Florida Statewide and Regional Physician Workforce Analysis: Estimating Current and Forecasting Future Supply and Demand

Prepared for:

SAFETY NET HOSPITAL ALLIANCE OF FLORIDA

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Executive Summary

Obtaining an accurate picture of the current and projected future adequacy of physician supply in Florida is essential to inform policy and planning initiatives; to guide medical school and graduate medical education (GME) residency training priorities; and to ensure that Florida has a future physician workforce that can continue to provide access to high quality and affordable care.

With funding support from the Safety Net Hospital Alliance of Florida (SNHA), IHS Global Inc. (IHS) was engaged to study the Florida physician workforce at the State level. This study presents estimates of current and projected future supply and demand by medical specialty.

Study guiding research questions include:

- In Florida, are there specialties where supply and demand currently are not in balance? If so, which specialties, and what is the estimated gap between supply and demand?
- What are the potential implications of health care reform initiatives, emerging care delivery models and other market factors on Florida's physician workforce supply and demand?
- To what extent will the future projected supply of physicians be adequate to meet projected statewide population service demand?

Synopsis of Study Methods

This study combined data on the physician workforce in Florida, data on the demographics, socioeconomics, and health risk factors of the population in Florida, data on health care use and delivery patterns from national sources, and two computer simulation models—the Healthcare Demand Microsimulation Model and the Health Workforce Supply Model. The demand model applies national health care use and delivery patterns to a population database that contains a representative sample of Florida's population. The demand estimates and projections take into consideration current and projected future demographics, presence of disease and other health risk factors among the population, and medical insurance coverage changes associated with the Affordable Care Act (ACA).

The supply model uses a microsimulation approach to model the likely career decisions of physicians taking into consideration the number, specialty mix and demographics of new entrants to Florida's physician workforce, and patterns of out-of-state migration, retirement patterns, and hours worked. Supply data and inputs come primarily from the 2012 and 2013 bi-annual Physician Workforce Licensure Surveys administered by the Florida Department of Health.

The analysis compares current and projected future supply to the number of physicians required to provide a level of care consist with the national average, and taking into consideration national shortages for primary care, psychiatrists, and select other specialties.

Key Findings

Physician adequacy of supply and demand and supply estimates for 2013 and projected for 2025 are summarized in Exhibits ES-1 and ES-2. Key study findings include the following:

- **Supply Versus Demand**
  - **Small primary care shortfall**. Florida's total current supply of primary care physicians falls short of the number needed to provide a national average level of care (-6%). Under a traditional definition of primary care specialties (i.e., general and family practice, general internal medicine, general pediatrics and geriatric medicine) supply falls short of demand by -3%. Over the next several years, this shortfall will grow slightly as more people obtain insurance coverage as mandated by ACA. However, if current trends continue, this shortfall should disappear within a decade. While supply may be adequate at the state level to provide a national average level of care, there is substantial geographic variation in adequacy of care as evidenced by the state's numerous designated Primary Care Health Professional Shortage Areas.
  - **Modest specialist physician shortfall**. The supply of specialists in Florida is insufficient to provide a level of care consistent with the national average, after taking into consideration differences in the demographics and health risk factors between Florida and the nation. The current 18% shortfall is likely to persist over the foreseeable future.
  - **Severe shortfall for some medical specialties**. Specialties where the state's supply of physicians is much smaller than required to provide a level of care consistent with the national average include general surgery, psychiatry, hematology & oncology, endocrinology, radiology, nephrology, thoracic surgery, and rheumatology.
  - **Abundance of some specialties**. Florida appears to have more than sufficient plastic surgeons and dermatologists to provide a level of care consistent with the national average, though there may be environmental factors in Florida that increase demand for these specialties beyond those characteristics in the demand model used.
- **Current and Future Demand**
  - In 2013, the number of physicians required to provide a national average level of care (adjusting for national shortages in primary care and select other specialties) was 47,230 FTEs.
  - Between 2013 and 2025 effects of changing demographics on healthcare service demand in Florida will exceed the U.S. across all care settings modeled.
    - Hospital inpatient days will grow by about 27% versus 23% for the U.S.
    - Emergency care visits will grow by about 17% versus 12% for the U.S.
    - Physician office visits will grow by about 19% versus 14% for the U.S.
    - Outpatient visits will grow by about 20% versus 15% for the U.S.

  - Total demand for physicians is projected to increase by about 11,430 FTEs (24%) between 2013 and 2025.Changing demographics is projected to increase statewide physician demand by about 9,550 FTEs (20%) between 2013 and 2025.
  - Expanded medical insurance coverage under ACA will increase demand by 1,880 FTEs (4%). Most of this increase in demand will occur between 2014 and 2017.
  - ACA will increase demand for general internists and family practitioners by about 790 physicians. In percentage terms, the impact is also high for otolaryngology (+8.2%), dermatology (+7.7%), general internal medicine (+6.7%), obstetrics & gynecology (+6.4%), radiology (+6.4%), and ophthalmology (+6.4%).
  - Specialties with the highest projected growth in demand through 2025 predominantly provide care to the elderly, with growth rates highest for geriatric medicine (+42%), vascular surgery (+34%), general internal medicine (+30%), and cardiology (+29%).
- **Current and Future Supply**
  - In 2013, there were approximately 42,610 full time equivalent (FTE) physicians actively practicing in the State.
  - An estimated 2,230 new physicians enter Florida's workforce each year. This includes physicians who complete their undergraduate and/or graduate medical education in Florida, as well as physicians trained or practicing in other states.
  - Approximately 1,080 physicians will retire each year between 2013 and 2025. When combined with physicians who leave Florida, changes in average hours worked as a growing proportion of physicians are women and as the workforce ages, Florida's physician workforce is growing by approximately 1,030 FTEs per year.
  - If current workforce participation patterns and number of new entrants to the workforce remain unchanged, between 2013 and 2025 Florida's physician workforce is projected to grow by about 12,360 FTEs (29%), reaching 54,970 physicians in 2025. The total supply of primary care physicians is projected to grow about 34% and supply of specialists is projected to grow by 23%.

Report Addendum: Florida Medicaid Region Physician Workforce Analysis

In 2014, Florida implemented the Statewide Medicaid Managed Care Managed Medical Assistance program under which almost all Medicaid recipients are enrolled in a health maintenance organization (HMO) or HMO-like plan. The program is operated in eleven Medicaid regions. Building upon statewide findings, this analysis estimated the current and future adequacy of supply by Medicaid region through 2025. Key findings include:

  - There is substantial geographic variation in adequacy of supply for both primary care and non-primary care specialties across state Medicaid regions.
  - Physician supply is inadequate to provide a national average level of care (i.e., demand) in ten of Florida's eleven Medicaid regions. In three regions there is an

estimated physician shortfall of 20% or greater: Region 2 (-30%), Region 8 (-26%) and Region 7 (-20%).

- By 2025 physician demand will exceed available supply in eight Medicaid regions. Regions with projected shortfalls of 20% or more in Region 8 (-33%), Region 2 (-30%) and Region 3 (-26%).

Conclusion

Overall, demand for physicians in Florida exceeds supply for many medical specialties. The state-wide shortfall of primary care physicians is small, and if current trends continue this shortfall will disappear within the next decade. However, there is substantial variation in adequacy of primary care supply across regions as evidenced by the large number of areas and communities designated as Health Profession Shortage Areas. The state-wide shortfall of specialists is projected to persist for the foreseeable future, with large variation in magnitude of the shortfall across regions.

Emerging care delivery models will continue to affect care use and delivery patterns, which in turn will affect supply of and demand for physicians. Greater use of advanced practice nurses, physician assistants, and other health workers will affect demand for physicians. As Florida works to attract and retain physicians to care for its growing and aging population, the state will face increased competition from other states who are dealing with similar trends.

Exhibit ES-1: Projected Growth Rates of Physician Supply and Demand, 2013-2025

	Supply				Demand			
Specialty	**2013 Supply**	**2025 Supply**	**Growth**	**% Growth**	**2013 Demand [a]**	**2025 Demand [a]**	**Growth**	**% Growth**
Total Primary Care	**21,830**	**29,180**	**7,350**	**34%**	**23,120**	**28,590**	**5,470**	**24%**
Traditional Primary Care	**16,430**	**22,000**	**5,570**	**34%**	**16,850**	**20,940**	**4,090**	**24%**
General/Family Practice	5,580	7,180	1,600	29%	6,540	8,100	1,560	24%
General Internal Medicine	6,870	9,530	2,660	39%	6,940	8,990	2,050	30%
Pediatrics	3,440	4,680	1,240	36%	3,080	3,440	360	12%
Geriatric Medicine [a]	540	610	70	13%	290	410	120	41%
General Surgery	1,090	1,450	360	33%	1,710	2,170	460	27%
Emergency Medicine	2,300	3,220	920	40%	2,150	2,520	370	17%
Obstetrics/Gynecology	2,010	2,510	500	25%	2,410	2,960	550	23%
Total Non-Primary Care	**18,760**	**23,140**	**4,380**	**23%**	**22,090**	**27,550**	**5,460**	**25%**
Allergy, Immun. & Infect Dis.	650	830	180	28%	770	970	200	26%
Anesthesiology	2,200	2,790	590	27%	2,820	3,440	620	22%
Cardiology	1,640	1,930	290	18%	1,870	2,420	550	29%
Dermatology	920	1,140	220	24%	690	880	190	28%
Endocrinology	370	570	200	54%	530	680	150	28%
Gastroenterology	920	1,100	180	20%	870	1,090	220	25%
Hematology & Oncology	740	1,010	270	36%	1,080	1,340	260	25%
Nephrology	450	700	250	56%	580	730	150	26%
Neurological Surgery	320	460	140	44%	330	420	280	26%
Neurology	1,060	1,320	260	25%	1,080	1,340	260	24%
Ophthalmology	1,170	1,240	70	6%	1,130	1,420	290	26%
Orthopedic Surgery	1,380	1,630	250	18%	1,520	1,900	380	25%
Otolaryngology	510	610	100	20%	550	700	150	27%
Plastic Surgery	630	720	90	14%	490	590	100	20%
Psychiatry	1,820	2,150	330	18%	2,850	3,340	490	17%
Pulmonology & Critical Care [b]	690	950	260	38%	1,000	1,250	250	25%
Radiology	1,910	2,450	540	28%	2,440	3,150	710	29%
Rheumatology	260	280	20	8%	320	400	80	25%
Thoracic Surgery	240	260	20	8%	300	360	60	20%
Urology	650	710	60	9%	650	820	170	26%

