



Texas Physician Education Pipeline

**As Required by
Texas Health and Safety Code
Section 105.009**



TEXAS
Health and Human
Services

**Texas Department of
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Executive Summary

In accordance with [Texas Health and Safety Code, Section 105.009](#), the Health Professions Resource Center at the Texas Department of State Health Services (DSHS) is required to conduct research identifying those specialties and subspecialties in Texas that are at critical shortage levels, the overall supply of physicians in Texas, and the ability of Texas's graduate medical education (GME) system to meet the current and future health care needs of Texas. This report is in fulfillment of the requirements in Section 105.009 and examines medical education in Texas, including Texas's ability to produce the physicians needed according to the [Texas Physicians Supply and Demand Projections, 2018 – 2032](#) report.

For this report, DSHS summarized results on medical education in Texas and 35 physician specialties from 2021 through 2032. These results are based on the Texas Physician Pipeline Model created by IHS Markit, a consulting firm that has previously conducted health care workforce modeling for the Health Resources and Services Administration, the Association of American Medical Colleges, and DSHS.

To create the Texas Physician Pipeline Model tool, IHS Markit used national data from the American Medical Association Masterfile.

Key findings include the following:

- 49.4 percent of Texas medical school graduates remained in Texas for their GME.
- 58.9 percent of physicians who completed their GME in Texas stayed in the state to practice.
- All Primary Care Specialties are projected to have shortages which, based on current models, will not be remedied through current medical education positions in Texas alone. Based on current rates of retention of medical students and their choices of specialties, GME would have to increase by the following number of graduates per year to meet the need for the following specialties:
 - Psychiatry would require an additional 31 residents each year
 - Pediatrics would require an additional 55 graduates each year

- Family Medicine would require an additional 61 graduates each year
- Obstetrics and Gynecology would require an additional 13 graduates each year
- General Internal Medicine would require an additional 61 graduates each year

In summary, there is a current shortage of physicians in Texas and this shortage will increase through 2032. Current projections for medical education enrollment indicate that the state's medical education system will not create a supply of physicians that can meet projected demand.

1. Introduction

Senate Bill 18, 84th Legislature, Regular Session, 2015, added [Section 105.009 to the Texas Health and Safety Code](#). Section 105.009 requires that the Health Professions Resource Center (HPRC) at the Texas DSHS conduct research identifying those specialties and subspecialties in the state that are at critical shortage levels, the overall supply of physicians in the state, and the ability of the state's GME system to meet the current and future health care needs of the state. By May 1 of even-numbered years, the Statewide Health Coordinating Council is required to report the results of research conducted by HPRC to the Legislative Budget Board, the Texas Higher Education Coordinating Board, the Office of the Governor, and the standing committees of each house of the legislature with primary jurisdiction over state finance or appropriations. This report is in fulfillment of the requirements in Section 105.009 and is an update to the [Texas Physicians Supply and Demand Projections, 2018 – 2032](#) report for primary care physicians and psychiatrists.

This report assesses physician shortages in Texas by examining the number of medical education graduates by specialty 2021 through 2032. These projections are based on the Health Workforce Model created by IHS Markit, a consulting firm that has previously conducted health care workforce modeling for the Health Resources

and Services Administration,¹ the Association of American Medical Colleges,² and DSHS.^{3,4,5}

This report is organized into four sections beginning with a brief introduction and the background and objectives of this report. Section 3 describes the methodology for the supply and demand models used for the projections in this report and discusses the strengths and limitations of these projections, presents data on medical education graduates and 35 physician specialty distribution statewide from 2000 through 2019, and provides projections on the number of additional medical graduates needed to fulfill projected supply. Section 4 provides report conclusions.

An appendix appears at the end of this report. Appendix A provides tables on physicians' medical education and choice of specialties.

¹ U.S. Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Workforce, National Center for Health Workforce Analysis. National and Regional Projections of Supply and Demand for Primary Care Practitioners: 2013-2025. <https://bhw.hrsa.gov/sites/default/files/bhw/health-workforce-analysis/research/projections/primary-care-national-projections2013-2025.pdf>. Published November 2016. Accessed January 28, 2020.

² Association of American Medical Colleges. 2019 Update: The Complexities of Physician Supply and Demand: Projections from 2017 to 2032. https://www.aamc.org/system/files/c/2/31-2019_update_-_the_complexities_of_physician_supply_and_demand_-_projections_from_2017-2032.pdf. Published April 2019. Accessed January 28, 2020.

³ Texas Department of State Health Services. Texas Projections of Supply and Demand for Primary Care Physicians and Psychiatrists, 2017 - 2030. <http://dshs.texas.gov/legislative/2018-Reports/SB-18-Physicians-Workforce-Report-Final.pdf>. Published July 2018. Accessed January 28, 2020.

⁴ Texas Department of State Health Services, Texas Center for Nursing Workforce Studies. Nurse Supply and Demand Projections, 2015-2030. <https://www.dshs.texas.gov/chs/cnws/WorkforceReports/SupplyDemand.pdf>. Published October 2016. Accessed January 28, 2020.

⁵ Texas Department of State Health Services. Texas Supply and Demand Dental Projections, 2018 - 2030. https://www.dshs.texas.gov/chs/hprc/publications/DSHS_DentalProjections_092019.pdf. Published September 2019. Accessed January 28, 2020.

