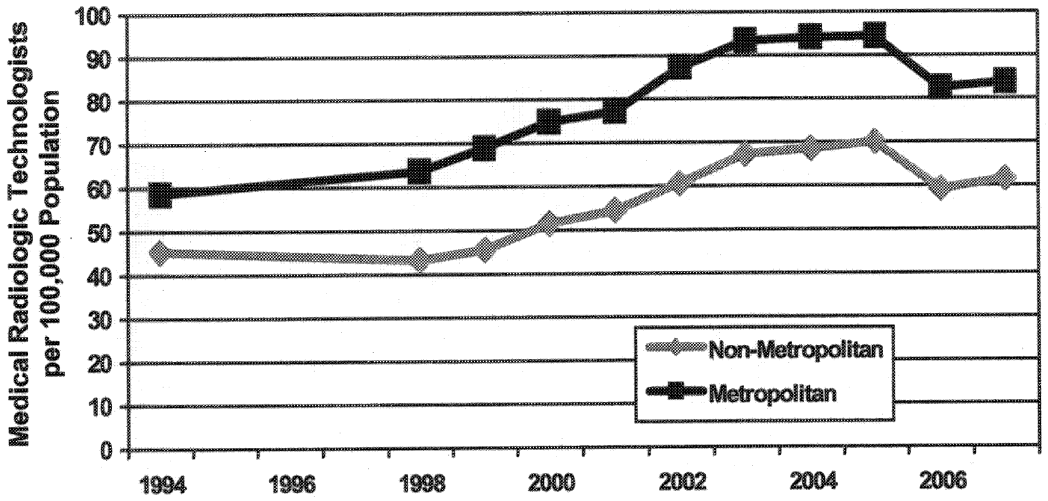
Trends:

Year	Number	Providers/100,000 Population
1991	5,338	30.8
1994	5,987	32.6
2000	7,057	34.7
2005	8,548	37.2
2007	9,188	38.7

Appendix Item 14

Medical Radiologic Technologists

Medical Radiologic Technologists per 100,000 Population, Metropolitan and Non-Metropolitan Counties, Texas, 1994–2007



Source: Professional Licensing and Certification Unit, DSHS
Source for *metropolitan–non-metropolitan* definition: Office of Management and Budget
Figures include all licensed, active, in-state medical radiologic technologists

2007 Texas Medical Radiologic Technologists Facts:

Race-ethnicity and gender data not available

Median Age 41

Number of counties with no medical radiologic technologists – 37

	Providers/100,000 Population
Border Metropolitan	62.1
Non-Border Metropolitan	86.3
Border Non-Metropolitan	29.3
Non-Border Non-Metropolitan	66.2

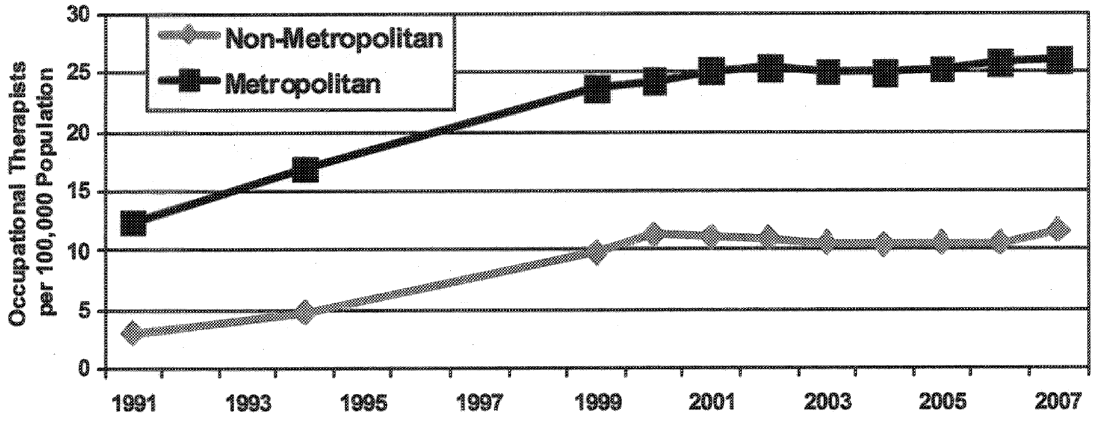
Trends:

Year	Number	Providers/100,000 Population
1994	10,385	56.5
1998	11,907	60.6
2000	14,517	71.4
2005	20,972	91.2
2007	19,204	80.9

Appendix Item 15

Occupational Therapists

Occupational Therapists per 100,000 Population, Metropolitan and Non-Metropolitan Counties, Texas, 1991–2007



Source: The Executive Council of Physical Therapy & Occupational Therapy Examiners
Source for *metropolitan–non-metropolitan* definition: Office of Management and Budget
Figures include all licensed, active, in-state occupational therapists

2007 Texas Occupational Therapist Facts:

White	71.6%	Male	12.0%	Median Age Male	40
Black	4.3%	Female	88.0%	Median Age Female	39
Hispanic	13.1%				
Other	11.1%				

Number of counties with no occupational therapists – 97

	Providers/100,000 Population
Border Metropolitan	18.9
Non-Border Metropolitan	26.8
Border Non-Metropolitan	6.0
Non-Border Non-Metropolitan	12.4

