
**Addendum to the Graduate Medical
Education System and Physician Supply
in Texas**

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

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Executive Summary

Senate Bill 18 (S.B. 18), 84th Texas Legislature, Regular Session, 2015 added Section 105.009 to the Texas Health and Safety Code to require the Department of State Health Services (DSHS) to conduct research on physician shortages in Texas and the capacity of the state's graduate medical education (GME) system. While basic methods for identifying physician shortages currently exist, DSHS is working to identify critical shortage levels by physician specialty and subspecialty. DSHS conducted a survey within a hospital setting asking which specialties were deemed to be at critical shortage levels in Texas as a result, the focus of this report is to assess shortage levels for two physician specialties – general surgery (GS) and emergency medicine (EM) physicians.

The results of demand and supply analysis of EM and GS physicians in Texas suggest different outcomes for the two specialties. On average, there is an adequate number of EM physicians in Texas, with a slight surplus in urban areas as a whole and a significant shortage in rural counties. On the other hand, there is an acute shortage of GS physicians across the state, with more critical shortages in rural counties than urban counties. Over the next 15 years, there will be a growing surplus of EM physicians, while the shortage in GS doctors will slightly improve.

For the two specialties that were the focus of this study, shortages in most counties are more acute for general surgeons than for EM physicians. Results of the study indicate that in 2015, only 35¹ percent of surgeries that are typically performed by general surgeons were performed by licensed physicians who practice GS in the State. This means that the majority of GS procedures were performed by physicians of other specialties². The shortage of general surgeons is more acute for rural (non-metro) counties (on average, only 20 percent of general surgery procedures in rural counties were performed by general surgeons in 2015) versus urban (metro) counties (on average 38 percent of GS procedures in urban counties were performed by general surgeons).

Projections for 2020 and 2030 indicate that availability of EM physicians will increase significantly with surpluses for most urban counties and close to half of rural counties by 2030. However, for GS physicians, the improvement in availability will be marginal. About half of GS services are still expected to be performed by physicians other than general surgeons through 2030. This is due to projections of only very small increases in new entrants into the GS labor force in Texas as compared to demand.

In summary, while extensive surpluses are projected for EM physician services across the board, including many rural counties, shortages for general surgeons will remain very acute in Texas, particularly rural counties, for the next 15 years unless measures are taken to address these shortages.

¹ The population weighted average is 35%, closer to the value for urban areas (38%) than that for rural areas (20%) because the majority of the Texas population lives in urban counties.

² For instance, many endoscopies are being performed by non-surgical specialists such as gastroenterologists. Similarly, many primary care physicians routinely perform minor surgeries that have traditionally been associated with general surgeons.

It is important to emphasize that projected shortages in general surgeon availability does not necessarily mean that most patient surgical needs will go unmet. It does mean that most of these needs will continue to be met by physicians of other specialties, or even by other health care practitioners who are not licensed physicians, and perhaps in extreme situations, some general surgery needs may not be met. Shortages in general surgeons can be improved by expanding GME programs and providing incentives for existing general surgeons to relocate to Texas, particularly rural Texas counties.

Introduction

The 2015 Texas State Government Effectiveness and Efficiency Report prepared by the Legislative Budget Board (LBB) included a finding that Texas should align new GME funding with the health care needs of the state. Included in this report was a recommendation that DSHS conduct research about the appropriate mix of primary care to specialty physicians to meet current and future needs of Texas. S.B. 18, 84th Texas Legislature, Regular Session, 2015 added Section 105.009 to the Health and Safety Code to require DSHS to conduct research on the state's GME system. This research must identify all medical specialties and subspecialties that are at critical shortage levels in the state, as well as the geographic location of physicians in those specialties and subspecialties. Additionally, the research must consider the overall supply of physicians in this state and any other issues that are relevant to the status of the GME system and the ability of that system to meet the current and future health care needs in Texas.

S.B. 18 requires that in each even-numbered year, the Statewide Health Coordinating Council (SHCC) report the results of the research conducted by DSHS to the LBB, the Texas Higher Education Coordinating Board (THECB), 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 S.B. 18 requirement. The results presented here focus on two hospital-based medical specialties – EM and GS. Based on stakeholder input, DSHS anticipates that its 2018 report will focus on a broader set of specialties, including additional hospital-based physician specialties, primary care physicians, and psychiatrists in the State of Texas.

Background

Physician availability to patients has been recognized as one of the top barriers to meeting the health care needs of patients in the United States (U.S.)³. Availability is defined as the relationship of the volume of existing physician services and health resources to patient volumes and types of medical needs. In 2015, the number of physicians of all specialties expressed on a per 100,000 population basis were estimated to be around 230 nationally, while the corresponding number was 177 for the State of Texas. Only 15 counties in Texas have a physician ratio surpassing the national ratio of 226 physicians per 100,000 population. This suggests that nearly 18 million Texans are residents in physician-shortage counties.

Other factors that may be an influence on physician shortage include a growing population and limited availability of residency positions. Texas' population is projected to grow by 21.7 percent between 2015 and 2025. Texas' population is projected to grow by 21.7 percent between 2015 and 2025, which increases the demand for physicians. Simultaneously, Texas' physician supply shortage is greater than the nation as a whole and is more prominent in rural areas. DSHS conducted a survey within a hospital setting asking which specialties were deemed to be at

³ Kullgren JT, McLaughlin CG, Mitra N, Armstrong K. "Nonfinancial Barriers and Access to Care for U.S. Adults." *Health Serv Res.* 2012;47(1, part 2):462-485.

critical shortage levels in Texas. The survey responses most commonly identified GS and EM as being at critical shortage levels. Further research conducted by the DSHS noted a correlation between the residency positions in the state and the number of physicians practicing in the states, reflecting the fact that physicians are more likely to reside and practice in the state in which they completed their GME. With more students completing their GMEs out of state, there are fewer practicing in Texas, thus exacerbating the shortage. Graduates of GS and EM are two of the more common specialties showing interest in choosing to complete their GME out of state because of a shortage of residency programs in Texas. Current budget projections through 2019 suggest that the number of matriculates from the Texas GME pipeline will increase only marginally, implying that current shortages are expected to continue. The shortages are most likely to affect rural and border areas and may vary for different specialties⁴.