2. Background

Undergraduate and Graduate Medical Education

Undergraduate medical education (UME) is a term that refers to the formal education an individual receives while in medical school. This stage in a physician's education typically lasts four years. Graduate medical education (GME) is used to describe formal education that occurs after an individual graduates from medical school. The Accreditation Council for GME is responsible for setting standards for GME (residency and fellowship) programs across the country.⁶ During the 2020-2021 academic year, there were an estimated 12,420 residency and fellowship programs accredited by the Accreditation Council for GME in 182 specialties and subspecialties nationwide. Residency programs last between three and six years depending on the specialty, though some physicians may complete more than one residency for their specialization.⁷

According to the *2021 Report on Residents* by the Association of American Medical Colleges, 11,113 of the 16,521 residents (67.3 percent) who completed residency training in Texas from 2011 through 2020 are currently practicing in the state.⁸ Moreover, Texas ranked third among the states (behind California and Alaska) with the highest physician retention rate from residency training.

UME and GME Availability in Texas

Texas currently has 15 medical schools, including 12 medical schools that offer the doctor of medicine degree and three that offer the doctor of osteopathic medicine

⁶ Accreditation Council for Graduate Medical Education. What We Do. <https://www.acgme.org/what-we-do/overview/>. Accessed November 15, 2021.

⁷ Accreditation Council for Graduate Medical Education. About Us. <https://www.acgme.org/about-us/overview/>. Accessed November 15, 2021.

⁸ Association of American Medical Colleges. 2021 Report on Residents: Table C6. Physician Retention in State of Residency Training, by State. <https://www.aamc.org/data-reports/students-residents/interactive-data/report-residents/2021/table-c6-physician-retention-state-residency-training-state>. Accessed November 15, 2021.

degree.⁹ Of the 15 medical schools in the state, six were established in recent years, with the first year of enrollment ranging from 2016 to 2020. The number of students entering medical schools in Texas increased from 1,454 in 2006 to an estimated 2,223 in 2020. In addition, the number of medical school graduates in Texas increased from 1,314 in 2007 to 1,977 in 2021. Among the 10 most populous states in 2020, Texas and California were tied for second place in the highest number of medical schools (behind New York).

Overall, the number of residency and fellowship positions that were filled in Texas increased from 6,779 in 2011 to 8,685 in 2019.¹⁰ During these years, the number of first-year residents increased from 1,494 to 1,950. Despite this increase, the percentage of residency and fellowship positions that were filled by first-year residents increased slightly from 2011 to 2019, 22.0 percent and 22.5 percent, respectively.

The state's goal is to achieve and maintain a 1.1 to 1 ratio of first-year residency positions to medical school graduates in Texas.¹¹ Doing so would allow medical school graduates not only in Texas but also outside of Texas an opportunity to complete residency training in the state. Texas achieved the goal of a 1.1 to 1 ratio of first-year residency positions to medical school graduates in 2017 and 2019.

⁹ Texas Higher Education Coordinating Board. The Graduate Medical Education (GME) Report: An Assessment of Opportunities for Graduates of Texas Medical Schools to Enter Residency Programs in Texas. <https://reportcenter.highered.texas.gov/reports/legislative/graduate-medical-education-report-an-assessment-of-opportunities-for-graduates-of-texas-medical-schools-to-enter-residency-programs-in-texas-fy2020/>. Published October 2020. Accessed November 23, 2021.

¹⁰ Texas Higher Education Coordinating Board. The Graduate Medical Education (GME) Report: An Assessment of Opportunities for Graduates of Texas Medical Schools to Enter Residency Programs in Texas. <https://reportcenter.highered.texas.gov/reports/legislative/graduate-medical-education-report-an-assessment-of-opportunities-for-graduates-of-texas-medical-schools-to-enter-residency-programs-in-texas-fy2020/>. Published October 2020. Accessed November 23, 2021.

¹¹ Texas Higher Education Coordinating Board. The Graduate Medical Education (GME) Report: An Assessment of Opportunities for Graduates of Texas Medical Schools to Enter Residency Programs in Texas. <https://reportcenter.highered.texas.gov/reports/legislative/graduate-medical-education-report-an-assessment-of-opportunities-for-graduates-of-texas-medical-schools-to-enter-residency-programs-in-texas-fy2020/>. Published October 2020. Accessed November 23, 2021.

Physician Shortages

In 2018, the number of active physicians was 277.8 per 100,000 population nationwide, while the corresponding number for Texas was 224.8.¹² Moreover, Texas ranked 41st among the 50 states in the number of active physicians per 100,000 population.

According to the Bureau of Labor Statistics, the projected job growth of physicians and surgeons nationwide from 2020 to 2030 is slower than average at 3 percent.¹³ Demand for physicians is projected to increase due to the aging and growing population.

In 2021, the Association of American Medical Colleges issued a report projecting the supply and demand for physicians nationally from 2019 to 2034.¹⁴ Results from this report indicate that there will be an estimated shortage of 37,800 to 124,000 physicians nationwide by 2034. This projected shortage includes 17,800 to 48,000 primary care physicians and 21,000 to 77,100 non-primary care specialty physicians.