	Supply				Demand			
Specialty	**2013 Supply**	**2025 Supply**	**Growth**	**% Growth**	**2013 Demand [a]**	**2025 Demand [a]**	**Growth**	**% Growth**
Vascular Surgery	230	290	60	26%	210	280	70	33%
Total (specialties modeled)	**40,590**	**52,320**	**11,730**	**29%**	**45,210**	**56,140**	**10,930**	**24%**
Specialties demand not modeled [c]	2,020	2,650	630	31%	2,020	2,520	500	25%
Total	**42,610**	**54,970**	**12,360**	**29%**	**47,230**	**58,660**	**11,430**	**24%**

Notes: [a] Demand is defined as the number of physicians required to provide a level of care consistent with the national average in 2013. For specialties such as geriatric medicine, demand should be considered in the context of availability of general internists and other primary care providers. [b] A substantial proportion of pulmonologists practice critical care medicine, and to be consistent with demand estimates based on national patterns we combined the categories of pulmonology, pulmonology/critical care, and critical care. Excluded from this category are critical care physicians in anesthesiology, surgery, and obstetrics/gynecology, as these categories are categorized elsewhere. [c] Physician specialties omitted from the demand model include: colon-rectal cancer, neonatal/perinatal medicine, pathology, physical medicine & rehabilitation, preventive medicine and radiation oncology. Initial demand for services for this category is assumed equal to supply, and assumed to grow at the same rate as the overall demand for non-primary care specialties. Supply is modeled separately by specialty, but combined for presentation for comparison to demand. Note: Specialties included in the expanded definition of primary care are general and family practice, general internal medicine, general pediatrics, geriatric medicine, general surgery, obstetrics and gynecology, and emergency medicine.

Exhibit ES-2: Current (2013) and Projected Future (2025) Adequacy of Physician Supply in Florida

	2013				2025			
Specialty	**Supply**	**Demand [a]**	**Supply - Demand**	**% Variance**	**Supply**	**Demand [a]**	**Supply - Demand**	**% Variance**
Total Primary Care	**21,830**	**23,120**	**(1,290)**	**-6%**	**29,180**	**28,590**	**590**	**2%**
Traditional Primary Care	**16,430**	**16,850**	**(420)**	**-3%**	**22,000**	**20,940**	**1,060**	**5%**
General/Family Practice	5,580	6,540	(960)	-17%	7,180	8,100	(920)	-13%
General Internal Medicine	6,870	6,940	(70)	-1%	9,530	8,990	540	6%
Pediatrics	3,440	3,080	360	10%	4,680	3,440	1,240	26%
Geriatric Medicine [a]	540	290	250	46%	610	410	200	33%
General Surgery	1,090	1,710	(620)	-57%	1,450	2,170	(720)	-50%
Emergency Medicine	2,300	2,150	150	7%	3,220	2,520	700	22%
Obstetrics/Gynecology	2,010	2,410	(400)	-20%	2,510	2,960	(450)	-18%
Total Non-Primary Care	**18,760**	**22,090**	**(3,330)**	**-18%**	**23,140**	**27,550**	**(4,410)**	**-19%**
Allergy, Immun. & Infect Dis.	650	770	(120)	-18%	830	970	(140)	-17%
Anesthesiology	2,200	2,820	(620)	-28%	2,790	3,440	(650)	-23%
Cardiology	1,640	1,870	(230)	-14%	1,930	2,420	(490)	-25%
Dermatology	920	690	230	25%	1,140	880	260	23%
Endocrinology	370	530	(160)	-43%	570	680	(110)	-19%
Gastroenterology	920	870	50	5%	1,100	1,090	10	1%
Hematology & Oncology	740	1,080	(340)	-46%	1,010	1,340	(330)	-33%
Nephrology	450	580	(130)	-29%	700	730	(30)	-4%
Neurological Surgery	320	330	(10)	-3%	460	420	40	9%
Neurology	1,060	1,090	(30)	-3%	1,320	1,370	(50)	-4%
Ophthalmology	1,170	1,130	40	3%	1,240	1,420	(180)	-15%
Orthopedic Surgery	1,380	1,520	(140)	-10%	1,630	1,900	(270)	-17%
Otolaryngology	510	550	(40)	-8%	610	700	(90)	-15%
Plastic Surgery	630	490	140	22%	720	590	130	18%
Psychiatry	1,820	2,850	(1,030)	-57%	2,150	3,340	(1,190)	-55%
Pulmonology & Critical Care [b]	690	1,000	(310)	-45%	950	1,250	(300)	-32%
Radiology	1,910	2,440	(530)	-28%	2,450	3,150	(700)	-29%
Rheumatology	260	320	(60)	-23%	280	400	(120)	-43%
Thoracic Surgery	240	300	(60)	-25%	260	360	(100)	-38%
Urology	650	650	-	0%	710	820	(110)	-15%
Vascular Surgery	230	210	20	9%	290	280	10	3%

	2013				2025			
Specialty	**Supply**	**Demand [a]**	**Supply - Demand**	**% Variance**	**Supply**	**Demand [a]**	**Supply - Demand**	**% Variance**
Total (specialties modeled)	**40,590**	**45,210**	**(4,620)**	**-11%**	**52,320**	**56,140**	**(3,820)**	**-8%**
Specialties demand not modeled [c]	2,020	2,020	-	0%	2,650	2,520	**130**	5%
Total	**42,610**	**47,230**	**(4,620)**	**-11%**	**54,970**	**58,660**	**(3,690)**	**-7%**

Notes: [a] Demand is defined as the number of physicians required to provide a level of care consistent with the national average in 2013. For specialties such as geriatric medicine, demand should be considered in the context of availability of general internists and other primary care providers. [b] A substantial proportion of pulmonologists practice critical care medicine, and to be consistent with demand estimates based on national patterns we combined the categories of pulmonology, pulmonology/critical care, and critical care. Excluded from this category are critical care physicians in anesthesiology, surgery, and obstetrics/gynecology, as these categories are categorized elsewhere. [c] Physician specialties omitted from the demand model include: colon-rectal cancer, neonatal/perinatal medicine, pathology, physical medicine & rehabilitation, preventive medicine and radiation oncology. Initial demand for services for this category is assumed equal to supply, and assumed to grow at the same rate as the overall demand for non-primary care specialties. Supply is modeled separately by specialty, but combined for presentation for comparison to demand. Note: Specialties included in the expanded definition of primary care are general and family practice, general internal medicine, general pediatrics, geriatric medicine, general surgery, obstetrics and gynecology, and emergency medicine.

I. Introduction

Florida's healthcare sector operates in an environment with economic and regulatory pressures to improve access to quality care while containing medical costs. In Florida, the use of health care services, the available supply of services, and how care is delivered is determined by the choices made by the state's population of over 19 million people, thousands of health professionals, practicing in the State, numerous health care facilities and payers, employers, and federal and State regulatory and payment policies. Furthermore, the use of services and care delivery patterns continue to evolve based on changing demographics, evolving care delivery models, emerging technologies, and policies such as requirements of the federal Affordable Care Act (ACA).

To help ensure an adequate supply of physicians to meet growing demand for health care services, Florida has added four new medical schools over the past decade and expanded other training programs. All the states compete for physicians in a national labor market, and historically 59.4% of physicians who complete their graduate medical education (GME)/residency in Florida remain in the state. With this expansion in medical school capacity, expansion in capacity to provide GME/residency is also needed for the state to retain these physicians trained in Florida.[1]

Between 2000 and 2012, Florida's population gained about 3.3 million people, an increase of 21% from a 2000 population of 16.0 million.[2] The population in Florida will likely reach close to 21.1 million by 2020 and 23.6 million by 2030.[3]

The Urban Institute estimated that ACA would decrease the number of uninsured nonelderly persons in Florida by about 2.2 million, a decrease of 14.6 percentage points.[4] Should Florida elect to participate in the Medicaid and CHIP expansions under ACA, about one million newly eligible persons would be phased-in to these programs by State fiscal year 2017-2018.[5] Expanded health insurance coverage under ACA is projected to increase demand for a wide range of medical services. For example, Hofer et al (2011) project that demand for primary care physicians in the U.S. will rise by 4,310 to 6,940 as a result of ACA.[6] Petterson et al (2013) estimate a national increase of 3% (about 8,000 additional primary care physicians) will be

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[1] http://safetynetsflorida.org/2013-legislative-priorities

[2] http://www.bebr.ufl.edu/articles/population-studies/trends-floridas-population-growth-2000-2012

[3] All Races Population Projections by Age and Sex for Florida and Its Counties, 2015–2040, With Estimates for 2012, Bureau of Economics and Business Research, University of Florida, June 2013.

[4] http://www.urban.org/uploadedpdf/1001520-Uninsured-After-Health-Insurance-Reform.pdf

[5] Social Services Estimating Conference: Estimates Related to Federal Affordable Care Act: Title XIX (Medicaid) & Title XXI (CHIP) Programs: Adopted March 7, 2013.

[6] Hofer AN, Abraham JM. and Moscovice I. Expansion of Coverage under the Patient Protection and Affordable Care Act and Primary Care Utilization. *Milbank Quarterly*, 2011; 89: 69–89.

needed to accommodate insurance expansion under the ACA.[7] Estimates of ACA insurance expansion impact by Dall et al. (2013) suggest the nation will experience approximately a 4% increase in demand for adult primary care physicians, with Florida projected to have a 6% increase in demand for primary care providers reflecting the demographics and health risk factors among the state's uninsured population.[8] The impact of expanded medical coverage under ACA will vary throughout Florida based on community rates of unemployment, demographics, socioeconomic characteristics, disease prevalence and health risk factors.