The purpose of this study is to identify the degree of shortage of GS and EM physicians at the county level for all counties in the State of Texas. This analysis will serve to inform state health and other governmental officials regarding areas of critical shortage in order to inform policies that might improve availability of health care providers to all Texas residents. This study is being conducted as a collaborative effort between the DSHS and Tarleton State University.

Objectives

To achieve the foregoing purpose, the primary objectives of this study were to:

- Develop a model of Texas GS and EM physician supply at the county level to estimate current and anticipated future supply of these physicians to meet the needs of residents in all Texas counties,
- Develop a model of county-level demand for GS and EM physicians in Texas to estimate the current and projected future demand for these physicians by residents in all Texas counties, and
- Compare GS and EM physician demand and supply to estimate shortage levels for each county to identify current and projected shortage areas, with particular attention to rural counties as well as counties that are or are projected to be in critical shortage.

For the purposes of the present analyses, the current baseline year was 2015. Supply, demand, and shortage projections were derived and presented for years 2020 and 2030. GS and EM specialties were chosen for this study specifically because, as indicated above, the two specialties were identified as a high priority for stakeholders. Additionally, more data are readily available for hospital-based specialties than other specialties that are based in clinics or doctors' offices.

There are factors on both the supply and demand sides that can contribute to potential shortages of physicians in the future. These shortages are inevitable given increases in population and their demographic composition, but they could be mitigated to some extent by policy decisions on the supply side. Briefly, on the demand side, the factors include: (a) rapid population growth with the sub-group of 65-plus years of age projected to exhibit the largest growth, (b) wealth and future expectations that could drive Texans to demand more health care, and (c) increased

⁴ Dickey N. Retaining Medical Graduates in Texas. *Texas Med.* 2015;112(2):68-70.

accessibility with more Texans covered under private insurance programs or as they become eligible to receive Medicare Medicaid⁵.

On the supply side, factors that could potentially lead to a shortage of physicians include: (a) retirement age and other factors such as a changing incentive systems and Medicare reforms potentially forcing physicians into early retirement; (b) changing preferences of the newer generations (cohorts) of physicians with a trend towards fewer work hours than the previous generations; and (c) supply of medical graduates not keeping up with the demand for physicians^{2,6}.

A study published in the American Journal of Surgery 2013 assessed the degree of shortage of the Texas GS workforce at the county level as compared to the state average. The results of that study indicated that the Texas general surgeon supply had not kept pace with the growing population. It stated that the total number of general surgeons had increased by 4 percent from 2002 to 2012, but per 100,000 population, it decreased by 14 percent over the same 10-year period. When evaluating Texas as a whole in 2012, the results stated there was a need for 329 more surgeons, but when analyzed at the county level, the total number of surgeons needed came out to 449. This analysis was conducted using a benchmark target of 7 general surgeons per 100,000 population⁷.

A 2012 research summary from the Dallas-Fort Worth Hospital Council Foundation focused on the changes and statistics in EM visits in North Texas, with a focus on Dallas County, an urban area. A key finding from 2010 to 2012 noted the overall increase in emergency department patients (18 percent) in North Texas while also concluding there was no significant change in ER usage per 1,000 patients⁸.

For the U.S. as a whole, the Health Resources and Service Administration (HRSA) published projections of active physicians for 2000 through 2020 for major medical specialties, including GS and EM⁹. In the base year of 2000 for that study, the total supply of active physicians in GS for the entire the nation was 33,980. The projection for 2020 was 31,880, which was a 3 percent decrease from their base year. In that study, the base year (2000) estimate for active EM was 27,460 physicians with a projection of 39,890 for 2020, an increase of 29 percent. This article overall projected that there will be a decrease of general surgeons and an increase of emergency room (ER) physicians in the U.S. by the year 2020. However, they projected an increase in

⁵ Salsberg E, Grover A. Physician workforce shortage: implications and issues for academic health centers and policymakers. *Acad Med*. 2006;81(9):782-787.

⁶ Cutchin MP, Norton JC, Quan MM, Bolt D, Hughes S, Lindeman B. To Stay or not to stay: issues in rural primary care physician retention in eastern Kentucky. *J of Rural Health*. 1994;10(4):273-278.

⁷ Stewart RM, Liao LF, West M, Sirnek KR. The general surgery workforce shortage is worse when assessed at county level. *The Am J of Surg*. 2013;1016-1023.

⁸ Sharma S, Schmitt E, Mendoza T, Jenkins K. "Emergency Room Visits in North Texas: A Comprehensive Overview & Frequent Flyer Analysis to Identify Disparities." Published by the Dallas-Fort Worth Hospital Council Foundation. November 2013.

⁹ U.S. Department of Health and Human Services. Health Resources and Services Administration. (USDA-HRSA). "The Physician Workforce: Projections and Research into Current Issues Affecting Supply and Demand." Bureau of Health Professions. December 2008. Available at <http://bhpr.hrsa.gov/healthworkforce/reports/physwffissues.pdf>. Last accessed September 15, 2016

demand for both GS and EM services. The main purpose of the present study is to identify areas of physician shortage in order to inform measures aimed at improving patient access to health care provision in all Texas counties. To this end, shortage is defined as a situation in which the quantity of physician services demanded – measured as full-time equivalent (FTE) units of doctors – exceeds the corresponding quantity supplied of the physicians, also expressed as FTEs. The following sections first address EM physician supply and demand, followed by subsequent sections on GS physician supply and demand.

Supply and Demand of Emergency Medicine Physicians

Current and projected supply and demand for EM physicians were estimated for each county to assess the degree of shortage of the physicians at the county level. Supply and demand of EM physicians were expressed in FTE units of doctors to have the same basis for comparison. Furthermore, all counties were designated either as rural or urban for comparative analyses of physician shortage for rural and urban counties. The following provides a brief discussion of the methods and results. More detailed information is provided in the technical appendix.