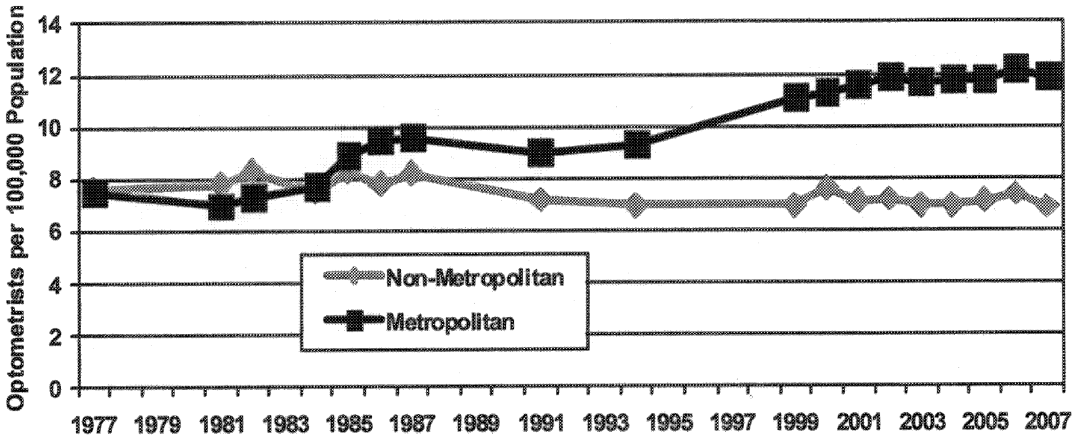
Trends:

Year	Number	Providers/100,000 Population
1991	1,894	10.9
1994	2,756	15.0
2000	4,526	22.2
2005	5,354	23.3
2007	5,729	24.1

Appendix Item 16

Optometrists

Optometrists per 100,000 Population, Metropolitan and Non-Metropolitan Counties, Texas, 1977–2007



Source: Texas Optometry Board
Source for *metropolitan–non-metropolitan* definition: Office of Management and Budget
Figures include all licensed, active, in-state optometrists

2007 Texas Optometrist Facts:

White	65.2%	Male	59.4%	Median Age Male	48
Black	3.3%	Female	40.6%	Median Age Female	37
Hispanic	9.1%				
Other	22.3%				

Number of counties with no optometrists – 109

	Providers/100,000 Population
Border Metropolitan	5.8
Non-Border Metropolitan	12.6
Border Non-Metropolitan	5.0
Non-Border Non-Metropolitan	7.1

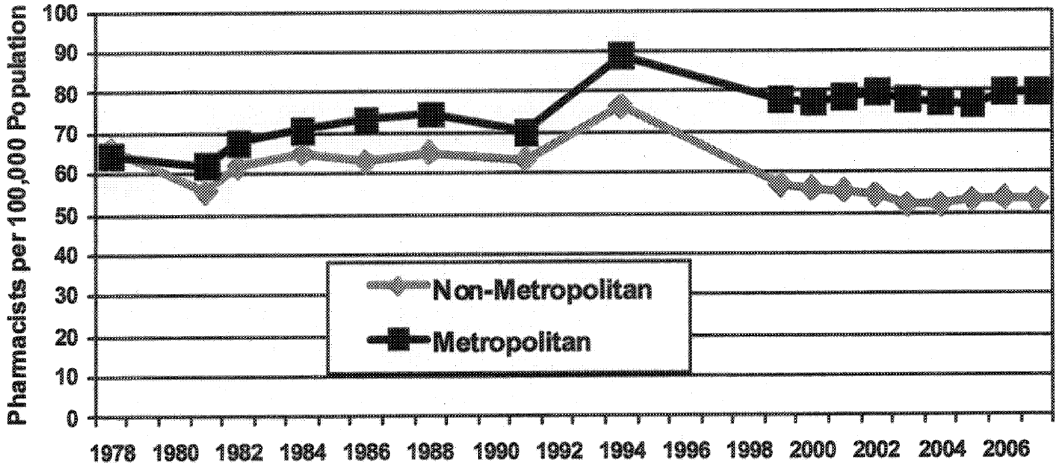
Trends:

Year	Number	Providers/100,000 Population
1991	1,513	8.7
1994	1,644	8.9
2000	2,177	10.7
2005	2,577	11.2
2007	2,668	11.2

Appendix Item 17

Pharmacists

Pharmacists per 100,000 Population, Metropolitan and Non-Metropolitan Counties, Texas, 1978–2007



Source: Texas State Board of Pharmacy
Source for *metropolitan–non-metropolitan* definition: Office of Management and Budget
Figures include all licensed, active, in-state pharmacists

2007 Texas Pharmacist Facts:

White	60.9%	Male	50.6%	Median Age Male	53
Black	13.2%	Female	49.4%	Median Age Female	40
Hispanic	8.6%				
Other	17.3%				

Number of counties with no pharmacists – 24

	Providers/100,000 Population
Border Metropolitan	43.0
Non-Border Metropolitan	84.1
Border Non-Metropolitan	30.1
Non-Border Non-Metropolitan	56.4