Changing demographics, care use and delivery patterns, economic factors, and policy changes are likely to have a dramatic impact on demand for and supply of health professionals at State and local levels. Having an accurate picture of the current and projected future size, specialty mix and characteristics of Florida's physician workforce and an accurate picture of future demand for services is essential to identify possible disparities in access to care and to inform health care policy making.

The primary purpose of this study is to quantify and assess the current and future adequacy of supply for selected physician specialties in Florida through 2025 under alternative scenarios that reflect different demand and supply trends and assumptions. Study findings are intended to be used to help decision makers throughout the State better understand how trends in physician supply and demand determinants will affect Florida, and the circumstances that may influence the physician specialty selected by medical school graduates.

Study guiding research questions include:

- In Florida, are there specialties where supply and demand currently are not in balance? If so, which specialties, and what is the estimated gap between supply and demand?
- What are the potential implications of health care reform initiatives, emerging care delivery models and other market factors on Florida's physician workforce supply and demand?
- To what extent will the future projected supply of physicians be adequate to meet projected statewide population service demand?

The remainder of this report is organized to present an assessment of current and future adequacy of physician supply (Section II), a summary of inputs and projections for current and future physician demand (Section III) and supply (Section IV), and a discussion of key findings and implications (Section V). A technical appendix provides additional information on how the workforce models were adapted for Florida.

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[7] Petterson SM, Liaw WR, Phillips RL, Rabin DL, Meyers DS, and Bazemore AW. Projecting US Primary Care Physician Workforce Needs: 2010-2025. Annals of Family Medicine, 2013; 10(6):503-509. http://www.annfammed.org/content/10/6/503.full.pdf+html

[8] Dall TM, Gallo PD, Chakrabarti R, West T, Semilla AP, Storm, MV. An Aging Population and Growing Disease Burden Will Require A Large and Specialized Health Care Workforce By 2025. *Health Affairs*, 2013; 32:2013-2020. http://content.healthaffairs.org/content/32/11/2013.abstract

II. Current and Future Adequacy of Physician Supply

This section compares Florida physician supply and demand in 2013, as well as projected to 2025. The 28 medical specialties covered by both the demand and supply analyses include 7 primary care specialties and 21 other medical and surgical specialties, and jointly account for 95% of active physicians in Florida. This study uses two definitions of primary care specialties. The medical specialties of general/family practice, general internal medicine, general pediatrics, and geriatric medicine are referred to as "Traditional" primary care specialties. At the request of SNHA we also model an expanded definition of primary care referred to as "Total" primary care specialties. In addition to the Traditional primary care specialties, Total primary care also includes obstetrics and gynecology, emergency medicine, and general surgery.

When comparing supply to demand for individual specialties, one should take into consideration the following:

1. **Shortfall or surplus severity**. When comparing supply to demand, if estimated imbalances are within ±5% one might consider supply to be essentially equal to demand. This level of imbalance is within the measurement error of any workforce model, and slight imbalances between supply and demand tend not to cause large disruptions in access to care. When imbalances are in the 5-10% range, this might be indicative of a mild shortfall (or surplus).
2. **Physician "plasticity"**. There is often overlapping scope of services provided by physicians in different specialties—this is sometimes referred to as plasticity. For example, primary care services provided to the elderly are typically provided by physicians in internal medicine and family practice as well as geriatric medicine. General internists often provide care that could be provided by internal medicine subspecialties—e.g., cardiologists and endocrinologists.
3. **Advanced practice nurses, physician assistants, and other health care providers**. The comparisons presented here compare supply to estimated demand based on national care use and delivery patterns, taking into account the characteristics of Florida's population. The comparisons do not take into account whether use of nurse practitioners, physician assistants, or other health care providers is similar or different from national care delivery patterns. To the extent that Florida uses more (less) non-physician providers relative to national patterns, then demand for physicians will be lower (higher) than projected by the Healthcare Demand Microsimulation Model.
4. **Self-correcting mechanisms**. The supply projections through 2025 indicate what is likely to happen if the number and mix of physicians trained and workforce participation remains unchanged from current patterns. As shortages or surpluses start to develop, there are self-correcting mechanisms that help prevent imbalances from becoming too severe. Physicians completing medical school will select residency and fellowship training opportunities that will lead to productive careers and these individuals will tend to gravitate away from specialties with projected surpluses and into specialties with projected shortages. Therefore,

over the long term it may be more important to focus on the total number of new physicians being trained and less on the specialty distribution which will self-correct to prevent severe imbalances. Likewise, physicians in specialties with an abundance of supply might move out of Florida, while specialties with inadequate supply might find more success in attracting physicians to Florida and retaining physicians already in the state.

A comparison of current supply and demand suggests that Florida has about 4,620 fewer physicians (11% shortfall) than required to meet demand (Exhibit 1). When comparing the traditional primary care specialties (family practice, internal medicine, pediatrics, and geriatric medicine), the state appears to use more pediatricians and geriatricians relative to the national average, but uses fewer family practitioners and general internists relative to the national average. Combining these traditional primary care specialties, the supply of 16,430 physicians is just 3% shy of the 16,850 demanded—suggesting that at the state level the population receives a level of services from primary care physicians consistent with the national average (where the national shortfall is about 3.6%).

Within Florida there is substantial distribution in supply of primary care providers as evidenced by the approximately 858 primary care providers (physicians, as well as nurse practitioners) that would be needed to remove the Primary Care Health Profession Shortage Area designation currently in place for 13 single counties and 108 other communities.[9]

Using the more expansive definition of primary care that includes general surgery, emergency medicine, and obstetrics/gynecology, it appears that the state has a shortfall of about 1,290 physicians. Florida has substantially fewer general surgeons (1,090) than is estimated to meet demand (1,710) for services. That Florida currently uses 7% more emergency physicians than is required to provide a national average level of care, given the characteristics of Florida's population, could be indicative of (1) higher than national average rates of uninsured and Medicaid recipients who might seek non-urgent care in emergency settings, (2) the large amount of tourism in the state, or (3) other factors not accounted for in the Healthcare Demand Microsimulation Model used.

For many surgical specialties state supply appears relatively consistent with estimated demand—e.g., otolaryngology (40 shortfall), neurological surgery (10 shortfall), urology (no shortfall), and vascular surgery (20 excess). The state has more than sufficient plastic surgeons to provide a level of care consistent with the national average (+140 physicians, or +22.2%), but insufficient thoracic surgeons (-60, or -25%).

Consistent with the shortfall of surgeons, the supply of anesthesiologists is less (by 620 physicians) than expected to meet demand. However, the State's 2,542 licensed Certified Registered Nurse Anesthetists (CRNAs) in 2011 suggests that Florida has a CRNA-to-anesthesiologist ratio of 1.16:1, whereas the national ratio is approximately 0.82:1. This suggests that Florida has

[9] http://datawarehouse.hrsa.gov/geoadvisor/shortagedesignationadvisor.aspx

approximately 230 more CRNAs than required to be consistent with national staffing patterns, which partially offsets the estimated 620 anesthesiologist shortfall.

The supply of dermatologists appears to be more than adequate to meet demand for services in 2013. Specialties where demand appears to be significantly greater than supply include: general surgery, psychiatry, oncology, endocrinology, radiology, thoracic surgery, and rheumatology. At the sub-state level, there is likely even greater imbalances between supply and demand in rural and small, metropolitan areas.

Exhibit 1: Estimated Supply and Demand for Physicians by Specialty , 2013

Specialty	Supply	Demand [a]	Supply - Demand	% Variance
Total Primary Care	**21,830**	**23,120**	**(1,290)**	**-6%**
Traditional Primary Care	**16,430**	**16,850**	**(420)**	**-3%**
General/Family Practice	5,580	6,540	(960)	-17%
General Internal Medicine	6,870	6,940	(70)	-1%
Pediatrics	3,440	3,080	360	10%
Geriatric Medicine [a]	540	290	250	46%
General Surgery	1,090	1,710	(620)	-57%
Emergency Medicine	2,300	2,150	150	7%
Obstetrics/Gynecology	2,010	2,410	(400)	-20%
Total Non-Primary Care	**18,760**	**22,090**	**(3,330)**	**-18%**
Allergy, Immun. & Infect Dis.	650	770	(120)	-18%
Anesthesiology	2,200	2,820	(620)	-28%
Cardiology	1,640	1,870	(230)	-14%
Dermatology	920	690	230	25%
Endocrinology	370	530	(160)	-43%
Gastroenterology	920	870	50	5%
Hematology & Oncology	740	1,080	(340)	-46%
Nephrology	450	580	(130)	-29%
Neurological Surgery	320	330	(10)	-3%
Neurology	1,060	1,090	(30)	-3%
Ophthalmology	1,170	1,130	40	3%
Orthopedic Surgery	1,380	1,520	(140)	-10%
Otolaryngology	510	550	(40)	-8%
Plastic Surgery	630	490	140	22%
Psychiatry	1,820	2,850	(1,030)	-57%
Pulmonology & Critical Care [b]	690	1,000	(310)	-45%
Radiology	1,910	2,440	(530)	-28%
Rheumatology	260	320	(60)	-23%
Thoracic Surgery	240	300	(60)	-25%
Urology	650	650	-	0%
Vascular Surgery	230	210	20	9%
Total (specialties modeled)	**40,590**	**45,210**	**(4,620)**	**-11%**
Specialties demand not modeled [c]	2,020	2,020	-	0%
Total	**42,610**	**47,230**	**(4,620)**	**-11%**

Notes: [a] Demand is defined as the number of physicians required to provide a level of care consistent with the national average in 2013. For specialties such as geriatric medicine, demand should be considered in the context of availability of general internists and other primary care providers. [b] A substantial proportion of pulmonologists practice critical care medicine, and to be consistent with demand estimates based on national patterns we combined the categories of pulmonology, pulmonology/critical care, and critical care. Excluded from this category are critical care physicians in anesthesiology, surgery, and obstetrics/gynecology, as these categories are categorized elsewhere. [c] Physician specialties omitted from the demand model include: colon-rectal cancer, neonatal/ perinatal medicine, pathology, physical medicine & rehabilitation, preventive medicine and radiation oncology. Initial demand for services for this category is assumed equal to supply, and assumed to grow at the same rate as the overall demand for non-primary care specialties. Supply is modeled separately by specialty, but combined for presentation for comparison to demand. Note: Specialties included in the expanded definition of primary care are general and family practice, general internal medicine, general pediatrics, geriatric medicine, general surgery, obstetrics and gynecology, and emergency medicine.