Texas DSHS issued a report in 2020 projecting the supply and demand for all physicians and 35 physician specialties in Texas from 2018 through 2032.¹⁵ Projections in medical school enrollment and residency positions by the Texas Higher Education Coordinating Board were included in the Health Workforce Model used for the supply and demand projections in the report. Results indicate that the state's GME system will not create a supply of physicians that can meet projected

¹² Association of American Medical Colleges. 2019 State Physician Workforce Data Report. https://store.aamc.org/downloadable/download/sample/sample_id/305/. Published November 2019. Accessed November 22, 2021.

¹³ U.S. Department of Labor, Bureau of Labor Statistics. Occupational Outlook Handbook: Physicians and Surgeons: Job Outlook. <https://www.bls.gov/ooh/healthcare/physicians-and-surgeons.htm#tab-6>. Accessed November 22, 2021.

¹⁴ Association of American Medical Colleges. The Complexities of Physician Supply and Demand: Projections From 2019 to 2034. <https://www.aamc.org/media/54681/download>. Published June 2021. Accessed November 22, 2021.

¹⁵ Texas Department of State Health Services. Texas Physician Supply and Demand Projections, 2018 - 2032. <https://dshs.texas.gov/legislative/2020-Reports/TexasPhysicianSupplyDemandProjections-2018-2032.pdf>. Published May 2020. Accessed November 22, 2021.

demand. The shortage of all physicians statewide is projected to increase from 6,218 full-time equivalents (FTE) in 2018 to 10,330 FTE's in 2032.

Physician Retention

When considering both medical education and physician deficits in the state of Texas, a central topic of concern is retention of GME-trained physicians in the state where they trained.¹⁶ From 2000-2019, of those physicians who completed their GME in Texas, 58.9 percent went on to practice in Texas. This places Texas slightly above the national average for 2011-2020, with 57.1 percent of physicians going on to practice in the same state they completed their GME.¹⁷ Furthermore, of those who completed both their UME and GME in Texas, 86.2 percent went on to practice in Texas. The state of Texas has one of the highest physician retention rates from medical school and residency training, ranking third (behind Hawaii and California).

Objectives

This report aims to inform state officials and stakeholders regarding how increases in medical school enrollment and residency positions may increase the supply of physicians in Texas and, thus, likely reduce the projected shortage of physicians statewide. By doing so, this report may assist in the development of policies that address the ability of the state's GME system to meet the health care needs of Texans.

The primary objective of this report is to identify enrollment changes that would improve projected shortages in the state by specialty.

¹⁶ Utah Medical Education Council. Utah GME Retention Report: Academic Year 2019-2020. <https://umec.utah.gov/wp-content/uploads/Retention.pdf>. Published 2020. Accessed February 25, 2022.

¹⁷ Association of American Colleges. 2021 Report on Residents: Physician Retention in State of Residency Training, by Last Completed GME Specialty. <https://www.aamc.org/data-reports/students-residents/interactive-data/report-residents/2021/table-c4-physician-retention-state-residency-training-last-completed-gme>. Published 2021. Accessed February 25, 2022.

3. Texas Physician Pipeline Model and Results

Texas Physician Pipeline Model

The Texas Physician Pipeline Model is a tool that was developed by IHS Markit. The tool builds upon the supply and demand models that were presented in the previous iteration of this required report published in 2020 on physician supply and demand projections. In developing this tool, IHS Markit used data gathered from the American Medical Association Masterfile and the Texas DSHS. When determining the impact of changes in the number of UME and GME spaces on the number of physicians practicing in Texas, the model considers the impact of choices of specialty and location of both UME and GME education.

Strengths and Limitations

Both the key strengths and limitations of the projections in this report lie in the availability and quality of state-level data, as well as the ability of historical behaviors to predict future outcomes.

The main strength of the pipeline tool lies in the use of state-level medical school graduation numbers which provide an accurate depiction of the production of new physicians over the last two decades. Likewise, the main strength of the supply side projections is the use of state-level physician licensure data. These data provide a timely and accurate count of the number of physicians practicing in Texas along with their demographics and practice specialties. The main strengths of the demand side projections are the use of state-level population numbers and demographics, which provide a sound starting point for estimating the population's demand for health care services.

As with any model, there are also limitations. The primary limitation of the pipeline tool stems from using historical data to forecast future trends. It is possible that physicians in the future would be more likely or less likely to want to practice in Texas based on factors outside of those included in the model. Additionally, the more time passes, the less applicable findings based on 2000-2019 data will be.

There are also a number of limitations on the demand side of the model. The demand projections model the impact of changing demographics over time while health care use and delivery patterns remain the same. The baseline demand

projections also assume that disease prevalence and health risk factors will remain consistent by demographic groups over time. The demand projections are also modeled on national health care use patterns rather than state-specific utilization patterns. Also, as access to care changes, models of care transform, and technology improves health practices and outcomes, it is difficult to predict how health care use and delivery patterns as well as disease prevalence and health risk factors will change over time.

Another limitation of this tool is that the supply and demand models that underlie the pipeline tool were based on data from 2015-2018 and the educational pipeline models are based on historical data through 2019. The Covid-19 pandemic first appeared in Texas in March of 2020 and its impact on health practices, health providers, and the health system at large cannot be overstated.