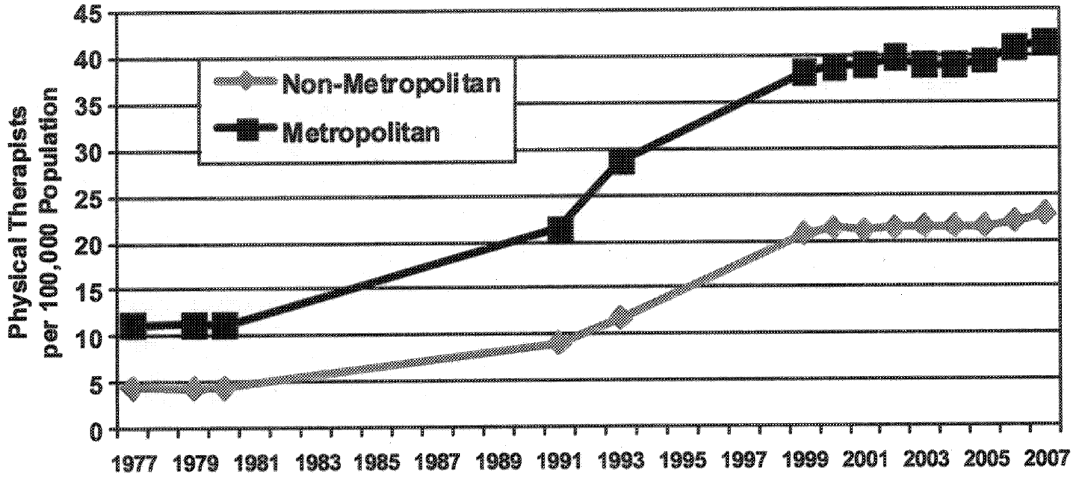
Trends:

Year	Number	Providers/100,000 Population
1991	12,020	69.2
1999	14,931	74.7
2000	15,071	74.1
2005	16,944	73.7
2007	18,138	76.4

Appendix Item 18

Physical Therapists

Physical Therapists per 100,000 Population, Metropolitan and Non-Metropolitan Counties, Texas, 1977–2007



Source: The Executive Council of Physical Therapy & Occupational Therapy Examiners
Source for *metropolitan–non-metropolitan* definition: Office of Management and Budget
Figures include all licensed, active, in-state physical therapists

2007 Texas Physical Therapist Facts:

White	77.5%	Male	28.8%	Median Age Male	40
Black	2.9%	Female	71.2%	Median Age Female	40
Hispanic	6.5%				
Other	13.1%				

Number of counties with no physical therapists – 47

	Providers/100,000 Population
Border Metropolitan	23.9
Non-Border Metropolitan	43.5
Border Non-Metropolitan	14.1
Non-Border Non-Metropolitan	24.0

Trends:

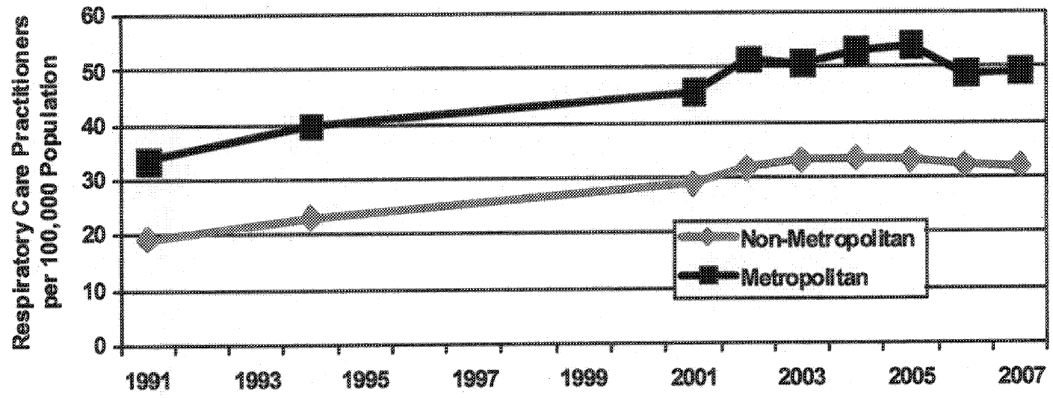
Year	Number	Providers/100,000 Population
1991	3,373	19.4
1993	4,681	26.0
2000	7,358	36.2
2005	8,511	37.0
2007	9,260	39.0

Appendix Item 19

Respiratory Care Practitioners

Comment [W7]:
Comment [W8]:
Comment [W9]:
Comment [W10]:
Comment [W11]:

Respiratory Care Practitioners per 100,000 Population, Metropolitan and Non-Metropolitan Counties, Texas, 1981–2007



Source: Texas Department of State Health Services, Professional Licensing and Certification Unit
Source for *metropolitan–non-metropolitan* definition: Office of Management and Budget
Figures include all licensed, active, in-state respiratory care practitioners

2007 Texas Respiratory Care Practitioner Facts:

Race-ethnicity and gender data not available

Median Age 43

Number of counties with no respiratory care practitioners – 56

	Providers/100,000 Population
Border Metropolitan	38.2
Non-Border Metropolitan	50.6
Border Non-Metropolitan	12.3
Non-Border Non-Metropolitan	34.8