Florida's supply and demand for primary care providers should remain roughly in equilibrium over the foreseeable future (Exhibit 2). The current shortfall of about 1,290 primary care physicians (a modest 6%), will grow to about 7.5% shortfall (1,770 physicians) by 2017. This growth in the shortfall of primary care providers is largely associated with the projected 4.4% growth in demand for primary care services between 2014 and 2017 from expanded insurance coverage under ACA.

Between 2013 and 2025, though, the supply of physicians for both traditional primary care specialties and those modeled under an expanded definition of primary care is projected to grow faster than demand (34% versus 24% growth). As a result, by 2023 supply and demand are projected to be in equilibrium. To the extent that the State's supply of nurse practitioners and physician assistants in primary care grows faster than 24% (i.e., faster than demand for primary care services), then the modest gap that exists between supply and demand for primary care physicians could disappear before 2023.

Over the foreseeable future, demand for specialist physicians is projected to exceed supply by about 18-19% (or between 3,330 and 4,410 annual shortfall between 2013 and 2025) (Exhibit 3). Across all medical specialties, Florida will experience an annual shortage of approximately 4,200 to 6,700 (or between 8% and 15% shortfall) between 2013 and 2025 (Exhibit 4).

Exhibit 2: Projected Supply and Demand for Primary Care Physicians, 2013-2025

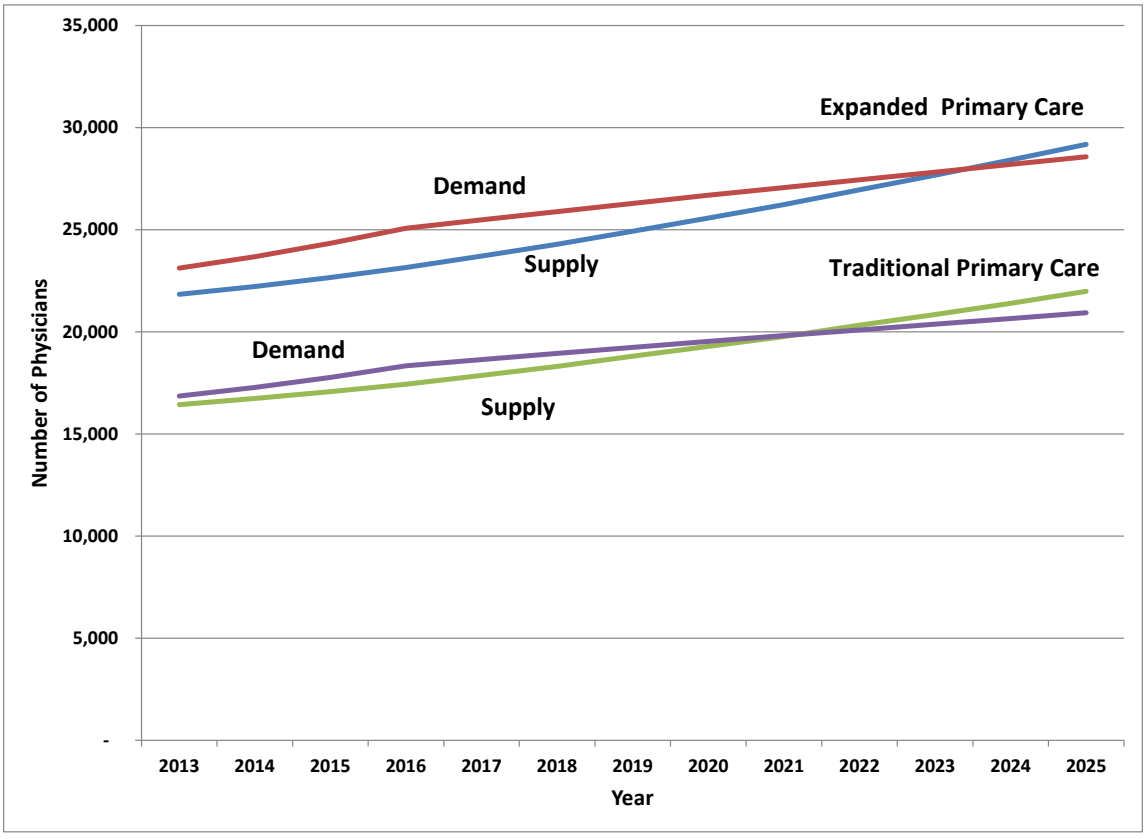


Exhibit 3: Projected Supply and Demand for Specialist Physicians, 2013-2025

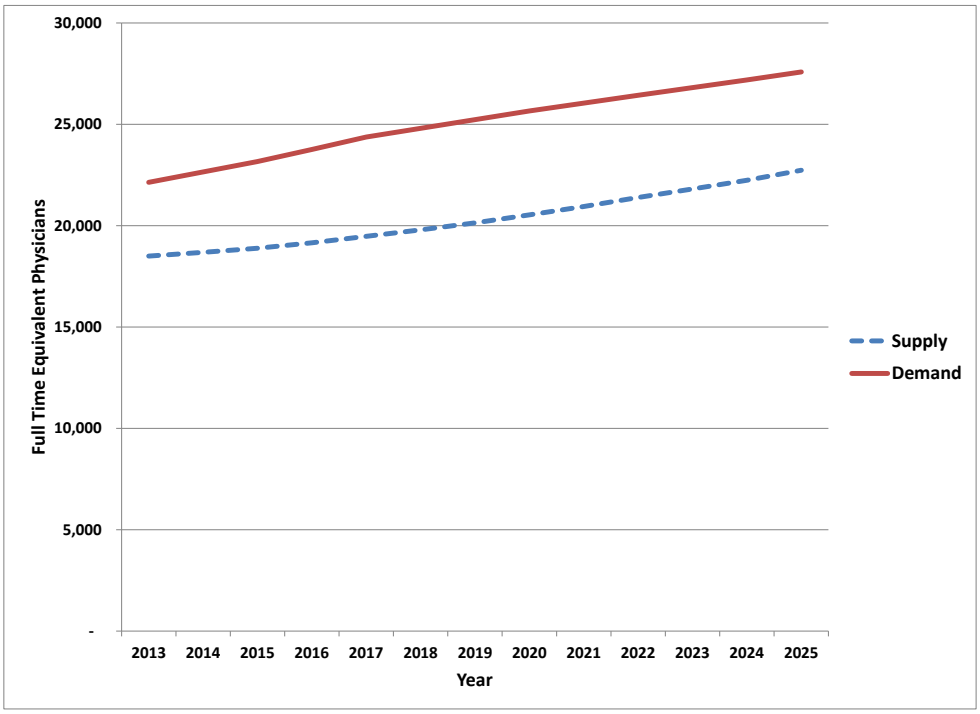
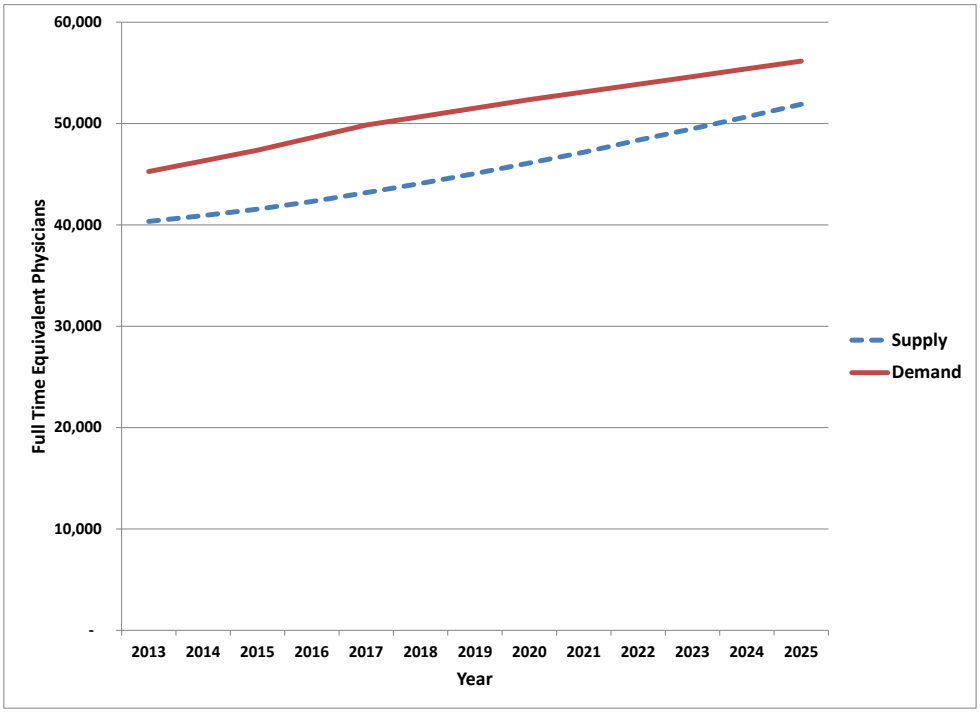


Exhibit 4: Projected Total Supply and Demand for Physicians, 2013-2025



By 2025, the total supply of primary care providers should be sufficient to provide a level of care consistent with national patterns of care in 2013 (Exhibit 5). However, individual primary care specialties show both shortages and excess supply. For example, if current trends continue the estimated shortfall of general surgeons is projected to persist. The state's supply of pediatricians also appears to be growing faster than growth in number of children—which is the primary driver of demand for pediatric services.