Estimating Current Supply of EM Physicians

The current supply of EM physicians was derived from data available in the Texas Medical Board physician licensure file for each county. For the current baseline year, the list of EM physicians who perform direct patient care in Texas was retrieved from the July 2015 licensure file. For each county, the total number of FTE EM physicians with practice location within the county was obtained by summing up the number of hours worked by physicians who listed EM as a specialty and dividing the result by 45, the average weekly hours worked by EM physicians as reported in published studies¹⁰. The resulting FTEs of EM physicians represents the full-time equivalent number of EM doctors located in each county. The FTEs totals also reflect a retirement age of 67 years. In other words, physicians older than 67 were excluded from the analyses¹¹.

To address the common occurrence of physicians serving patients located in counties in close proximity to the area in which they practice¹², the analysis was expanded slightly. For this analysis, it was assumed that patients living in urban counties would travel up to 35 miles to a hospital or EM facility for care while patients living in rural counties would travel up to 50 miles for care. Consequently, the supply of EM physicians for each county was calculated by applying a 35-mile buffer (50-mile buffer for rural counties) as an adjustment to the number of physicians located within each county. In effect, each physician's time availability was distributed to residents within a 35-mile or 50-mile radius of their practice location regardless of whether they reside in the same county as the physician's practice location. Each doctor's availability was assumed to decrease with increasing distance from their practice location in a manner that also depends on the population distribution around them. Total EM physician supply for each county was calculated by applying the buffer region to each EM physician actively practicing in Texas.

Estimating Current Demand for EM Physicians

Current demand for EM services was estimated from discharge data provided to DSHS by all hospitals in Texas. Quarterly inpatient and outpatient data available in the Public Use Data File (PUDF) documents patient discharges from hospitals, indicating the county of residence of the

¹⁰ The average weekly hours worked by EM physicians is based on data published in the HRSA (2008) report.

¹¹ More information about the methodology used to calculate the number of FTEs of doctors is provided in the appendix.

¹² Guagliardo MF. Spatial accessibility of primary care: concepts, methods and challenges. *Int J of Health Geogr.* 2004;3(3). Available at <http://www.ij-healthgeographics.com/content/3/1/3>. Last accessed September 15, 2016.

patient, as well as age, gender, race, and ethnic demographic attributes. These quarterly records represent the most reliable data available on demand for hospital-based physician services. This data actually represents met demand in that it reflects services actually rendered to patients. Consequently, the data may not fully reflect the amount of demand for EM services, but still represent the most accurate measure available within the time frame of this study.

To estimate current demand for EM services, the annual number of records corresponding to patients who were treated at ERs was retrieved from the inpatient and outpatient PUDF files. The resulting number of records was divided by the number of patients a typical EM physician treats each calendar year to obtain the current demand for EM services in FTE units.

Current Results for EM Physicians

As mentioned above, the results presented here are based on a retirement age of 67 and also assume that EM physicians work 45 hours per week,¹³ on average. Furthermore, current estimates of the supply of and demand for EM physicians were obtained with 2015 as the baseline year. Based on these assumptions, current demand for EM physicians across the State of Texas is estimated at 12.0 FTE per 100,000 people (Table 1). The corresponding estimate for current supply of EM physicians is 11.9 FTE per 100,000 people. However, the values for both demand and supply varied dramatically across Texas counties¹⁴ and urban counties have more EM physicians both in terms of total supply as well as when expressed as FTEs per 100,000 people. On the contrary, rural counties have more demand for EM physicians when expressed as FTEs per 100,000 people. More details are provided in Table 1.

Based on these demand and supply estimates (Table 1), it is clear that the number of EM physicians available in the State of Texas is just about enough to meet the total demand for their services. In general, a surplus of EM physicians exists in many urban areas. However, for rural counties, the supply of EM physicians is well below the demand.

Current Critical Shortage Areas for EM Physicians

Current estimates of demand and supply for physicians reveals that there are ten rural counties where most residents are at least 50 miles away from hospitals or other the practice locations of EM physicians, such as freestanding emergency care centers. These include Briscoe, Culberson, Donley, Edwards, Hemphill, La Salle, Presidio, Sutton, Terrell, and Wheeler counties. Many residents of one urban county, Hudspeth, to the east of El Paso County, would also have to drive at least 35 miles to get to an EM practice location, due primarily to the sheer size of Hudspeth, a sparsely populated county. These counties are considered critical shortage areas due to the time it would take most residents to travel to an EM location in case of an emergency.

Table 1. Current Supply of and Demand for EM Physicians

¹³ These estimates of hours worked are based on the HRSA (2008) report. Results of alternative retirement age and hours worked assumptions are in Appendix Table A1.

¹⁴ Demand for EM physicians ranged from 0.012 FTE for Loving County, a county with a 2015 population of 82, to 377 FTE for Harris County (with a total 2015 population of 4.3 million). Similarly, supply of EM physicians ranged from 0 FTE for a number of counties, mostly rural, to 591 FTE for Harris County.

	Supply (FTE)		Demand (FTE)	
	Total FTE	FTE/100K	Total FTE	FTE/100K
Urban (metro)	2,915.9	12.6	2,670.2	11.5
Rural (non-metro)	240.0	7.8	458.8	14.9
Entire State	3,155.9	12.0	3,129.0	11.9

Demand and Supply Projections for EM Physicians

In addition to the current year (Year 2015), demand and supply of EM physicians were estimated for the years 2020 and 2030 in order to provide a near term view of anticipated shortages. For projecting supply, several factors were considered. The current supply (stock) of physicians was used as the starting point for supply estimations. To this, new entrants were added from GME institutions, as well as those relocating to counties within Texas. Then, the number leaving by retirement or decease, as well as those relocating from their current counties of practice, were subtracted. Other attributes that differ between physician cohorts, such as age, gender, hours worked, and likely retirement age were also considered.

To adequately project demand for EM services, the PUDF data used to estimate current demand were processed to estimate current utilization patterns based on demographic attributes available at the county level. The following were the demographic attributes included in the demand estimations:

- Race: White, Black, Other;
- Ethnicity: Hispanic or Non-Hispanic;
- Gender: Male or Female; and
- Age: under 18, 18-24, 25-44, 45-64, and 65+ years.