Historical Trends

The Texas Physician Pipeline Model uses several data sources to provide accurate projections. The data comes from the American Medical Association Masterfile and the Texas DSHS.

From 2000 to 2019, 50.6 percent of Texas UME graduates completed GME in another state, while 49.4 percent remained in Texas.

Table 1. State of Graduate Medical Education for Texas Medical School Graduates, 2000-2019

State of Graduate Medical Education	Total
Other State	10,006
Texas	9,752
Total	19,758

When comparing the GME and practice states among physicians who graduated from a Texas medical school between 2000 and 2019, completing GME and practicing in Texas (42.6 percent) was the most common finding. Results also indicate that 15.1 percent of Texas medical school graduates completed GME in another state and returned to Texas to practice.

Table 2. State of Graduate Medical Education and Practice for Texas Medical School Graduates, 2000-2019

State of Graduate Medical Education	State of Practice	Total
Other State	Other State	7,018
Other State	Texas	2,988
Texas	Other State	1,341
Texas	Texas	8,411
Total	-	19,758

Among physicians who completed GME in Texas between 2000 and 2019, there was a fairly even split between those who completed their UME in another state (40.8 percent) and those who completed their UME in Texas (40.1 percent); however, those who graduated from an international UME only made up 19.1 percent of those who completed their GME in Texas. Family medicine was the most common practice specialty for physicians who completed their UME in Texas (6.5 percent), internationally (3.1 percent), and another state (2.8 percent). The least common practice specialty differed by UME location. For instance, the least common specialty was dermatology for physicians who completed their UME internationally (0.1 percent), colorectal surgery for physicians who completed their UME in Texas (0.1 percent), and critical care medicine for physicians who completed their UME in another state (0.2 percent).

Table 3. Location of Medical School for Physicians Who Completed GME in Texas by Specialty, 2000-2019

Specialty	International Medical School	Other State Medical School	Texas Medical School	Total
Allergy and Immunology	16.9%	54.3%	28.8%	431
Anesthesiology	13.3%	38.2%	48.5%	4,113

Specialty	International Medical School	Other State Medical School	Texas Medical School	Total
Cardiology	29.1%	46.3%	24.6%	2,298
Colorectal Surgery	21.9%	54.1%	24.0%	242
Critical Care Medicine	38.4%	37.7%	23.9%	297
Dermatology	3.1%	51.8%	45.1%	1,057
Emergency Medicine	6.5%	54.5%	39.0%	2,994
Endocrinology	39.7%	34.3%	26.1%	633
Family Medicine	24.8%	22.7%	52.5%	7,819
Gastroenterology	22.7%	47.3%	29.9%	1,236
General Internal Medicine	23.3%	30.6%	46.0%	4,702
General Surgery	10.1%	47.9%	41.9%	2,209
Hematology and Oncology	33.2%	43.8%	23.0%	1,684
Infectious Diseases	38.6%	39.4%	22.1%	775
Neonatology	28.2%	41.0%	30.8%	507
Nephrology	43.3%	32.2%	24.5%	995
Neurological Surgery	12.5%	49.3%	38.2%	353
Neurology	31.5%	35.9%	32.5%	1,027
Obstetrics and Gynecology	7.3%	41.5%	51.2%	4,024

Specialty	International Medical School	Other State Medical School	Texas Medical School	Total
Ophthalmology	6.6%	58.4%	35.0%	1,727
Orthopedic Surgery	4.3%	58.7%	37.0%	2,213
Other Specialties	18.6%	52.0%	29.5%	2,175
Otolaryngology	4.2%	54.2%	41.6%	882
Pathology	32.4%	39.0%	28.7%	2,453
Pediatrics	18.2%	34.6%	47.2%	4,537
Physical Medicine and Rehabilitation	19.8%	51.4%	28.8%	1,286
Plastic Surgery	8.4%	57.5%	34.1%	963
Psychiatry	27.6%	26.4%	46.0%	3,002
Pulmonology	32.9%	36.7%	30.4%	862
Radiation Oncology	16.0%	58.3%	25.7%	530
Radiology	9.0%	48.0%	42.9%	2,792
Rheumatology	34.9%	38.5%	26.6%	384
Thoracic Surgery	24.7%	54.1%	21.2%	567
Urology	6.0%	56.5%	37.5%	885
Vascular Surgery	23.7%	50.0%	26.3%	472

From 2000 to 2019, 58.9 percent of physicians who completed GME in Texas stayed in the state to practice (see Appendix A, Table 8). When considering the specialty and medical school location of physicians, the three highest retention rates were for

Texas medical school graduates with a specialty in family medicine (88.3 percent), allergy and immunology (86.9 percent), and general internal medicine (85.3 percent). The three lowest retention rates were for physicians who graduated from medical school in another state with a specialty in colorectal surgery (21.2 percent), thoracic surgery (22.1 percent), or vascular surgery (22.9 percent).

Family medicine was the most common specialty among Texas medical school graduates who completed GME in Texas between 2000 and 2019 (14.5 percent), followed by pediatrics (9.7 percent) and general internal medicine (9.3 percent). Thoracic surgery was the least common specialty (0.1 percent), followed by colorectal surgery (0.2 percent) and vascular surgery (0.3 percent).