If current patterns continue, specialties where supply is projected to be substantially less than demand include: psychiatry, general surgery, rheumatology, thoracic surgery, and radiology. For many internal medicine subspecialties supply is also projected to be adequate to meet demand for services. The few specialties where supply is projected to exceed the number demanded to provide a level of care consistent with national 2013 patterns are pediatrics, dermatology, emergency medicine, and plastic surgery. For emergency medicine, demand estimates based on national patterns of care do not take into consideration that Florida has more tourism than most parts of the country—which might help explain why the number of practicing emergency physicians in Florida exceeds estimated demand based on the characteristics of the state's resident population. As noted earlier, self-correcting mechanisms in specialty choice suggest that large shortages or surpluses in individual professions are unlikely to persist.[10]

[10] Note: Supply and demand were not modeled at the sub-specialty level, and trends affecting a subspecialty might not be the same as trends affecting the larger specialty in which the subspecialty is categorized.

Exhibit 5: Projected Supply and Demand for Physicians by Specialty, 2025

Specialty	Supply	Demand [a]	Supply - Demand	% Variance
Total Primary Care	**29,180**	**28,590**	**590**	**2%**
Traditional Primary Care	**22,000**	**20,940**	**1,060**	**5%**
General/Family Practice	7,180	8,100	(920)	-13%
General Internal Medicine	9,530	8,990	540	6%
Pediatrics	4,680	3,440	1,240	26%
Geriatric Medicine [a]	610	410	200	33%
General Surgery	1,450	2,170	(720)	-50%
Emergency Medicine	3,220	2,520	700	22%
Obstetrics/Gynecology	2,510	2,960	(450)	-18%
Total Non-Primary Care	**23,140**	**27,550**	**(4,410)**	**-19%**
Allergy, Immun. & Infect Dis.	830	970	(140)	-17%
Anesthesiology	2,790	3,440	(650)	-23%
Cardiology	1,930	2,420	(490)	-25%
Dermatology	1,140	880	260	23%
Endocrinology	570	680	(110)	-19%
Gastroenterology	1,100	1,090	10	1%
Hematology & Oncology	1,010	1,340	(33)	-33%
Nephrology	700	730	(30)	-4%
Neurological Surgery	460	420	40	9%
Neurology	1,320	1,370	(50)	-4%
Ophthalmology	1,240	1,420	(180)	-15%
Orthopedic Surgery	1,630	1,900	(270)	-17%
Otolaryngology	610	700	(90)	-15%
Plastic Surgery	720	590	130	18%
Psychiatry	2,150	3,340	(1,190)	-55%
Pulmonology & Critical Care [b]	950	1,250	(300)	-32%
Radiology	2,450	3,150	(700)	-29%
Rheumatology	280	400	(120)	-43%
Thoracic Surgery	260	360	(100)	-38%
Urology	710	820	(110)	-15%
Vascular Surgery	290	280	10	3%
Total (specialties modeled)	**52,320**	**56,140**	**(3,820)**	**-8%**
Specialties demand not modeled [c]	2,650	2,520	130	5%
Total	**54,970**	**58,660**	**(3,690)**	**-7%**

Notes: [a] Demand is defined as the number of physicians required to provide a level of care consistent with the national average in 2013. For specialties such as geriatric medicine, demand should be considered in the context of availability of general internists and other primary care providers. [b] A substantial proportion of pulmonologists practice critical care medicine, and to be consistent with demand estimates based on national patterns we combined the categories of pulmonology, pulmonology/critical care, and critical care. Excluded from this category are critical care physicians in anesthesiology, surgery, and obstetrics/gynecology, as these categories are categorized elsewhere. [c] Physician specialties omitted from the demand model include: colon-rectal cancer, neonatal/perinatal medicine, pathology, physical medicine & rehabilitation, preventive medicine and radiation oncology. Initial demand for services for this category is assumed equal to supply, and assumed to grow at the same rate as the overall demand for non-primary care specialties. Supply is modeled separately by specialty, but combined for presentation for comparison to demand. Note: Specialties included in the expanded definition of primary care are general and family practice, general internal medicine, general pediatrics, geriatric medicine, general surgery, obstetrics and gynecology, and emergency medicine.

III. Current and Projected Future Physician Demand

This section first provides a brief overview of how demand is defined and the approach used to model current and future demand for health care services and physicians. Then, demand projections are presented for both health care services and providers under alternative scenarios.

A. Overview

The demand for health services is defined as the level and mix of services that consumers are able and willing to purchase at current prices given epidemiological and economic considerations. Current demand, therefore, is equivalent to the quantity of services utilized plus any services not utilized because provider shortages prevented patients from accessing care. Demand for services does not equal "need," where need is based on a clinical definition taking into account patient epidemiological considerations combined with an assessment of appropriate patient care—regardless of ability to pay for services.

The demand for physicians is based on the demand for health care services, but taking into consideration care delivery patterns. The number of physicians in a particular specialty to meet demand for services is based, in part, on the adequacy of supply of physicians in other specialties whose scope of practice might partially overlap this specialty. Furthermore, the availability and use of advanced practice nurses, physician assistants, and other health workers can affect demand for physicians. Changes over time in technology, physician productivity, average levels of patient acuity, and mix of services can change how many patients can be cared for by an individual physician and the state's overall demand for physicians

The Healthcare Demand Microsimulation Model used for this analysis has three major components:

1. **Population database**. A population database contains characteristics (demographics, socioeconomics, health risk-related behaviors, and presence of chronic conditions) for each person in a representative sample of the State population through 2025.
2. **Health care use forecasting equations**. Equations based on national data relate health care use patterns to each person's characteristics and presence of disease and other health risk factors that affect their health care utilization patterns.
3. **Care delivery patterns**. The model reflects national average staffing patterns in terms of the number of physicians required to provide a set amount of services by medical specialty and care delivery setting.

The model components, and the data used to adapt the model for Florida, are described in more detail in Appendix A.

The demand projections presented here take into account projected population growth and changing demographics from 2013 to 2025, as well as anticipated expansion in health insurance coverage from ACA. The demand estimates reflect the number and mix of physicians that

Florida requires to provide a national average level of care given the characteristics of Florida's population and economic factors.

The national average level of care is not necessarily equivalent to a best-practice level of care. Many might argue, for example, that the national supply of mental health workers, primary care providers, and other practitioners currently is inadequate to meet the demand for services of the nation's population. This is evidenced by long wait times for appointments and delays in hiring new practitioners in some occupations and medical specialties. Consequently, when calculating national patterns of care this analysis assumes the following in terms of the supply and demand for physicians prior to implementation of the Affordable Care Act:

1. There is a national primary care provider shortfall of approximately 8,000 (3.6%) physicians reflecting the number of practitioners required to de-designate the federally designated primary care health professional shortage areas.
2. Similarly, there is a national shortfall of 2,800 (-6%) psychiatrists which reflects the number of mental health practitioners required to de-designate the federally designated mental health professional shortage areas.
3. As reflected in a recent report the nation likely has a current shortage of ~1,700 (-10%) adult neurologists and ~470 (-20%) pediatric neurologists. [11] Another recent study suggests a shortage of ~100 (-10%) shortage of pediatric endocrinologists and ~1,500 (-25%) shortage of adult endocrinologists.[12] The endocrinologist shortfall estimates are based on vacancy rates, and after adjusting for a natural vacancy rate to reflect normal delays in hiring we assume that at the national level the overall endocrinologist shortage is about 15%.
4. For some other specialties, there is inconclusive evidence of a current national shortfall. For example, the nation has approximately 5,100 neurosurgeons and recent estimates of 305 job vacancies suggested that hospitals or practices were trying to hire neurosurgeons.[13] While this suggests potentially a 6% current national shortfall of neurosurgeons, because of normal delays to fill a position when one becomes available, this estimate likely represents an upper bound on the degree of current shortfall. Furthermore, a large portion of these positions are for emergency department coverage—suggesting that overall the nation might have an adequate supply of neurosurgeons but that within that supply many choose not to provide certain types of care—such as emergency department coverage.

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[11] Dall TM, Storm MV, and Chakrabarti R. Supply and demand analysis of the current and future US neurology workforce. *Neurology*. 2013; 81(5): 470-478. http://www.neurology.org/content/early/2013/04/17/WNL.0b013e318294b1cf.short

[12] Vigersky R, Fish L, Hogan P, et al. The Clinical Endocrinology Workforce: Current Status and Future Projections of Supply and Demand. *The Journal of Clinical Endocrinology & Metabolism*. 2014

[13] Rosman J1, Slane S, Dery B, Vogelbaum MA, Cohen-Gadol AA, Couldwell WT.Neurosurgery. Is there a shortage of neurosurgeons in the United States? *Neurosurgery*. 2013 Aug;73(2):354-5.

B. Projected Service Demand by Specialty and Setting

Between 2012 and 2025, Florida's population will grow by about 3.3 million people (17%) from its current level of 19 million.[14] This compares with a smaller 10% projected national population growth rate during the same period.[15] Florida's population age sixty-five and older is projected to grow by about 1.5 million (45%) during this period, while the seventy-five and older population is projected to grow by about 661,000 (42%). High rates of projected population growth, especially among the elderly "Baby Boomer" population, portend rapidly growing demand for health care services with highest growth expected for those specialties that disproportionately serve the elderly.

Demographic shifts in race and ethnicity also are modeled, as these shifts inform projected changes over time in population characteristics, in turn related to projected changes in chronic disease prevalence and other health risk factors that are determinants of health care service use. Between 2012 and 2025, Florida's non-Hispanic white population will grow by about 899,000 people (8%). By comparison, the Hispanic population is projected to grow by about 1.6 million people (37%) and the non-Hispanic black population by about 690,000 people (23%). Historically, many ethnic groups have experienced large disparities in mortality, health status and disease prevalence. Care use patterns also differ by race and ethnicity, with minority populations generally using fewer health care services relative to a non-Hispanic, white population after controlling for other demographics and health risk factors, insurance status, and household income.

For example, our analysis of the Medical Expenditure Panel Survey finds that Hispanic and black adults have only about 50% as many office visits to a psychiatrist during the year compared to white adults. In some cases, though, racial or ethnic minorities use more services. For example, black adults are more likely than white and Hispanic adults to use emergency services related to cardiovascular problems.