Demand projections were computed by applying population projections to current utilization patterns. Results of the demand projections suggest a 4.5 percent increase in demand for EM services from 2015 through 2020, and a 12 percent increase from 2015 through 2030 (Table 2). These increases are driven by demographic changes anticipated across Texas over the next 15 years.

Table 2. Current and Projected Demand for EM Physicians

	Current			% Change
	Year	2020	2030	from Current Year to 2030
Urban (metro)	2,670.2	2,790.9	3,006.5	12.6
Rural (non-metro)	458.8	475.7	503.8	9.8
State Totals	3,129.0	3,266.6	3,510.2	12.2

Supply projections indicate much faster growth in the number of EM physicians (Table 3) than the growth in demand for their services. The total number of EM physicians entering Texas

counties is projected to increase by over 270 per year. However, attrition due to retirement or decrease would reduce this to a less dramatic growth rate of EM physicians in the State. Due to the current relative abundance of EM physicians in urban areas, the distribution of new EM physicians would be widespread, with rural counties also experiencing significant growth in the supply of EM doctors. The projected percentage change in EM physicians from 2015 to 2030 is roughly the same in urban and rural counties (Table 3).

Table 3. Current and Projected Supply of EM Physicians

	Current Year	2020	2030	% Change from Current Year to 2030
Urban (metro)	2,915.9	3,950.2	5,854.6	100.8
Rural (non-metro)	240.0	322.1	481.9	100.8
State Totals	3,155.9	4,272.3	6,336.4	100.8

Analysis of EM Physician Shortages

Demand and supply projections reveal very definite trends for EM physicians over the next 15 years (Figure 1). In the figure, trends of EM physician demand and supply are shown separately for urban (metro) counties as a whole and rural (non-metro) counties also in aggregate, as well as for the entire State of Texas. The figure clearly indicates that there is currently a small surplus of EM physicians in urban areas, and that this surplus will grow significantly through 2030. On the contrary, there is a significant shortage of EM physicians in rural areas, which will largely disappear by 2030. The average for the entire state (middle panel of the figure) mostly tracks the urban trend given that the majority of Texas residents and physicians live in urban areas. By 2030, shortages of EM physicians would be eliminated for most counties, with a statewide average surplus and surpluses for most urban counties and many rural counties, as well.

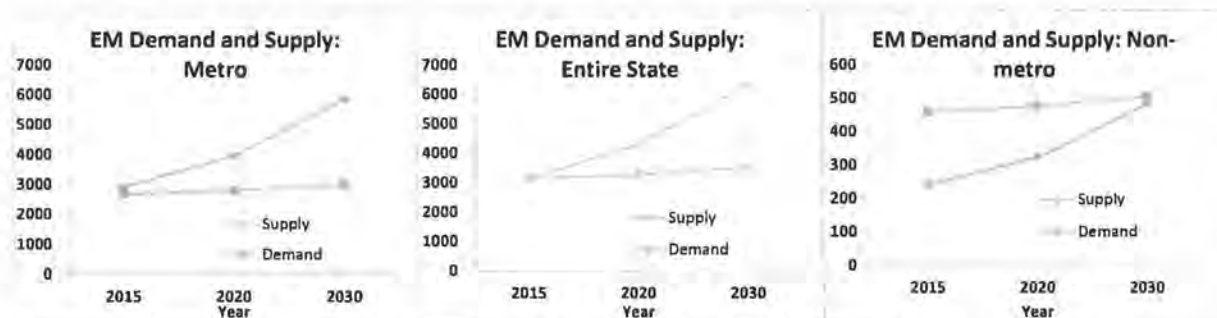


Figure 1. Trends in EM physician demand and supply: 2015 through 2030.

Projected Critical Shortage Areas for EM Physicians

Projections in demand and supply of EM physicians indicate that shortages would largely disappear over the next 15 years. By 2030, only two rural counties are projected to have critical shortage situations where most residents have to drive at least 50 miles for EM care. This would

be a significant improvement over the current situation, where ten rural counties have no EM physician services within 50 miles of their population centers. This is not to say that all other counties would have an adequate number of EM physicians. About half of rural counties in Texas would still have a shortage of EM physicians, though these shortages would be mostly marginal.

Supply and Demand of General Surgeons

The procedures used to estimate current and projected supply and demand for GS physicians are very similar to those presented above for EM physicians. All supply and demand estimates are expressed here in FTE units of doctors.

Estimating Current Supply of GS Physicians

To estimate current supply of GS physicians, the list of physicians who perform direct patient care in Texas and specified GS as a specialty was retrieved from the July 2015 Texas Medical Board physician licensure file. The total number of FTE GS physicians with practice location within each county was then obtained by summing up the number of hours worked by each physician in the county and dividing by 55 hours, the average weekly hours worked by a typical GS physician¹⁵. As in the case of EM physicians, a 35-mile buffer was applied for urban counties and a 50-mile buffer was applied for rural counties to obtain the number of FTEs of GS doctors available to residents in each county. Each doctor's availability was assumed to decrease with increasing distance from their practice location.

Estimating Current Demand for GS Physicians

Current demand for GS services was estimated from the inpatient and outpatient discharge data provided to DSHS. These data actually represent met demand, but was used for estimating GS demand because they represent the most accurate measure available within the time frame of this study. To estimate current demand for GS services, the annual number of records corresponding to patients who were treated for diagnoses highly associated with GS physicians was extracted for each county. The number of FTE GS physicians involved in their care was then calculated by dividing the extracted number of records by the number of patient discharges each GS physician handles in one calendar year¹⁶.

Current Results for GS Physicians

For the present study, GS physicians were assumed to retire at 67 years. In particular, all physicians over 67 years old were excluded from the analyses. Current estimates of the supply of and demand for GS physicians were obtained with 2015 as the baseline year. Using these assumptions, current demand for GS physicians across the State is estimated at 16.6 FTE per 100,000 people (Table 4), with considerable variation across counties¹⁷. The corresponding

¹⁵ This estimate of the average number of hours worked by GS physicians was obtained from the HRSA (2008) report. Results of alternative weekly hours and retirement age assumptions are provided in Appendix Table A1.

¹⁶ More information on the demand estimation procedure is provided in the technical appendix.