Scenario Results

Calculations were determined using the Texas Physician Pipeline Model tool. For UME projections, the years used to determine the number of additional graduates that would need to graduate from Texas medical schools were 2026-2032. These years were used based on the fact that UME takes four years, and therefore matriculants who begin their UME in 2022 would graduate in 2026. For GME projections, the years used to determine the number of additional residencies was 2023-2032.

UME

The Texas Physician Pipeline Tool was used to estimate how many additional medical school graduates Texas would need to meet demand in 2032, if increasing UME was the sole method of increasing physician supply. The projected demand considers the growing Texas population, but only at the rates of growth between 2016-2018 and not any impacts of change since that period. The final column in Table 4 presents the number of additional graduates each Texas medical school would need every year between 2026 and 2032 to overcome the projected deficit.

Within the four specialties that comprise Primary Care Physicians (Family Medicine, General Internal Medicine, Pediatrics, and Obstetrics/Gynecology) and Psychiatry, each specialty will face a deficit of over 10 percentage points in 2032.

If increasing UME was the sole method of increasing physician supply, to meet the 2032 demand for Primary Care Physicians (PCPs) specializing in Family Medicine, each Texas medical school would need to have an additional 88 new graduates per year, for each year beginning in 2026. The supply of Family Medicine specialists

currently satisfies 85 percent of the demand in 2022, however, this will decrease to 78.3 percent if no change is made. For General Internal Medicine physicians, each Texas medical school would need to increase the number of graduates by 149 students each year. Without these increases, Texas would fall from 79 percent of the demand met in 2022 to 74.8 percent in 2032. For Obstetrics and Gynecology, there would need to be an increase of 33 graduates each year in every Texas medical school. The need for Obstetrics and Gynecology specialists is currently 91 percent met, but this could fall slightly to 89.8 percent in 2032. Texas currently has 70 percent of the Pediatrics specialists it needs, and without change, supply is expected to meet 71 percent of the demand in 2032. To combat the need for physicians specializing in Pediatrics, all Texas medical schools would need to increase by 109 graduates each year.

Without added UME seats in Psychiatry, the percent of demand met for Psychiatrists will change from 69 percent in 2022 to 73.2 percent in 2032. While this is a decrease in the deficit, adding 125 new seats per year at each school would fulfill the demand for Psychiatrists.

Table 4. Projected Supply and Demand and New Undergraduate Medical Education Graduates Needed to Meet 2032 Deficit for Primary Care Physicians and Psychiatrists

Specialty	2032 Supply (FTEs)	2032 Demand (FTEs)	2032 Deficit (FTEs)	2032 Percent Demand Met	Additional UME Graduates Per Year Per School to Meet Demand
Family Medicine	9,004	11,499	2,495	78.3%	88
General Internal Medicine	7,759	10,366	2,607	74.8%	149
Obstetrics and Gynecology	3,783	4,210	427	89.8%	33
Pediatrics	4,675	6,588	1,913	71.0%	109

Specialty	2032 Supply (FTEs)	2032 Demand (FTEs)	2032 Deficit (FTEs)	2032 Percent Demand Met	Additional UME Graduates Per Year Per School to Meet Demand
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Psychiatry	2,852	3,895	1,143	73.2%	125
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GME

While increasing the number of students in UME in Texas can be used to help address physician shortages in Texas, increasing the number of GME residencies in certain specialties with shortages allows for more focus on these specialties with greater demand. Specifically, the number of additional spots that would need to be introduced year after year to meet the 2032 demand for Primary Care Physicians (PCPs) and Psychiatry was determined. For those specializing in Family Medicine, GME positions would need to increase by a total of 61 total residency spots per year, for each year beginning in 2023. For General Internal Medicine physicians, GME positions would need to increase by 70 residents each year. For Obstetrics and Gynecology, there would need to be an increase of 13 GME positions each year. Texas currently has 70 percent of the Pediatrics specialists it needs, and without change, supply is expected to meet 71 percent of the demand in 2032. If using solely increases in GME to address this deficit, Texas would need to add an additional 55 residencies each year. Finally, for Psychiatry, there would need to be an increase of 31 GME positions each year to address the projected deficit.

Table 5. Projected Demand and New Graduate Medical Education Residents Needed to Meet 2032 Demand for Primary Care and Psychiatry Specialties

Specialty	2032 Supply (FTEs)	2032 Demand (FTEs)	2032 Deficit (FTEs)	2032 Percent Demand Met	Additional GME Residents Per Year to Meet Demand
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Family Medicine	9,004	11,499	2,495	78.3%	61
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Specialty	2032 Supply (FTEs)	2032 Demand (FTEs)	2032 Deficit (FTEs)	2032 Percent Demand Met	Additional GME Residents Per Year to Meet Demand
General Internal Medicine	7,759	10,366	2,607	74.8%	70
Obstetrics and Gynecology	3,783	4,210	427	89.8%	13
Pediatrics	4,675	6,588	1,913	71.0%	55
Psychiatry	2,852	3,895	1,043	73.2%	31

Two alternative scenarios were also considered. One model considers the impact of a ten percent yearly increase in GME positions between 2023-2032 (Table 6), while the other model considers the impact of a five percent increase in GME positions over that same period of time (Table 7).