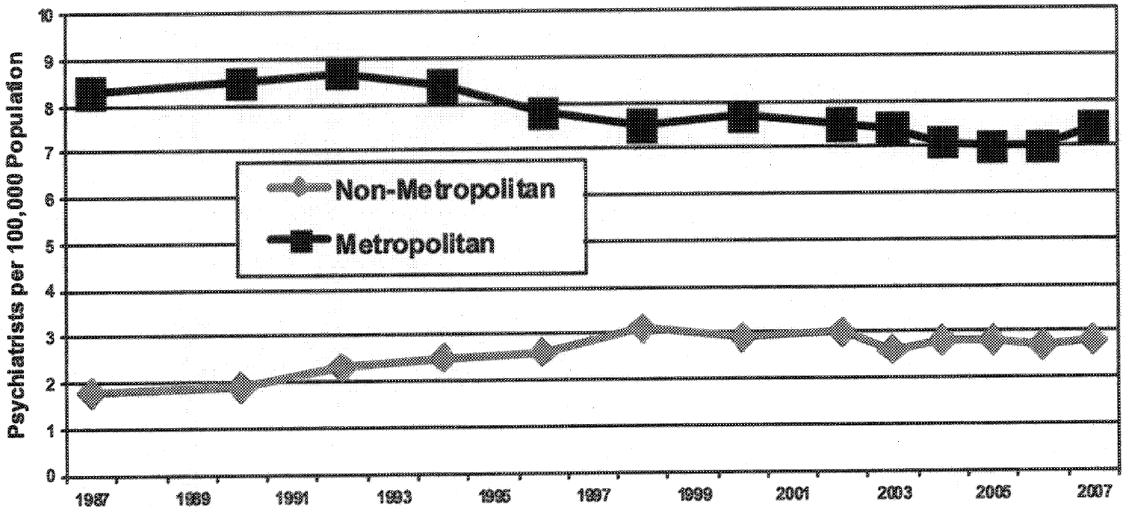
Trends:

Year	Number	Providers/100,000 Population
1991	5,446	31.4
1994	6,854	37.3
2001	8,941	43.2
2005	11,768	51.2
2007	11,166	47.1

Appendix Item 20

Psychiatrists

Psychiatrists per 100,000 Population, Metropolitan and Non-Metropolitan Counties, Texas, 1999–2007



Source: Texas Medical Board
Source for *metropolitan–non-metropolitan* definition: Office of Management and Budget
Figures include all licensed, active, non-federal, non-resident in training psychiatrists and child psychiatrists

2007 Texas Psychiatrists Facts:

White	67.2%	Male	65.9%	Median Age Male	57
Black	3.8%	Female	34.1%	Median Age Female	49
Hispanic	12.5%				
Other	16.4%				

Number of counties with no psychiatrists – 178

	Providers/100,000 Population
Border Metropolitan	2.4
Non-Border Metropolitan	7.4
Border Non-Metropolitan	1.0
Non-Border Non-Metropolitan	2.8

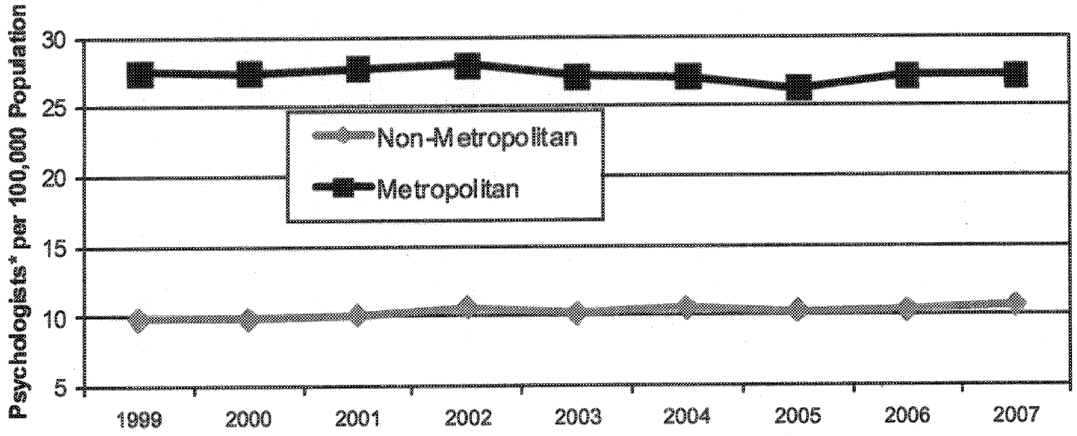
Trends:

Year	Number	Providers/100,000 Population
1990	1,264	7.4
1996	1,336	7.0
2000	1,422	7.0
2005	1,488	6.5
2007	1,510	6.4

Appendix Item 21

Psychologists

Psychologists per 100,000 Population, Metropolitan and Non-Metropolitan Counties, Texas, 1999–2007



Source: Texas State Board of Examiners of Psychologists
Source for *metropolitan–non-metropolitan* definition: Office of Management and Budget
Figures include all licensed, active, in-state psychologists

<u>2007 Texas Licensed Psychologist Facts:</u>

Race-ethnicity, age, and gender data not available

Number of counties with no licensed psychologists – 108

	Providers/100,000 Population
Border Metropolitan	8.9
Non-Border Metropolitan	29.3
Border Non-Metropolitan	4.7
Non-Border Non-Metropolitan	11.6