¹⁷ Total demand for GS services ranges from 0.027 FTE for Loving County to 609 FTE for Harris County. On the other hand, total supply of GS services ranges from 0 (for a number of rural counties) to 268 FTE for Harris County

supply of GS physicians is 5.9 FTE per 100,000 people, with noticeable variation across counties. The estimates presented in the table indicate that GS supply per 100,000 people is higher in urban than in rural counties, but GS demand per 100,000 people is lower in urban than in rural counties.

The results of this study indicate that demand for GS services in 2015 as measured by the FTEs of GS physicians required to perform general surgeries in Texas (4,355.9) far exceeds the number of FTEs of licensed physicians who are general surgeons (1,536.5; Table 4). This situation holds for urban and rural areas alike. It is important to note that this does not mean a large number of surgeries were not performed. Rather, it means that they were performed by health care providers other than general surgeons. Specifically, in 2015, only about 35 percent of GS operations in Texas were performed by licensed physicians who are general surgeons. The rest were performed by physicians of other specialties¹⁸ or by other health care providers. Thus, while the demand was met, the fact that the surgeries were performed by other physician specialists is indicative of a shortage of GS physicians, and that perhaps there is some unmet demand that has not been reflected in the data available.

Current Critical Shortage Areas for GS Physicians

Current critical shortage counties are defined here as those urban counties with no GS physicians within a 35-mile radius and those rural counties with no GS doctor within 50 miles of the county’s population center. Based on these definitions, 18 rural counties are critical shortage areas. Many residents of these 18 rural counties would have to drive at least 50 miles for GS services. These include Cottle, Crockett, Culberson, Dickens, Edwards, Kent, King, La Salle, Lipscomb, Loving, Menard, Motley, Ochiltree, Presidio, Reagan, Reeves, Sutton, and Terrell counties. Hudspeth is again the only urban county where the population center is at least 35 miles away from the closest general surgeon, due primarily to the sheer size of the county.

Table 4. Current Supply of and Demand for GS Physicians

	Supply (FTE)		Demand (FTE)	
	Total FTE	FTE/100K	Total FTE	FTE/100K
Urban (metro)	1,411.1	6.1	3,726.4	16.1
Rural (non-metro)	125.4	4.1	629.5	20.4
Entire State	1,536.5	5.9	4,355.9	16.6

Demand and Supply Projections for GS Physicians

In addition to estimates for the current year, demand and supply projections for GS physicians were developed for the years 2020 and 2030 to provide a near term view of anticipated shortages. Supply projections were based on current supply, with adjustments for new entrants and attrition due to retirement or decease, as well as relocation to or from current counties of

¹⁸ Quite often, these procedures are performed by other surgical specialists such as orthopedic or colorectal surgeons.

practice. To obtain demand projections, current GS utilization rates were applied to population projections in a manner similar to the procedure outlined above for EM physicians.

Results of the demand projections suggest a 9 percent increase from 2015 through 2020 and an increase of over 27 percent by 2030 (Table 5). A significant component of these increases are attributable to the aging of population segments in counties that experienced the greatest increases, particularly the over-65 population segment.

Table 5. Current and Projected Demand for GS Physicians

	Current year	2020	2030	% Change from Current Year to 2030
Urban (metro)	3,726.4	4,103.3	4,842.2	29.9
Rural (non-metro)	629.5	663.6	717.7	14.0
State Totals	4,355.9	4,766.9	5,559.9	27.6

Supply projections also indicate an increase in GS physicians (Table 6). A total of about 100 new GS physicians start practice in Texas each year. Subtracting annual attrition rates from this results in only a small increase in GS physicians each year. Furthermore, most of the increase in GS physicians would occur in urban (metro) areas, as suggested by Table 6.

Table 6. Current and Projected Supply of GS Physicians

	Current year	2020	2030	% Change from Current Year to 2030
Urban (metro)	1,411.1	1,838.8	2,557.4	81.2
Rural (non-metro)	125.4	136.9	220.4	75.8
State Totals	1,536.5	1,975.7	2,777.8	80.8

Analysis of GS Physician Shortages

Demand and supply projections for GS physicians are shown in Figure 2. The charts in the figure indicate a significant shortage in GS physicians that will only marginally be helped by a slow growth in GS physician supply from now through 2030. The nature of GS physician shortage deserves emphasis due to the kind of data used for these projections.

The projections presented here are based on current surgeries performed in hospitals and ambulatory centers across Texas. Since these reflect surgical procedures performed that qualify as GS procedures, a shortage simply means that the demand for GS services was met by health

care providers who are not general surgeons. In urban areas, many of these surgeries would be performed by other surgical specialists. However, in rural areas, the GS procedures not met by GS physicians may also be performed by other physicians or perhaps even health care providers who are not licensed physicians. While this data reflects actual surgeries performed, the fact that most did not involve general surgeons is again indicative to some extent of a shortage of GS physicians, particularly in rural counties.

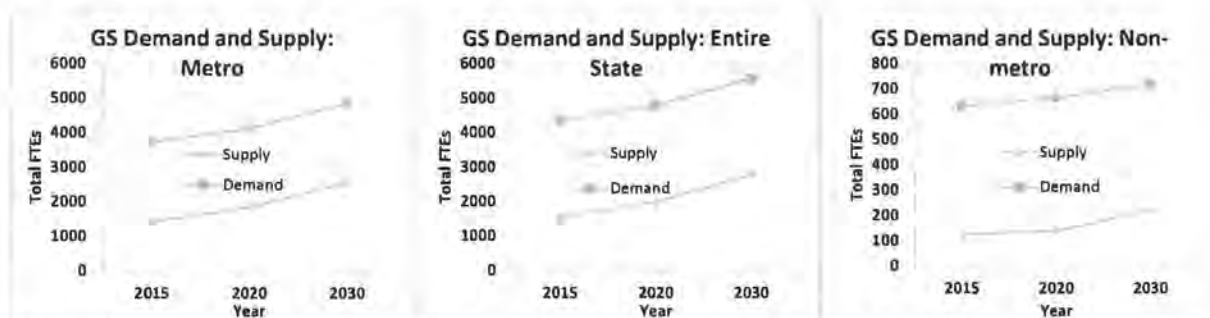


Figure 2. Trends in GS physician demand and supply: 2015 through 2030.