Projected statewide growth rates in service demand by care setting (Exhibit 6) account for changing demographics and expanded medical insurance. As noted above, ACA is projected to reduce the numbers of uninsured by about 2.2 million individuals in Florida by 2016. The demand projections presented here assume that people who gain coverage under ACA will have similar patterns of care as their privately insured peers—taking into account demographic and socioeconomic characteristics as well as health risk factors. Thus, the impact of expanded coverage represents the expected increase in use of health care services compared to estimated use rates prior to gaining insurance coverage.

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[14] All Races Population Projections by Age and Sex for Florida and Its Counties, 2015–2040, With Estimates for 2012, Bureau of Economics and Business Research, University of Florida, June 2013.

[15] US Census Bureau. National Population Projections 2012 to 2060 (based on 2010 Census). 2012

Demand projections suggest that the effects of changing demographics in Florida will have a much greater influence on future service demand than will the effects of ACA. Demand for hospital inpatient care will grow by about 27% between 2013 and 2025, compared to 23% for the U.S. overall based on changing demographics alone. Similarly, demand will grow by about 17% for emergency care compared to 12% for the U.S.; 19% for physician office visits compared to 14% for the U.S.; and 20% for outpatient visits compared to 15% for the U.S. These numbers compare to projected 17% population growth for Florida and 10% population growth for the U.S. between 2013 and 2025

Expansion of medical coverage under ACA is projected to impact service demand in Florida to a greater extent than the nation as a whole across most care delivery settings modeled. Demand for physician office visits is projected to grow by an additional 6 percentage points, demand for outpatient visits by an additional 4 percentage points, and demand for inpatient days by an additional 2 percentage points.

Demand for emergency care is projected to be largely unaffected by ACA, with the projected increase in use of emergency care due to lower out-of-pocket expenditures almost entirely offset by non-emergent care shifted from emergency departments to other ambulatory settings.

Exhibit 6: Projected Growth in Service Demand by Care Setting/Source, 2013-2025

Care Setting	Growth from Changing Demographics		Growth from Insurance Coverage Expansion under ACA	
	Florida	U.S.	Florida	U.S.
Office visits	19%	14%	+6%	+4%
Outpatient visits	20%	15%	+4%	+2%
Emergency visits	17%	12%	+0%	+0%
Hospital inpatient days	27%	23%	+2%	+1%

Reflecting the rising burden of disease associated with Florida's growing and aging population, service utilization is projected to increase significantly across care settings and most medical specialties, particularly those that treat an aging population with high chronic disease prevalence (Exhibit 7). For example, by 2025 statewide hospital inpatient days of care are projected to increase about 30% for patients with cardiology-related conditions; physician office visits to geriatric care providers will likely rise by about 42% and outpatient visits associated with diagnosis and treatment of diabetes and other endocrinology related diagnoses are forecast to rise by about 21%.

Across all medical specialties, hospital days are projected to grow by 27%, which is much higher than projected growth in demand for outpatient (20%), office (19%) and emergency (17%) visits. The appendix provides growth projections for all the specialties modeled. In contrast to the high-

growth specialties, specialties that predominantly treat children are projected to grow more slowly. Office visits to pediatricians are projected to grow about 11% between 2013 and 2025.

Exhibit 7: Projected Percent Growth in Service Demand by Setting among Top 10 Highest Growth Specialties in Florida, 2013-2025

Specialty	Hospital Inpatient Days	Emergency Visits	Physician Office Visits	Outpatient Visits
Geriatrics	40%		42%	42%
Endocrinology	30%	23%	25%	21%
Cardiology	30%	22%	24%	24%
Rheumatology	27%	19%	23%	25%
Pulmonology	30%	17%	20%	20%
Oncology	24%	19%	22%	21%
General Surgery	27%	16%	21%	19%
Nephrology	35%		24%	23%
Allergy & Infectious Diseases	30%	15%	17%	20%
Orthopedic Surgery	29%	17%	20%	16%
Total Growth (all specialties)	**27%**	**17%**	**19%**	**20%**

Note: Demand projections reflect current national patterns of care use and delivery applied to Florida's current and projected future population. Specialty for hospital inpatient days and emergency visits was determined based on primary ICD-9 diagnosis codes associated with the hospitalization or visit. Specialty for office and outpatient visits was determined by reported physician specialty.

These service demand projections assume that future care delivery patterns remain relatively unchanged from current patterns. To the extent that emerging care delivery models such as Accountable Care Organizations (ACOs) gain market share in Florida sufficient to substantially alter care delivery patterns, then service demand in hospital emergency departments might grow at a slower pace while demand in ambulatory care settings might grow more rapidly than projected here.

C. Statewide Projected Physician Demand by Specialty

Statewide projected growth in physician demand reflecting changing demographics and expanded Medical coverage under ACA is summarized in Exhibit 8 and Exhibit 9. Overall, statewide demand for physicians is projected to increase by about 11,430 FTEs (24%) between 2013 and 2025. Projected growth in physician demand includes 5,470 FTE primary care providers, with an additional 5,460 FTEs among the 21 non-primary care specialties included in the Healthcare Demand Microsimulation Model and 500 additional FTE among the specialties not modeled (assuming a similar growth rate in demand as the non-primary care specialties modeled).

However, the impacts of changing demographics and expanded medical coverage under ACA will differ substantially across specialties. In absolute terms, demand growth is highest for general internal medicine (2,050) and general and family practice (1,560). In percentage terms, overall demand growth is highest for geriatric medicine (42%) and vascular surgery (34%).

For specialties that predominantly serve an older population (e.g., cardiology, endocrinology, rheumatology), demand growth is projected to be in the 25-30% range. Projected growth in demand for psychiatrists is 17%, consistent with the states projected 17% population growth rate. This reflects that expanded medical coverage under ACA is not anticipated to grow demand for psychiatrists. However, other provisions of ACA not modeled in our analysis are designed to improve access to mental health services. Therefore, these demand growth projections for psychiatry are likely conservative. Projected growth in demand for pediatricians (12%) reflects the expectation that younger age cohorts are projected to grow less rapidly than the general population.

The projected impact of ACA on demand for emergency physicians is projected to be small based upon the Massachusetts experience to date and an assumption that Florida will elect not to expand the current state Medicaid program. ACA has many of the same design features as the Massachusetts reform. The Massachusetts' health care reform law has thus far neither increased nor decreased ED utilization relative to that in other states. The similarity among states is to be expected if the level of ED use is dominated by broader trends in population health, such as health status, that are not affected by health insurance expansion. Alternatively, it is possible that this result arises from two equal forces pushing in opposite directions — that the Massachusetts insurance expansion increased prevention, thereby reducing ED use, but that this effect has been offset by the reduced out-of-pocket cost of using the ED or difficulties in finding primary care physicians.[16]

Were Florida to expand its current Medicaid program, the demand projection for ED physicians would have to be adjusted upward, as adult Medicaid beneficiaries have higher ED utilization rates compared to both uninsured and privately insured patients. This could reflect access constraints for Medicaid beneficiaries seeking care in outpatient settings.

Changes in technology, reimbursement policies, and other trends not modeled could affect future demand for services. For example, efforts to control medical costs could lead to larger patient out-of-pocket expenses for items such as hip and knee replacements. Larger out-of-pocket expenses could dampen demand for services, resulting in slower projected growth in demand for orthopedic surgeons and other specialties. Changes in technology can also increase demand for services, offering patients treatment options that might now be unavailable.

[16] Chen, C, Scheffler G,and Chandra, A.. Massachusetts' Health Care Reform and Emergency Department Utilization. The New England Journal of Medicine. November 2011;

Compared to the magnitude of changing demographics, expanded healthcare coverage under ACA is projected to increase demand relatively modestly by about 1,880 FTEs (4%). For modeling purposes, we assume that the impact of expanded coverage under ACA is phased in between 2014 and 2017. Specialties with the largest projected increases in demand due to medical coverage expansions include otolaryngology and dermatology (8%), and general internal medicine (7%). ACA alone is expected to have little or no effect on demand for geriatricians, pediatricians, and several other specialties, as the patient populations treated by these specialties largely already have medical coverage (e.g., through Medicare in the case of geriatric medicine, or Medicaid and Commercial insurance).