<u>Trends:</u>

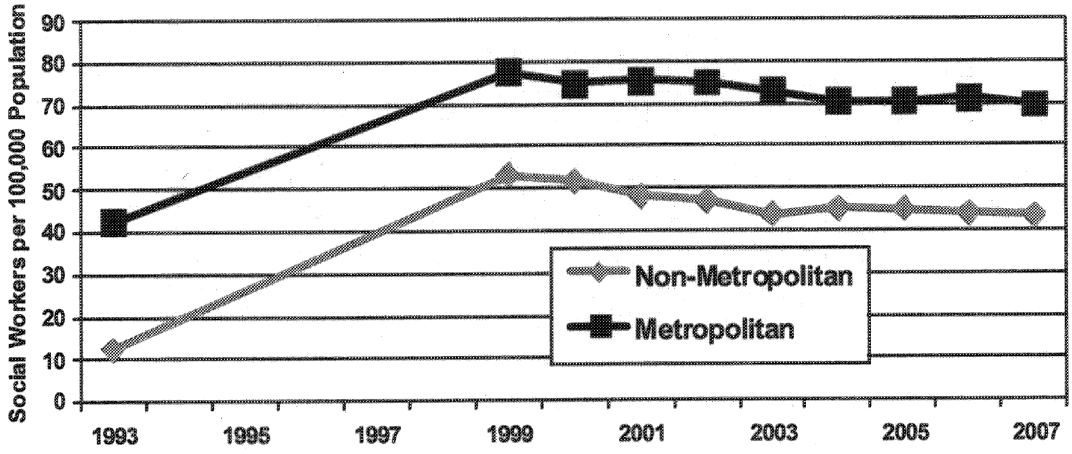
Year	Number	Providers/100,000 Population
1999	4,955	24.8
2001	5,229	25.2
2003	5,432	24.9
2005	5,567	24.2
2007	5,942	25.0

Note: There are four types of Psychologists in Texas: Licensed Psychologists (LP), Provisionally Licensed Psychologists (PLP), Licensed Psychological Associates (LPA), and Licensed Specialists in School Psychology (LSSP). An LP, PLP, or LPA may also be an LSSP. The data above were derived from an unduplicated count of the sum of all four professions.

Appendix Item 22

Social Workers

Social Workers per 100,000 Population, Metropolitan and Non-Metropolitan Counties, Texas, 1993–2007



Source: Professional Licensing and Certification Unit, DSHS
Source for *metropolitan–non-metropolitan* definition: Office of Management and Budget
Figures include all licensed, active, in-state social workers

2007 Texas Social Worker Facts:

Race-ethnicity and gender data not available

Median Age 48

Number of counties with no social workers – 37

	Providers/100,000 Population
Border Metropolitan	45.2
Non-Border Metropolitan	72.6
Border Non-Metropolitan	20.7
Non-Border Non-Metropolitan	46.7

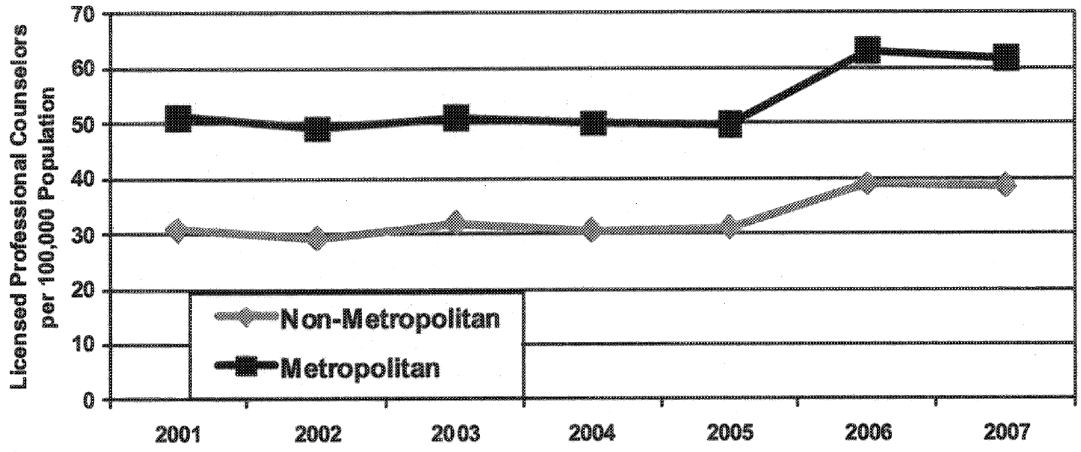
Trends:

Year	Number	Providers/100,000 Population
1993	6,783	37.6
2000	14,549	71.5
2003	15,003	68.7
2005	15,687	68.2
2007	15,743	66.3

Appendix Item 23

Licensed Professional Counselors

Licensed Professional Counselors per 100,000 Population, Metropolitan and Non-Metropolitan Counties, Texas, 2001–2007



Source: Professional Licensing and Certification Unit, DSHS
Source for *metropolitan–non-metropolitan* definition: Office of Management and Budget
Figures include all licensed, active, in-state licensed professional counselors