The charts shown in Figure 2 confirm the conclusions from other studies that indicate a persistent shortage in general surgeons across the nation¹⁹. Shortages across the state and at the county level are projected to prevail through 2030 and beyond. By 2030, only 50 percent of the general surgeries in Texas would be performed by general surgeons, up from a current estimate of 35 percent. While the projections for 2030 would be improvements over the current situation, they still reflect gross shortages for most counties, with critical shortages in many rural areas of the state²⁰.

While beyond the scope of this report, it is apparent that in urban areas, other surgical specialists meet the GS needs of patients. In other words, some procedures that have traditionally been performed by general surgeons in urban areas may now be performed by other surgical specialists. In rural areas, these needs may be met by other physicians or patients may tend to travel to urban areas to seek care.

Projected Critical Shortage Areas for GS Physicians

Projections in demand and supply of GS physicians indicate that critical shortage areas would largely remain intact through 2030. Only five of the 18 rural counties with critical shortage would have GS physicians within 50 miles of their population centers. That leaves 13 rural counties that are still projected to have no GS physicians within a 50-mile radius of their population centers by the year 2030.

Policy Implications

The foregoing results suggest a marked disparity between the demand for and supply of emergency medicine and GS physicians in terms of availability to residents in Texas counties.

¹⁹ See for instance, the HRSA (2008) report.

²⁰ Maps showing the county-level distributions of the availability indices for 2020 and 2030 are shown in the Appendix.

While shortages are more acute for GS physicians, more doctors are coming to Texas to practice EM. A statewide surplus in EM physicians is projected to increase through 2030, with shortages projected to disappear for most counties by then. In contrast, fewer doctors are seeking to practice GS in Texas, and shortages at the state and county levels are projected to prevail beyond 2030.

The disparity between demand and supply for these two specialties indicates that adequate incentive mechanisms may not exist to encourage the practice of GS in Texas, particularly in rural counties where there are fewer hospitals. Measures aimed at increasing residency positions in GS in the Texas GME system will have more permanent but delayed results. More immediate results may be obtained by using incentive mechanisms that attract general surgeons from other states that are in relative abundance to Texas, particularly rural Texas counties.

Conclusions

An analysis of the demand for and supply of EM and GS physicians in Texas was conducted to determine the degree of shortage of each of these physician specialties at the county level in Texas. Results of the analyses indicate that currently there are shortages of GS physicians in most counties across the state, urban and rural alike. However, there is an adequate supply of EM physicians in the State, with a surplus in urban counties while many rural counties have shortages. Projections for 2020 and 2030 indicate that shortages in EM physicians will largely disappear for most counties, both rural and urban in the next 15 years.

In contrast, shortages of GS physicians are much more acute and are projected to continue. As a result, many GS operations will likely be performed not by general surgeons, but by other health care providers. The analyses presented here also indicate that the shortages in GS physicians will persist beyond 2030 unless corrective measures are put in place. Given the duration of GME in GS, any corrective measures at improving residency vacancies within the state will not impact the shortage situation for at least five years. However, other incentive mechanisms that attract general surgeons from other states or even from abroad to Texas counties may show more immediate results.

Appendix A: Projected Physician Availability Figures

The following maps display the availability indices calculated for each county in Texas. Availability indices were calculated simply by dividing the total FTE units of physicians supplied in a given county by the total FTE units of physicians demanded for the same county. Thus an availability index greater than 1 implies a surplus of physicians, while an availability index less than 1 implies a shortage of physicians. The lower the availability index, the greater the severity of shortage. Conversely, the higher the availability index, the greater the surplus or the lesser the severity of shortage.

In the following maps, availability indices are displayed such that lower index values are presented in darker hues while higher index values are presented in lighter hues. Finally, urban counties are distinguished with more prominent boundaries in these maps.