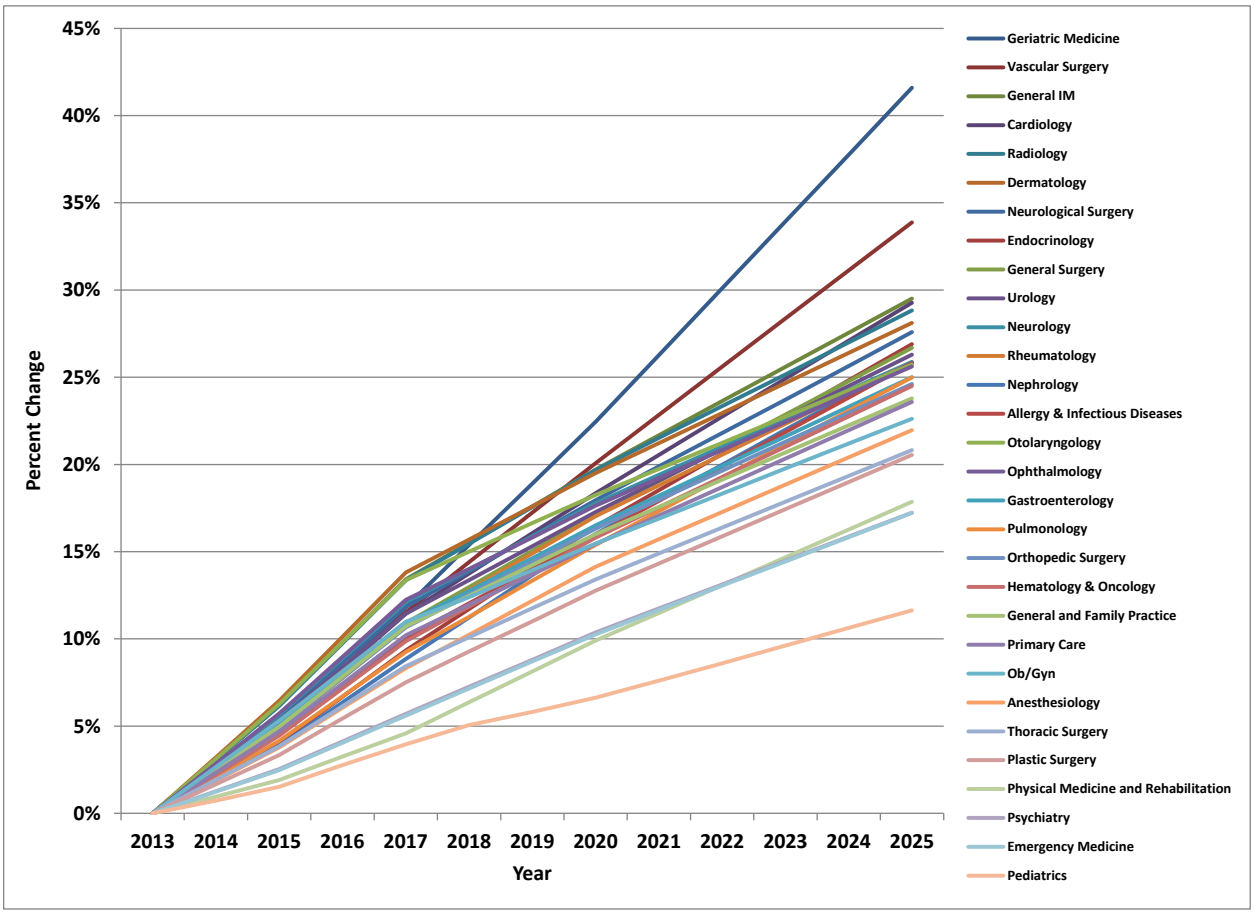
Exhibit 8: Projected Growth in Florida's Physician Demand, 2013-2025

Specialty	Demand 2013 [a]	Projected growth by demand driver, 2013 to 2025			Demand 2025	Percent growth by demand driver, 2013 to 2025		
		Demographics	ACA Expanded Coverage [b]	Total		Demographics	ACA Expanded Coverage [b]	Total [c]
Total Primary Care	**23,120**	**4,450**	**1,020**	**5,470**	**28,590**	**19.2%**	**4.4%**	**23.6%**
Traditional Primary Care	**16,850**	**3,300**	**790**	**4,090**	**20,940**	**19.6%**	**4.7%**	**24.3%**
General/Family Practice	6,540	1,240	320	1,560	8,100	18.9%	4.9%	23.8%
General Internal Medicine	6,940	1,580	470	2,050	8,990	22.8%	6.7%	29.5%
Pediatrics	3,080	360	<10	360	3,440	11.6%	0.0%	11.6%
Geriatric Medicine [a]	290	120	<10	120	410	41.6%	0.0%	41.6%
General Surgery	1,710	390	70	460	2,170	22.8%	3.9%	26.7%
Emergency Medicine	2,150	370	<10	370	2,520	17.2%	0.0%	17.2%
Obstetrics/Gynecology	2,410	390	160	550	2,960	16.2%	6.4%	22.6%
Total Non-Primary Care	**22,090**	**4,670**	**790**	**5,460**	**27,550**	**21.1%**	**3.6%**	**24.7%**
Allergy, Immun. & Infect Dis.	770	170	30	200	970	22.4%	3.4%	25.8%
Anesthesiology	2,820	570	50	620	3,440	20.3%	1.6%	21.9%
Cardiology	1,870	480	70	550	2,420	25.5%	3.7%	29.2%
Dermatology	690	140	50	190	880	20.4%	7.7%	28.1%
Endocrinology	530	140	10	150	680	25.7%	1.2%	26.9%
Gastroenterology	870	180	40	220	1,090	20.3%	4.7%	25.0%
Hematology & Oncology	1,080	230	30	260	1,340	21.5%	3.0%	24.5%
Nephrology	580	150	<10	150	730	25.5%	0.5%	25.8%
Neurological Surgery	330	70	20	90	420	22.5%	5.1%	27.6%
Neurology	1,090	220	60	280	1,370	19.9%	6.0%	25.9%
Ophthalmology	1,130	220	70	290	1,420	19.2%	6.4%	25.6%
Orthopedic Surgery	1,520	310	70	380	1,900	20.3%	4.3%	24.6%
Otolaryngology	550	100	50	150	700	17.6%	8.2%	25.8%
Plastic Surgery	490	90	10	100	590	19.2%	1.3%	20.5%
Psychiatry	2,850	490	<10	490	3,340	17.2%	0.0%	17.2%
Pulmonology & Critical Care [b]	1,000	230	20	250	1,250	22.6%	2.4%	25.0%

Specialty	Demand 2013 [a]	Projected growth by demand driver, 2013 to 2025			Demand 2025	Percent growth by demand driver, 2013 to 2025		
		Demographics	ACA Expanded Coverage [b]	Total		Demographics	ACA Expanded Coverage [b]	Total [c]
Radiology	2,440	550	160	710	3,150	22.4%	6.4%	28.8%
Rheumatology	320	70	10	80	400	22.4%	3.5%	25.9%
Thoracic Surgery	300	50	10	60	360	18.2%	2.7%	20.9%
Urology	650	140	30	170	820	21.3%	5.0%	26.3%
Vascular Surgery	210	70	<10	70	280	32.1%	1.8%	33.9%
Total (specialties modeled)	**45,210**	**9,120**	**1,810**	**10,930**	**56,140**	**20.1%**	**4.0%**	**24.1%**
Specialties demand not modeled [c]	2,020	430	70	500	2,520	21.1%	3.5%	24.6%
Total	**47,230**	**9,550**	**1,880**	**11,430**	**58,660**	**20.2%**	**4.0%**	**24.2%**

Notes: [a] Demand is defined as the number of physicians required to provide a level of care consistent with the national average in 2013. For specialties such as geriatric medicine, demand should be considered in the context of availability of general internists and other primary care providers. [b] A substantial proportion of pulmonologists practice critical care medicine, and to be consistent with demand estimates based on national patterns we combined the categories of pulmonology, pulmonology/critical care, and critical care. Excluded from this category are critical care physicians in anesthesiology, surgery, and obstetrics/gynecology, as these categories are categorized elsewhere. [c] Physician specialties omitted from the demand model include: colon-rectal cancer, neonatal/perinatal medicine, pathology, physical medicine & rehabilitation, preventive medicine and radiation oncology. Initial demand for services for this category is assumed equal to supply, and assumed to grow at the same rate as the overall demand for non-primary care specialties. Supply is modeled separately by specialty, but combined for presentation for comparison to demand.

Exhibit 9: Projected Growth in Florida FTE Physician Demand by Specialty, 2013-2025



Note: Specialties excluded from demand analyses due to data constraints include critical care medicine, colon-rectal surgery, neonatal/perinatal medicine, pathology, physical medicine, preventive medicine and specialties designated as "other."

IV. Current and Projected Future Supply of Physicians

This study used a Health Workforce Supply Model (HWSM) that reflects state of the art techniques for health workforce modeling. HWSM has been used to model supply of physicians and other health professionals at the state and national level. In this section we provide a brief description of supply inputs. A more comprehensive description is provided in the technical appendix. We then present a range of supply projections under alternative scenarios reflecting uncertainty in key supply inputs.

As a microsimulation model, the HWSM simulates expected workforce decisions of physicians by specialty and demographic. There are four major components of the supply model:

A. **Starting supply**. The starting point for modeling future supply is to obtain an accurate picture of current supply by estimating the number of physicians in active practice by specialty, age, and gender.
B. **New entrants**. Each year, physicians enter practice in Florida. This includes a portion of physicians who complete their GME/residency in Florida and remain in the state to practice, as well as physicians who migrate from other states.
C. **Attrition**. Retirement patterns and mortality are highly correlated with physician age and, to a lesser degree, gender and specialty. The probability of exiting the state to work in another state varies by specialty and demographic.
D. **Workforce participation level**. For those physicians in active practice, patient care hours worked differ by demographic and specialty.

A. Current Supply

Estimates of the current size and characteristics of Florida's physician workforce come from the combined 2012 and 2013 bi-annual Physician Workforce Licensure Surveys administered by the Florida Department of Health.[17] This source contains information on all licensed and active physicians in Florida. The supply estimate reflects the subset of physicians who reported practicing medicine at any time during the year in Florida; provided a valid self-reported practice address; reported a "clear" and "active" license status; and are not in a residency, internship, or fellowship program.

In 2012-2013, there were 62,310 physicians with an active license in Florida, or about 336 per 100,000 populations.[18] Only 12 states reported fewer licensed physicians per 100,000 populations.

[17] The Physician Workforce Survey is part of the licensure renewal process for Florida physicians. Licensed physicians are divided into two groups with each group renewing every other year. The result is a combination of two years of data for a total set of Florida physician workforce data.

[18] Young, A, Chaudhry, HJ, Thomas, JV, Dugan, M. A census of Actively Licensed Physicians in the United States, 2012. *Journal of Medical Regulation.* 2013;99 (2):11-24.

Florida's 2013 Physician Workforce Annual Report, based on analysis of 2012 and 2013 state physician workforce licensure survey data, reports that about 43,410 licensed physicians are actively practicing in the State.[19] The same source reports that approximately 26% of the physician workforce is female and about two-thirds (62%) are age 50 or older.

The supply estimates presented in this report are largely consistent with estimates in Florida's 2013 Physician Workforce Annual Report, though there are slight differences in categorizing some physician specialties to make supply estimates and projections comparable to demand estimates and projections. In addition, physicians over the age of 85 were removed from the supply estimates and newly licensed physicians over age 60 were excluded from the supply estimates under the concern that new physicians moving to the state after age 60 are likely not in full time clinical practice. Consequently, our supply estimate of 42,610 active physicians in 2013 is lower than the 43,410 reported in the 2013 Workforce report.