2007 Texas Licensed Professional Counselor Facts:

Race-ethnicity and gender data not available

Median Age 51

Number of counties with no licensed professional counselors – 47

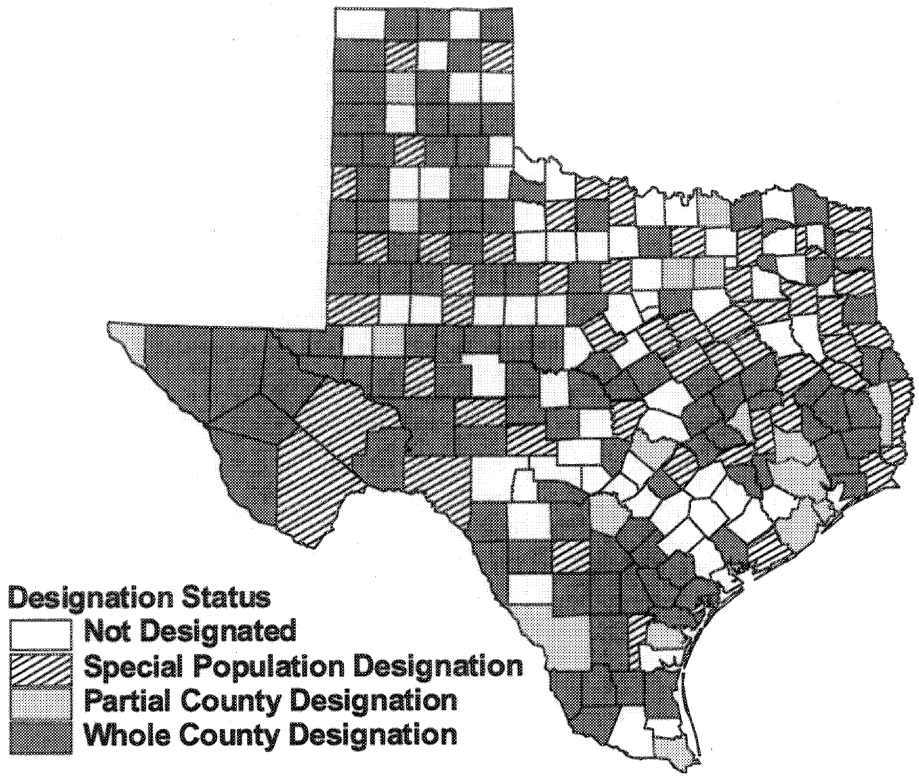
	Providers/100,000 Population
Border Metropolitan	29.4
Non-Border Metropolitan	65.6
Border Non-Metropolitan	24.3
Non-Border Non-Metropolitan	40.7

Trends:

Year	Number	Providers/100,000 Population
2001	10,036	48.5
2003	10,596	48.5
2005	10,896	47.4
2007	13,254	58.9

Appendix Item 24

Federally Designated Primary Care Health Professional Shortage Areas in Texas, January 2008



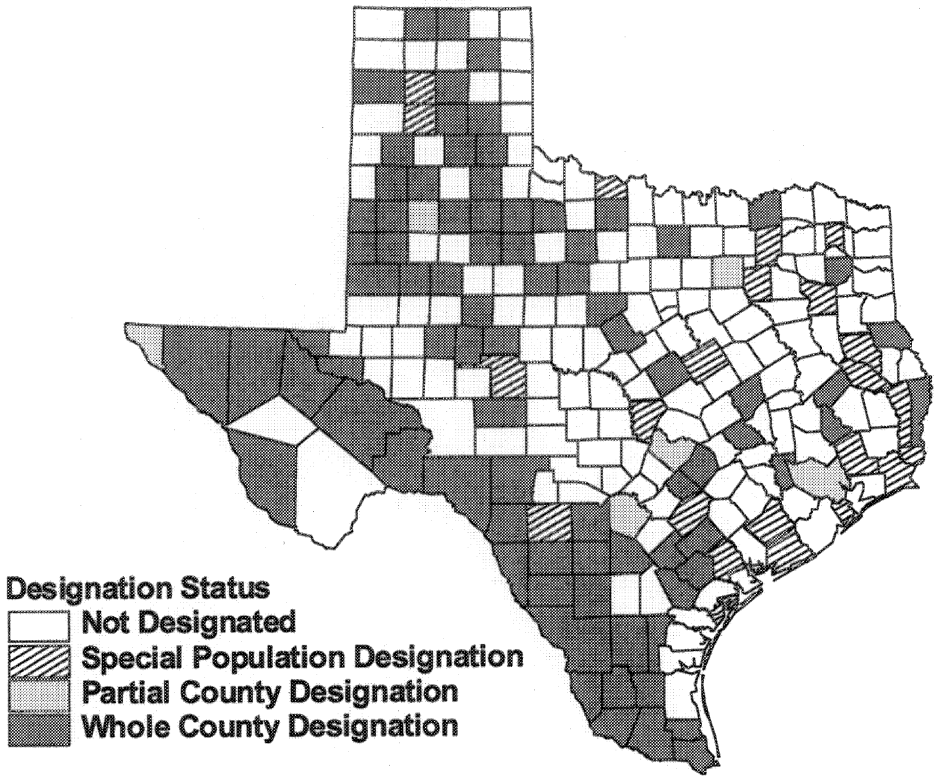
Prepared by:
Health Professions Resource Center
Center for Health Statistics
Texas Department of State Health Services
Data Source:
Shortage Designation Branch
United States Department of Health and Human Services
January 2008

Federal "Primary Medical Care" Health Professional Shortage Areas (HPSAs)

The U.S. Department of Health and Human Services HPSA designation program is administered in conjunction with the Health Professions Resource Center. The designation program uses population-to-PC physician ratios to identify counties having shortages of PC physicians. In January 2008, 72.8 percent of the counties in Texas (113 whole counties; 72 partial counties/special populations) had either whole or partial-county/special population HPSA designations. Seventy-five percent of the 113 "whole county" HPSAs were rural counties, and 17 percent were border counties. In addition to these designations, the HPSA designation program also provides for the designation of facilities under certain circumstances.