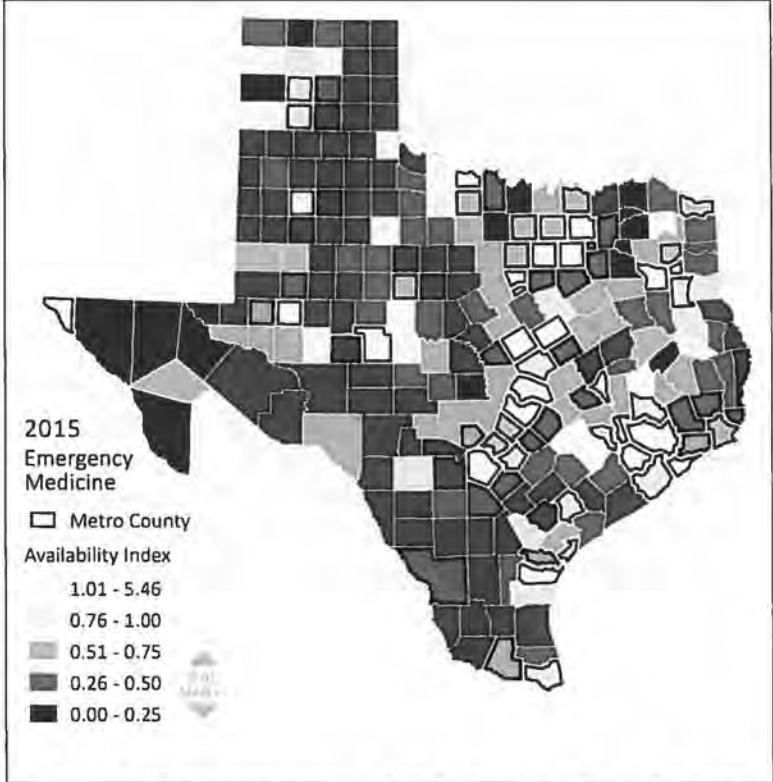


Figure A1. Current county-level availability indices for EM physicians

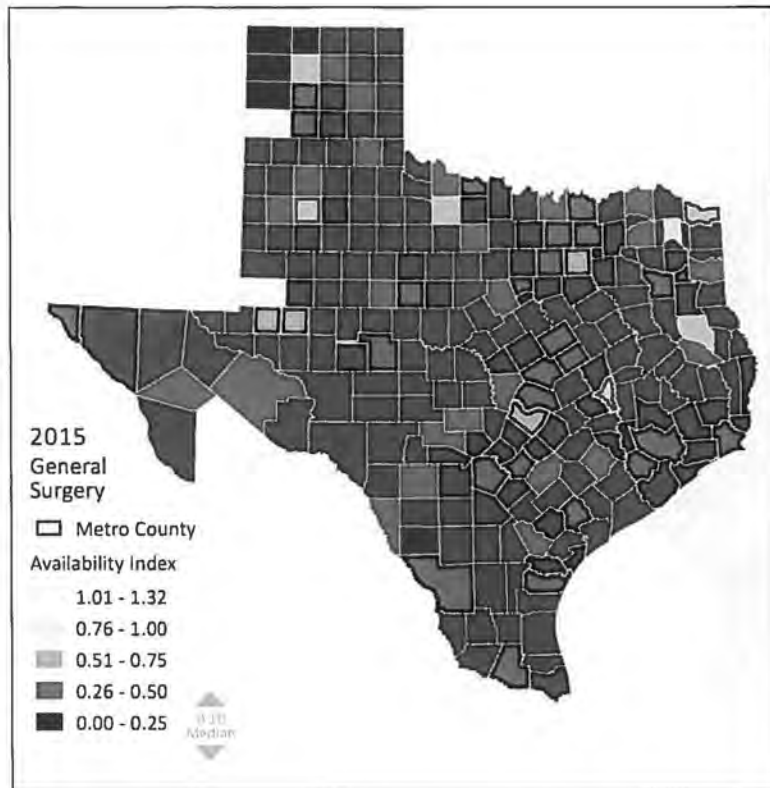


Figure A2. Current county-level availability indices for GS physicians

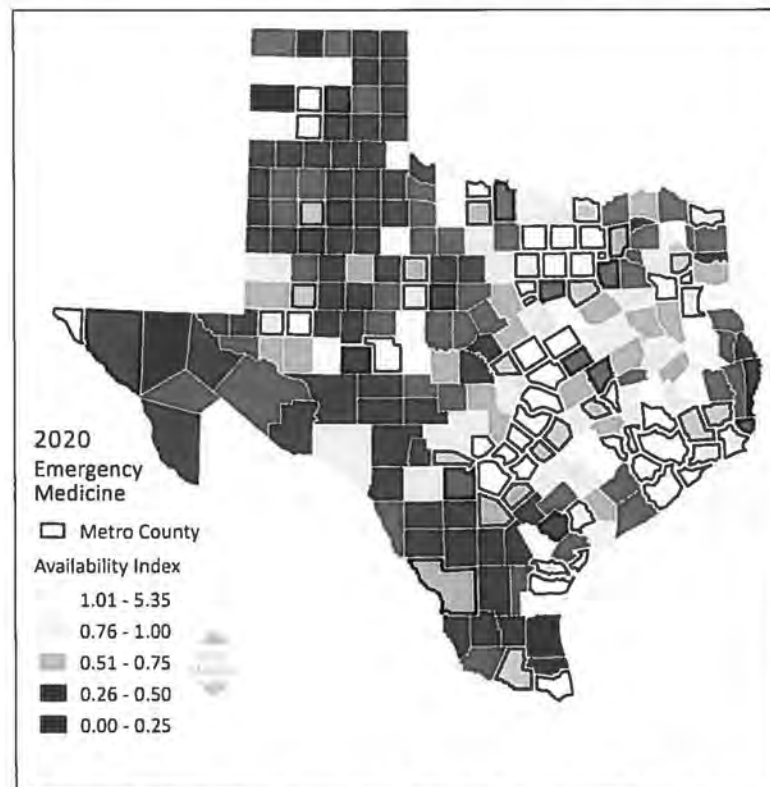


Figure A3. Projected availability indices for EM physicians: 2020

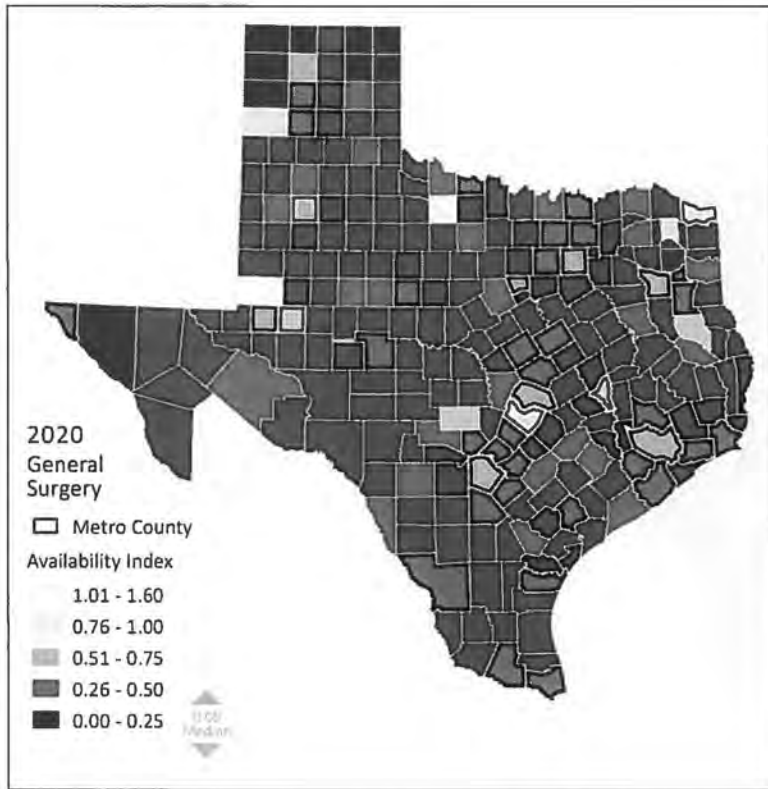


Figure A4. Projected availability indices for GS physicians: 2020

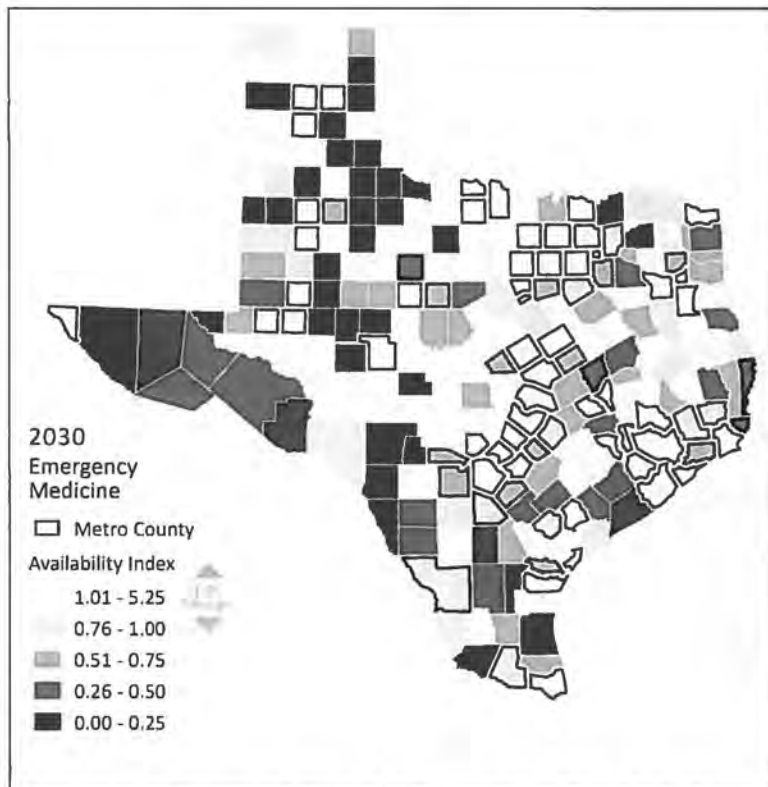


Figure A5. Projected availability indices for EM physicians: 2030

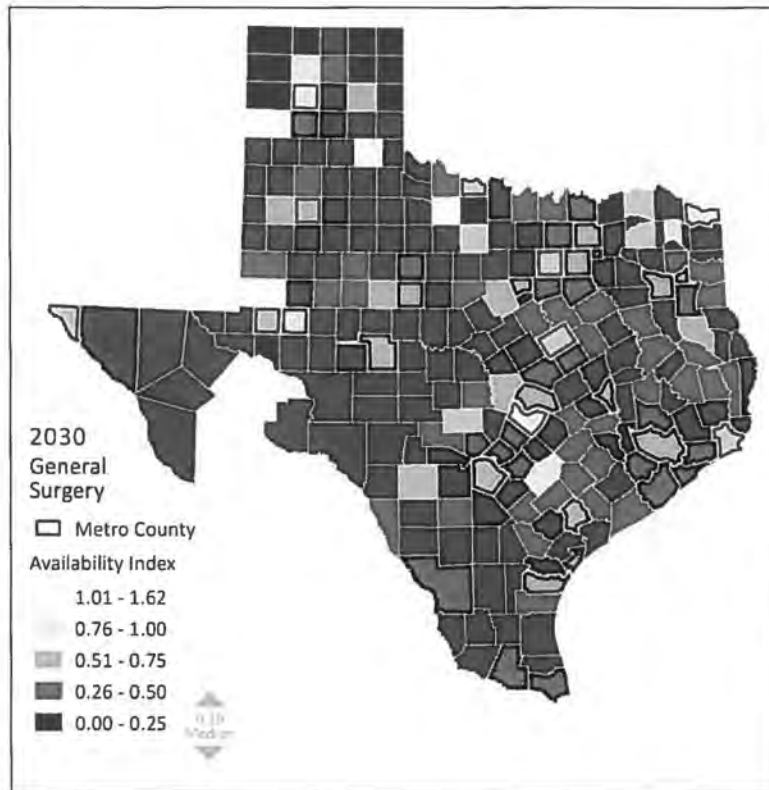


Figure A6. Projected availability indices for GS physicians: 2030

Table A1: Physician supply FTEs corresponding to alternative retirement age and hours worked assumptions⁺

Scenario	Urban			Rural			Entire State		
	2015	2020	2030	2015	2020	2030	2015	2020	2030
EM1: 67 years, 45 hours average for 40+/wk doctors	2,376.2	3,459.5	5,499.5	185.1	276.9	456.3	2,561.2	3,736.3	5,955.8
EM2: 67 years, 45 hours average for all doctors	2,915.9	3,950.2	5,854.6	240.0	322.1	481.9	3,155.9	4,272.3	6,336.4