For Family Medicine, a yearly ten percent increase in GME positions would result in an additional 1,758 physicians practicing Family Medicine. This would fulfill over two-thirds of the current deficit predicted for 2032. For General Internal Medicine, a yearly ten percent increase in GME positions would result in an additional 3,022 physicians practicing General Internal Medicine in the state than are currently projected. This would create a surplus of General Internal Medicine physicians.¹⁸¹⁹

¹⁸ When considering potential changes in GME, it is important to note that some of the specialties included under Primary Care, particularly General Internal Medicine residents, are a first step to becoming a specialist in a non-Primary Care specialty. According to Long et. al. (2016), approximately four-fifths of internal medicine residents and nearly two-thirds of primary care internal medicine residents do not plan to have a career in primary care or general internal medicine. Therefore, only a fraction of the increase in General Internal Medicine GME residencies would help to alleviate shortages in Primary Care in Texas.

¹⁹ Long, Theodore, MD MHS; Krisda Chaiyachati, MD MPH; Olatunde Bosu, MD; Sohini Sircar; Bradley Richards, MD; Megha Garg, MD; Kelly McGarry, MD; Sonja Solomon, MD;

For Obstetrics and Gynecology, a yearly ten percent increase in GME positions would result in an additional 516 physicians practicing Obstetrics and Gynecology. This would create a surplus of Obstetrics and Gynecology physicians. For Pediatrics, a yearly ten percent increase in GME positions would result in an additional 951 physicians practicing Pediatrics. This would fulfill approximately half of the current deficit predicted for 2032. For Psychiatry, a yearly ten percent increase in GME positions would result in an additional 671 physicians practicing Psychiatry. This would fulfill almost three-fifths of the current deficit predicted for 2032.

Table 6. Projected Impact of 10 Percent Increase of Graduate Medical Education Residents for Primary Care and Psychiatry Specialties

Specialty	2032 Supply (FTEs)	2032 Demand (FTEs)	2032 Deficit (FTEs)	10 Percent Increase Per Year GME Resident Yield	Percent Demand Met By 10 Percent Increase
Family Medicine	9,004	11,499	2,495	1,758	70.4%
General Internal Medicine	7,759	10,366	2,607	3,022	115.9%
Obstetrics and Gynecology	3,783	4,210	427	516	120.8%
Pediatrics	4,675	6,588	1,913	951	49.7%
Psychiatry	2,852	3,895	1,043	671	58.7%

For Family Medicine, a yearly five percent increase in GME positions would result in an additional 749 physicians practicing Family Medicine. This would fulfill

Rebecca Berman, MD; Leslie Curry, PhD MPH; John Moriarty, MD; and Stephen Huot, MD PhD. Why Aren't More Primary Care Residents Going into Primary Care? A Qualitative Study. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5130953/#:~:text=BACKGROUND,care%20or%20general%20internal%20medicine>. Published December 2016. Accessed February 22, 2022.

approximately a third of the current deficit projected for 2032. For General Internal Medicine, a yearly five percent increase in GME positions would result in an additional 1,286 physicians practicing General Internal Medicine. This would fulfill approximately half of the current deficit projected for 2032. For Obstetrics and Gynecology, a yearly five percent increase in GME positions would result in an additional 220 physicians practicing Obstetrics and Gynecology. This would fulfill approximately half of the current deficit projected for 2032. For Pediatrics, a yearly five percent increase in GME positions would result in an additional 405 physicians practicing Pediatrics. This would fulfill over a fifth of the current deficit projected for 2032. For Psychiatry, a yearly five percent increase in GME positions would result in an additional 285 physicians practicing Psychiatry. This would fulfill one fourth of the current deficit projected for 2032.

Table 7. Projected Impact of Five Percent Increase of Graduate Medical Education Residents for Primary Care and Psychiatry Specialties

Specialty	2032 Supply (FTEs)	2032 Demand (FTEs)	2032 Deficit (FTEs)	5 Percent Increase Per Year GME Resident Yield	Percent Demand Met By 5 Percent Increase
Family Medicine	9,004	11,499	2,495	749	30.0%
General Internal Medicine	7,759	10,366	2,607	1,286	49.3%
Obstetrics and Gynecology	3,783	4,210	427	220	51.5%
Pediatrics	4,675	6,588	1,913	405	21.2%
Psychiatry	2,852	3,895	1,043	285	25.0%

Collectively, a combination of increases in UME and GME can help to address physician shortages in Texas. Increases in UME positions at medical schools create a larger supply of physicians in the state overall, while increases in GME residency positions allows for a more targeted approach in creating a larger supply of physicians in specific specialties.

4. Conclusion

This report presents information on the medical education pipeline in the state of Texas. This report also identifies the potential impact that changes in the medical education system would have on the supply of physicians in Primary Care and Psychiatry specialties in the state.

Projected deficits vary greatly based on specialty, meaning the number of additional medical education positions needed to meet projected needs vary, as well. For example, based on the medical education pipeline as it currently stands, the GME positions would have to increase for all PCP specialties. Whereas Obstetrics and Gynecology would require a yearly increase of 13 additional new resident positions, General Internal Medicine would require a yearly increase of 70 additional new resident positions to overcome the projected deficit. Meanwhile, to overcome the projected deficit in Psychiatry, the specialty would require a yearly increase of 31 additional new resident positions.