Appendix Item 25

Federally Designated Dental Health Professional Shortage Areas in Texas, January 2008



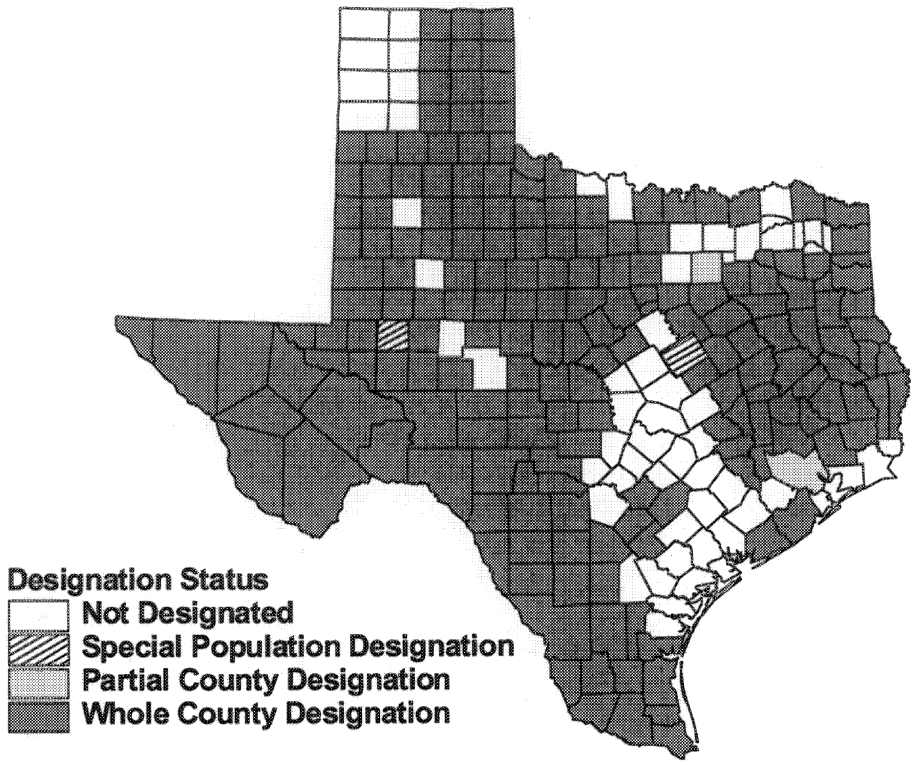
Prepared by:
Health Professions Resource Center
Center for Health Statistics
Texas Department of State Health Services
Data Source:
Shortage Designation Branch
United States Department of Health and Human Services
January 2008

Federal Dental Health Professional Shortage Areas (HPSAs)
The U.S. Department of Health and Human Services HPSA designation program uses population–to–general dentist ratios to identify counties with a shortage of dentists. In addition to geographic area designations, the HPSA designation program also provides for the designation of special population groups within geographic areas and for the designation of facilities under certain circumstances.

In January 2008, 111 counties in Texas had some type of designation by the U.S. Department of Health and Human Services as experiencing a shortage of dentists. Eighty-two of these designations were for whole counties.

Appendix Item 26

Federally Designated Mental Health Professional Shortage Areas in Texas, January 2008



Prepared by:
Health Professions Resource Center
Center for Health Statistics
Texas Department of State Health Services
Data Source:
Shortage Designation Branch
United States Department of Health and Human Services
January 2008

Mental Health Professional Shortage Areas (HPSAs)

The U.S. Department of Health and Human Services Health Professional Shortage Area designation program uses population-to-psychiatrist ratios to identify counties with a shortage of psychiatrists. In addition to geographic area designations, the HPSA designation program also provides for the designation of special population groups within geographic areas and for the designation of facilities under certain circumstances. In January 2008, there were 184 counties designated by the U.S. Department of Health and Human Services as whole-county mental-health HPSAs in Texas, two counties designated as partial-county mental-health HPSAs, and three counties designated in whole or part as HPSAs for the low-income population.

SECTION 3

2009 – 2010
TEXAS STATE HEALTH PLAN UPDATE
RECOMMENDATIONS

Approved by the
Statewide Health Coordinating Council

September 11, 2008

2009-2010
Texas State Health Plan Update
Recommendations

Texas must take the necessary steps to achieve education and training in the health professions that will ensure that an appropriately skilled, sufficient, and experienced workforce becomes a reality for the state. This will be achieved through effective and innovative models of education and practice that provide work-ready graduates, improve the participation of minorities in the health professions, and retain trained health professionals in the workforce.

The Statewide Health Coordinating Council believes that the following recommendations are essential to fulfill these workforce goals and thereby ensure a quality health workforce for Texas.

General Workforce Recommendations

1. Require all health professions licensing boards to standardize the collection of critical data by implementing the Minimum Data Set developed by the Statewide Health Coordinating Council.

2. Regulatory boards should allocate funds to support the collection of health workforce supply and demand data and to support needed research based on these data. (It would be desirable if other health professions could replicate the Center for Nursing Workforce Studies concept.)

3. Realign health workforce licensure and regulatory agencies in a structure that is better able to collaborate and coordinate health workforce planning and data collection to enable Texas to be more responsive to potential funding opportunities.
4. Require health professional licensees and applicants to disclose ethnicity information and instruct regulatory boards and educational institutions to collect, compile and report it, using the U.S. Census ethnicity categories as the basis for collection.

5. The Texas Higher Education Coordinating Board should develop and implement positive financial incentives for schools that create innovative models in education for the health professions that will move toward shared or combined curricula, interdisciplinary classes across health programs, and the use of multidisciplinary faculty or interdisciplinary teams among the health programs.

6. Continue to support the College for Texans Campaign administered by the Texas Higher Education Coordinating Board to ensure diversity and minority participation in higher education. (For information on the program, visit http://www.collegefortexans.com or http://www.thecb.state.tx.us/SAMC/overview/).