GS1: 67 years, 55 hours average for 40+/wk doctors	1,285.7	1,674.7	2,329.5	114.6	125.0	200.9	1,400.3	1,799.7	2,530.3
GS2: 67 years, 55 hours average for all doctors	1,411.1	1,838.8	2,557.4	125.4	136.9	220.4	1,536.5	1,975.7	2,777.8
GS3: 67 years, 65 hours average for 40+/wk doctors	1,517.3	1,979.2	2,755.0	134.7	147.2	237.4	1,652.1	2,126.4	2,992.4
GS4: 67 years, 65 hours average for all doctors	1,672.3	2,184.5	3,044.4	148.3	162.3	262.3	1,820.7	2,346.8	3,306.7
GS5: 75 years, 55 hours average for 40+/wk doctors	1,336.8	1,763.1	2,444.4	123.3	131.7	211.7	1,460.1	1,894.8	2,656.0
GS6: 75 years, 55 hours average for all doctors	1,458.6	1,922.6	2,664.1	133.5	142.3	230.1	1,592.1	2,065.0	2,894.2
GS7: 75 years, 65 hours average for 40+/wk doctors	1,561.5	2,059.1	2,854.6	142.3	151.5	246.2	1,703.8	2,210.6	3,100.8
GS8: 75 years, 65 hours average for all doctors	1,711.7	2,258.6	3,133.8	155.1	164.9	269.7	1,866.8	2,423.5	3,403.5

⁺ Scenarios used in the report are in bold typeface: EM2 and GS2. Demand projections did not change with these assumptions.