Current projections in medical school enrollment and resident positions by the Texas Higher Education Coordinating Board indicate that the state's GME system will not create a supply of physicians that can meet projected demand. The different scenarios demonstrate a need to increase both UME and GME enrollment, as well as a need for physician recruitment strategies beyond the medical education system in Texas.

Unless corrective measures are taken, the shortage of physicians in Texas may persist beyond 2032. As the legislature continues to analyze the shortage of physicians in the state, DSHS will continue to work with stakeholders to ensure accurate and consistent understanding of the shortages facing Texas today and in the future.

List of Acronyms

Acronym	Full Name
DSHS	Texas Department of State Health Services
FTE	Full-time equivalent
GME	Graduate Medical Education
HPRC	Health Professions Resource Center
PCP	Primary Care Physician
UME	Undergraduate Medical Education

Appendix A. Physician Specialties and Education

Table 8. Physicians Who Completed Graduate Medical Education and Stayed to Practice in Texas by Specialty and Location of Medical School, 2000-2019

Specialty	Location of Medical School	Graduate Medical Education in Texas	Practice in Texas
Allergy and Immunology	International	59	33
Allergy and Immunology	Other State	200	65
Allergy and Immunology	Texas	107	93
Anesthesiology	International	449	266
Anesthesiology	Other State	1,269	455
Anesthesiology	Texas	1,669	1,378
Cardiology	International	584	326
Cardiology	Other State	936	302
Cardiology	Texas	491	392
Colorectal Surgery	International	44	17
Colorectal Surgery	Other State	113	24
Colorectal Surgery	Texas	55	42
Critical Care Medicine	International	95	45
Critical Care Medicine	Other State	99	37
Critical Care Medicine	Texas	60	50

Specialty	Location of Medical School	Graduate Medical Education in Texas	Practice in Texas
Dermatology	International	27	16
Dermatology	Other State	473	146
Dermatology	Texas	422	319
Emergency Medicine	International	157	96
Emergency Medicine	Other State	1,329	581
Emergency Medicine	Texas	942	797
Endocrinology	International	215	138
Endocrinology	Other State	196	91
Endocrinology	Texas	145	111
Family Medicine	International	1,660	1,142
Family Medicine	Other State	1,453	699
Family Medicine	Texas	3,520	3,108
Gastroenterology	International	246	129
Gastroenterology	Other State	511	179
Gastroenterology	Texas	328	269
General Internal Medicine	International	910	562
General Internal Medicine	Other State	1,163	518

Specialty	Location of Medical School	Graduate Medical Education in Texas	Practice in Texas
General Internal Medicine	Texas	1,847	1,575
General Surgery	International	160	80
General Surgery	Other State	854	314
General Surgery	Texas	739	575
Hematology and Oncology	International	481	245
Hematology and Oncology	Other State	633	231
Hematology and Oncology	Texas	340	265
Infectious Diseases	International	243	143
Infectious Diseases	Other State	258	85
Infectious Diseases	Texas	140	109
Neonatology	International	120	74
Neonatology	Other State	168	78
Neonatology	Texas	127	94
Nephrology	International	380	236
Nephrology	Other State	272	99
Nephrology	Texas	226	177
Neurological Surgery	International	36	18

Specialty	Location of Medical School	Graduate Medical Education in Texas	Practice in Texas
Neurological Surgery	Other State	145	47
Neurological Surgery	Texas	116	76
Neurology	International	267	140
Neurology	Other State	317	107
Neurology	Texas	297	213
Obstetrics and Gynecology	International	247	136
Obstetrics and Gynecology	Other State	1,409	514
Obstetrics and Gynecology	Texas	1,785	1,446
Ophthalmology	International	92	48
Ophthalmology	Other State	876	225
Ophthalmology	Texas	512	386
Orthopedic Surgery	International	69	42
Orthopedic Surgery	Other State	1,111	277
Orthopedic Surgery	Texas	704	541
Other Specialties	International	336	196
Other Specialties	Other State	797	271
Other Specialties	Texas	504	392

Specialty	Location of Medical School	Graduate Medical Education in Texas	Practice in Texas
Otolaryngology	International	28	14
Otolaryngology	Other State	392	102
Otolaryngology	Texas	325	250
Pathology	International	597	304
Pathology	Other State	717	240
Pathology	Texas	527	394
Pediatrics	International	702	436
Pediatrics	Other State	1,307	495
Pediatrics	Texas	1,834	1,506
Physical Medicine and Rehabilitation	International	208	108
Physical Medicine and Rehabilitation	Other State	563	207
Physical Medicine and Rehabilitation	Texas	328	256
Plastic Surgery	International	59	26
Plastic Surgery	Other State	467	140
Plastic Surgery	Texas	300	218
Psychiatry	International	679	413
Psychiatry	Other State	614	311

Specialty	Location of Medical School	Graduate Medical Education in Texas	Practice in Texas
Psychiatry	Texas	1,133	918
Pulmonology	International	241	148
Pulmonology	Other State	271	111
Pulmonology	Texas	229	187
Radiation Oncology	International	61	35
Radiation Oncology	Other State	253	79
Radiation Oncology	Texas	119	82
Radiology	International	193	119
Radiology	Other State	1,071	391
Radiology	Texas	985	804
Rheumatology	International	113	65
Rheumatology	Other State	120	39
Rheumatology	Texas	86	63
Thoracic Surgery	International	101	38
Thoracic Surgery	Other State	244	54
Thoracic Surgery	Texas	106	72
Urology	International	38	16
Urology	Other State	428	110