7. Instruct the Texas Higher Education Coordinating Board to develop and implement field of study curricula for additional health profession programs and require adoption of these curricula by public educational institutions to encourage and promote a seamless transition and career mobility within the professions.

8. Support initiatives that result in the creation of a representative and culturally competent health workforce for Texas. This could include items such as
    - programs that interest minority students in health careers,
    - curricula for preparing practitioners to recognize health disparities and to implement appropriate interventions,
    - new models for education in the health professions,
    - strategies for reducing the loss of intellectual capital across countries and regions, and
    - the addition of multilingual and technological competencies.

9. Direct the regulatory boards for the health professions to permit exceptions to their regulations to facilitate the increase in innovative, outcome-oriented demonstration projects.

10. Support initiatives that will promote the application of technology in all areas of health education and all areas of clinical care throughout the health care continuum. This should include applications for initial professional and continuing education, recruitment and retention efforts, health care practice, and community health education.

11. Support funding of the Area Health Education Centers to guarantee that vital health career development efforts and recruitment and retention strategies are available in areas not provided through other means or agency efforts.

Nursing Workforce Recommendations

1. Increase funding levels to nursing programs throughout the state to increase capacity to admit and graduate nursing students.

2. Continue to support the Nursing Innovation Grant Program funded by tobacco earnings from the Permanent Fund for Higher Education Nursing, Allied Health, and other Health-Related Programs and administered by the Texas Higher Education Coordinating Board.

3. Instruct health professions and other regulatory agencies and boards to support strategies that would incorporate the use of technology to reduce paperwork and streamline the process required by regulatory agencies to that which is truly necessary for quality patient care.

4. Provide institutions with Special Item funding through the Nursing Shortage Reduction Act to support enrollment increases in nursing programs and stimulate graduate programs that prepare nursing faculty, and establish procedures that would confirm that these special allocations for nursing programs are spent for these purposes.

5. The Texas Higher Education Coordinating Board should create positive incentives for schools that develop and implement innovative solutions between schools, as

well as health care entity relationships, that will result in an increase in the number of entry-level nursing students. This could include the sharing of faculty and classes among nursing degree programs.

6. The Texas Higher Education Coordinating Board should reinforce the implementation of the Field of Study Curriculum for nursing programs to facilitate a seamless, student-oriented articulation from ADN to BSN programs.

7. The Texas Higher Education Coordinating Board and the Texas Board of Nursing should encourage educational institutions to add appropriate accelerated degree programs at all levels of nursing.

8. The Texas Higher Education Coordinating Board and the Texas Board of Nursing should encourage institutions to use technology, preceptors, simulation, etc., to maximize the use of existing and new faculty, while ensuring quality outcomes and increasing student enrollments.

9. The Texas Higher Education Coordinating Board should encourage the development of regional centers such as, "nursing centers of educational excellence" to consolidate redundant tasks performed by educators at individual institutions.

10. Support initiatives that promote healthy workplace environments for nursing personnel.

11. The Texas Higher Education Coordinating Board should study avenues to expand nurse-midwifery educational programs.

Primary Care Recommendations

1. Support initiatives that will support public health prevention and education programs in an effort to decrease the incidence and severity of chronic disease in the population by enabling individuals to take personal responsibility for their health.

2. Reinstate general revenue funds in support of the Medicaid draw- down of federal funds for graduate medical education to 2002–03 biennial levels as a way of maintaining physician supply.

3. Work with others to actively and urgently seek relief from the Centers for Medicare and Medicaid Services to eliminate the current outdated caps on funding graduate medical education training slots and to increase and to distribute the funds according to geographically equitable calculations.

4. Restore general revenue funding for graduate medical education and the Family Practice Residency Program through the trustee funds to the Texas Higher Education Coordinating Board to the 2002–03 biennial levels.

5. Provide the Texas Higher Education Coordinating Board new state funding to support 300 new resident positions, to be funded at $50,000 per position and phased in over a four-year period, and should contain fifth-year continuation funding.

6. Provide Special Item funding to support enrollment increases at the state's pharmacy schools to help relieve the current shortage of pharmacists in the state.

7. Continue to support the growth in the numbers of Federally Qualified Health Centers in Texas.

8. Support methodologies for the development of innovative models for the delivery of primary care that would include physical, mental, and oral health.

9. Support demonstration projects that use interdisciplinary teams of health professionals for prevention and management of chronic disease and that utilize an appropriate mix of caregivers and responsibilities.

10. The Health and Human Services Commission should support changes in Medicaid, Children's Health Insurance Program, and Texas Vendor Drug Program rules and policies to trace outcomes and increase accountability by
    - identifying the practitioner that prescribed the drug instead of the delegating physician,
    - requiring all providers to bill services under their own names, and
    - increasing Medicaid and Children's Health Insurance Program reimbursement for advanced practice nurses to 92 percent of the physician's rate.

11. Take steps to ensure cost savings by including Advanced Practice Nurses in all state health care networks.

12. The Office of State and Federal Relations should encourage federal legislation that allows Nurse Practitioners, Clinical Nurse Specialists, and Physician Assistants to order home health care services, and then change state regulations accordingly.

13. Support legislation, regulation, and reimbursement methodologies that will support the training and use of state certified community-level health providers to assist in the cost-effective management of health care.

14. Provide positive financial incentives for providers who implement the use of evidence-based health care and the use of outcome-based practice guidelines that have been approved by an agreed upon nationally recognized health association.

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