Specialty	Location of Medical School	Graduate Medical Education in Texas	Practice in Texas
Urology	Texas	284	213
Vascular Surgery	International	92	34
Vascular Surgery	Other State	205	47
Vascular Surgery	Texas	111	85
Total	-	52,666	31,011

Table 9. Specialty Distribution of Texas Medical School Graduates Who Completed Graduate Medical Education in Texas, 2000-2019

Specialty	Total
Allergy and Immunology	41
Anesthesiology	787
Cardiology	211
Colorectal Surgery	18
Critical Care Medicine	46
Dermatology	248
Emergency Medicine	548
Endocrinology	92
Family Medicine	1,417
Gastroenterology	176

Specialty	Total
General Internal Medicine	903
General Surgery	367
Hematology and Oncology	174
Infectious Diseases	52
Neonatology	77
Nephrology	106
Neurological Surgery	60
Neurology	130
Obstetrics and Gynecology	701
Ophthalmology	205
Orthopedic Surgery	282
Other Specialties	192
Otolaryngology	102
Pathology	209
Pediatrics	942
Physical Medicine and Rehabilitation	205
Plastic Surgery	118
Psychiatry	497
Pulmonology	129

Specialty	Total
Radiation Oncology	70
Radiology	447
Rheumatology	53
Thoracic Surgery	14
Urology	102
Vascular Surgery	31
Total	9,752

Table 10. Probability that Texas GME Residents Practice in Texas by Specialty and UME Location

Specialty	International	Other State	Texas
Allergy & Immunology	55.9%	32.5%	86.9%
Anesthesiology	59.2%	35.9%	82.6%
Cardiology	55.8%	32.3%	79.8%
Colorectal Surgery	38.6%	21.2%	76.4%
Critical Care Medicine	47.4%	37.4%	83.3%
Dermatology	59.3%	30.9%	75.6%
Emergency Medicine	61.1%	43.7%	84.6%
Endocrinology	64.2%	46.4%	76.6%
Family Medicine	68.8%	48.1%	88.3%

Specialty	International	Other State	Texas
Gastroenterology	52.4%	35.0%	82.0%
General Internal Medicine	61.8%	44.5%	85.3%
General Surgery	50.0%	36.8%	77.8%
Hematology & Oncology	50.9%	36.5%	77.9%
Infectious Diseases	58.8%	32.9%	77.9%
Neonatology	61.7%	46.4%	74.0%
Nephrology	62.1%	36.4%	78.3%
Neurological Surgery	50.0%	32.4%	65.5%
Neurology	52.4%	33.8%	71.7%
Obstetrics & Gynecology	55.1%	36.5%	81.0%
Ophthalmology	52.2%	25.7%	75.4%
Orthopedic Surgery	60.9%	24.9%	76.8%
Other Specialties	58.3%	34.0%	77.8%
Otolaryngology	50.0%	26.0%	76.9%
Pathology	50.9%	33.5%	74.8%
Pediatrics	62.1%	37.9%	82.1%
Physical Medicine & Rehabilitation	51.9%	36.8%	78.0%
Plastic Surgery	44.1%	30.0%	72.7%
Psychiatry	60.8%	50.7%	81.0%

Specialty	International	Other State	Texas
Pulmonology	61.4%	41.0%	81.7%
Radiation Oncology	57.4%	31.2%	68.9%
Radiology	61.7%	36.5%	81.6%
Rheumatology	57.5%	32.5%	73.3%
Thoracic Surgery	37.6%	22.1%	67.9%
Urology	42.1%	25.7%	75.0%
Vascular Surgery	37.0%	22.9%	76.6%

Table 11. Specialty Distribution of Texas Medical School Graduates Who Returned to Texas to Practice After Completing Graduate Medical Education in Another State, 2000-2019

Specialty	Total
Allergy and Immunology	1.2%
Anesthesiology	8.5%
Cardiology	2.5%
Colorectal Surgery	0.4%
Critical Care Medicine	0.5%
Dermatology	2.3%
Emergency Medicine	10.9%
Endocrinology	0.7%

Specialty	Total
Family Medicine	6.0%
Gastroenterology	1.7%
General Internal Medicine	6.3%
General Surgery	4.7%
Hematology and Oncology	1.6%
Infectious Diseases	0.6%
Neonatology	0.7%
Nephrology	0.9%
Neurological Surgery	0.9%
Neurology	1.1%
Obstetrics and Gynecology	5.5%
Ophthalmology	2.5%
Orthopedic Surgery	5.8%
Other Specialties	2.1%
Otolaryngology	2.9%
Pathology	1.7%
Pediatrics	8.2%
Physical Medicine and Rehabilitation	3.2%
Plastic Surgery	1.7%

Specialty	Total
Psychiatry	3.1%
Pulmonology	1.0%
Radiation Oncology	0.6%
Radiology	6.2%
Rheumatology	0.8%
Thoracic Surgery	0.4%
Urology	2.0%
Vascular Surgery	0.6%
Total	2,988