B. New Entrants

The careers of physicians often span 30 to 40 years, so the number and demographic distribution of new health professionals trained each year and in- and out-migration patterns have profound implications for future physician supply. Based on analysis of Florida's licensure data base, and taking into account physicians' cross-state migration patterns, there are annually approximately 2,230 new entrants to Florida's physician workforce each year across the projection period.

Data from physicians newly licensed in 2006-2009 and active in Florida in 2012-2013 were used to estimate the age, gender, and specialty distribution of new entrants (Exhibit 10). Physicians newly licensed between 2010-present will not have completed the follow-up survey which is used to determine if the person has completed GME/residency and is still practicing in Florida. The majority of new entrants to the Florida physician workforce range in age from their early-thirties to mid-forties. The overall gender distribution in recent years has been about 62% male and 38% female. Among newly licensed physicians, about 55% practice in primary care specialties, of which about 60% are male.

The new entrant estimates do not take into consideration future growth in residency training programs at nine institutions in Florida that as of January 2014 received accreditation but were not yet administering residency programs.[20]

[19] Florida Department of Health. November, 2013. 2013 Physician Workforce Annual Report.

[20] Source: The Florida Legislature: Office of Program Policy Analysis. *Florida's Graduate Medical Education System. Report No. 14-08.* February, 2014. The nine institutions accredited but not administering residency programs as of January, 2014 were not individually identified.

Exhibit 10: Number and Characteristics of New Entrants

Specialty	New Entrants #	New Entrants %	% Male	Age Distribution <36	Age Distribution 36-40	Age Distribution 41-45	Age Distribution >45
Total Primary Care	**1,219**	**54.7%**	**60%**	**12%**	**35%**	**26%**	**28%**
Traditional primary care	**909**	**40.8%**	**61%**	**11%**	**32%**	**27%**	**30%**
General/Family Practice	290	13.0%	63%	14%	36%	25%	26%
General Internal Med.	400	17.9%	73%	5%	29%	29%	36%
Pediatrics	193	8.7%	35%	18%	33%	24%	24%
Geriatric Medicine	26	1.2%	52%	12%	37%	22%	28%
General Surgery	62	2.8%	53%	17%	30%	25%	28%
Emergency Medicine	149	6.7%	69%	18%	45%	19%	18%
Obstetrics/Gynecology	99	4.4%	39%	12%	42%	28%	18%
Total Non-Primary Care	**876**	**39.3%**	**73%**	**10%**	**42%**	**24%**	**24%**
Allergy & Immunology	7	0.3%	56%	22%	33%	17%	28%
Infectious Diseases	25	1.1%	57%	17%	35%	30%	17%
Anesthesiology	120	5.4%	74%	12%	41%	23%	24%
Cardiology	67	3.0%	86%	4%	40%	32%	25%
Colon & Rectal Surgery	9	0.4%	61%	9%	35%	35%	22%
Critical Care Medicine	19	0.9%	84%	12%	45%	24%	18%
Dermatology	44	2.0%	43%	24%	34%	27%	15%
Endocrinology	26	1.2%	48%	17%	44%	23%	17%
Gastroenterology	37	1.7%	74%	8%	59%	17%	16%
Hematology & Oncology	28	1.3%	64%	6%	34%	30%	30%
Neonatal & Perinatal	5	0.2%	38%	15%	31%	23%	31%
Nephrology	31	1.4%	78%	12%	40%	33%	15%
Neurological Surgery	21	0.9%	92%	4%	38%	19%	40%
Neurology	52	2.3%	67%	11%	33%	29%	27%
Ophthalmology	41	1.8%	68%	22%	47%	13%	18%
Orthopedic Surgery	62	2.8%	90%	7%	51%	19%	23%
Other Specialties	2	0.1%	20%	0%	80%	20%	0%
Otolaryngology	24	1.1%	82%	8%	49%	25%	18%
Pathology	47	2.1%	50%	10%	17%	29%	45%
Physical Med. & Rehab.	25	1.1%	61%	11%	39%	27%	23%
Plastic Surgery	26	1.2%	82%	7%	48%	33%	12%
Preventive Medicine	6	0.3%	33%	7%	7%	27%	60%
Psychiatry	88	3.9%	52%	13%	31%	22%	35%
Pulmonology	22	1.0%	89%	5%	47%	27%	20%
Radiation Oncology	22	1.0%	73%	11%	34%	21%	34%
Radiology	99	4.4%	80%	7%	48%	23%	22%
Rheumatology	10	0.4%	46%	12%	46%	27%	15%
Thoracic Surgery	9	0.4%	92%	4%	8%	38%	50%
Urology	26	1.2%	95%	2%	46%	23%	29%
Vascular Surgery	11	0.5%	96%	0%	56%	19%	26%
Total	**2,230**	**100%**	**65%**	**11%**	**37%**	**25%**	**26%**

C. Workforce Attrition

Statewide about 5,720 currently practicing physicians (13%) report planning to retire in the next five years and about 1,600 (4%) plan to relocate to other states or elsewhere. Primary reasons for relocation cited include family considerations, compensation and liability exposure.

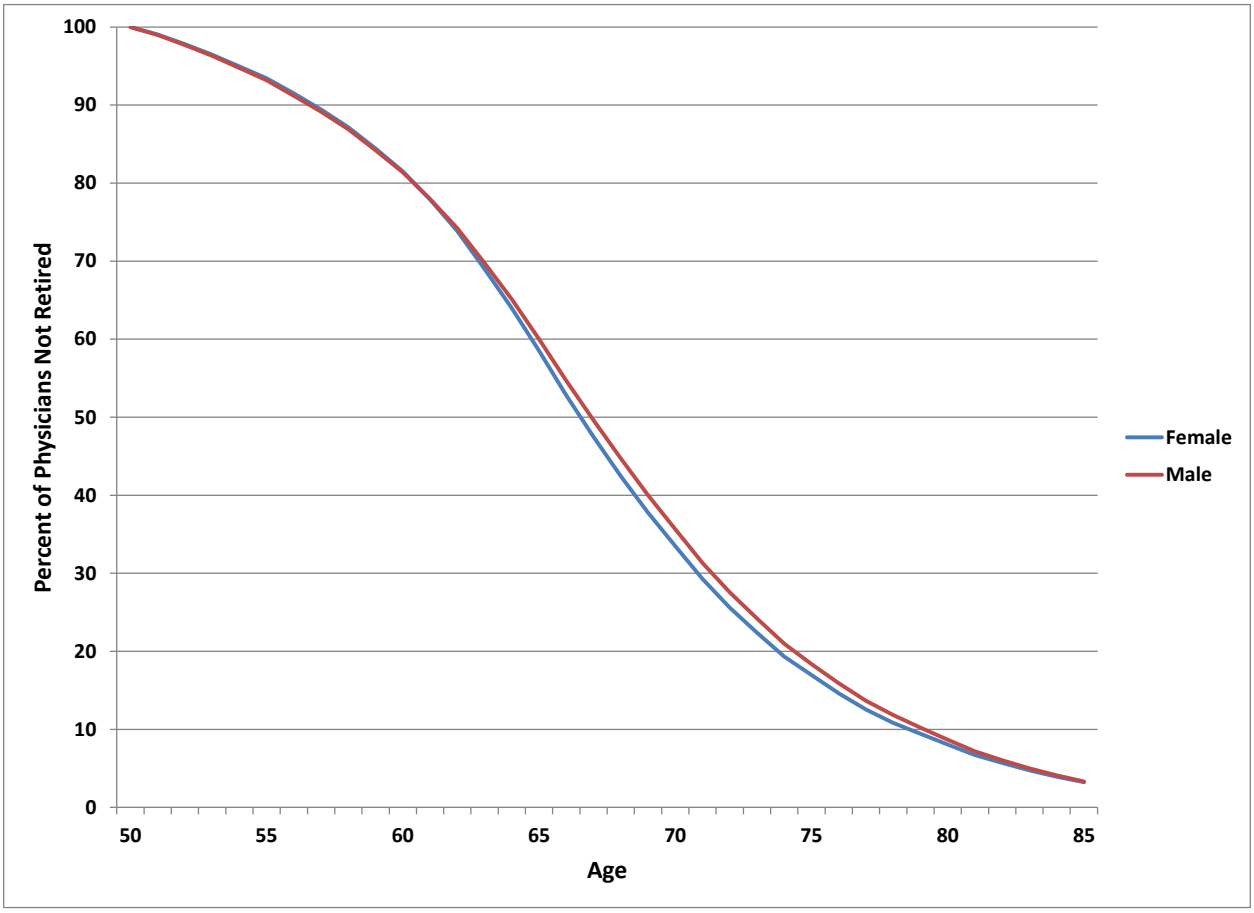
We used Florida-specific estimates of annual retirement probability and probability of moving to another state to practice. Estimates differ by age, gender, and specialty. Mortality rates by age and sex are sourced from the Centers for Disease Control and Prevention (CDC). The rates used in the HWSM take into consideration that people in professional occupations tend to have lower mortality rates through age 65 as compared to national average mortality rates for men and women. Johnson et al. estimate age-adjusted mortality rates for professional and technical occupations are approximately 25% lower than overall national rates for men and 15% lower for women.[21]

The HWSM simulates who remains in the workforce and who leaves in each year based on probability of exit. Retirement patterns for physicians come from analysis of the combined 2012 and 2013 Florida Physician Workforce Survey which includes a question asking respondents if they plan to retire within the next five years. The projections assume that retirement probability begins at age 50, and that the few physicians still in the workforce by age 84 will all be retired by age 85.

Analysis of the literature suggests that although female physicians report that they expect to retire slightly earlier than men, their historical retirement patterns are similar to those of men after adjusting for higher mortality rates among men. For every thousand physicians active at age 50, we estimate that approximately 600 males and 580 females will still be active past age 65 (Exhibit 11).

[21] Johnson NJ, Sorlie PD, Backlund E. The Impact of Specific Occupation on Mortality in the U.S. National Longitudinal Mortality Study. *Demography*. 1999;36(3):355-367.

Exhibit 11: Workforce Attrition Patterns by Physician Age and Gender



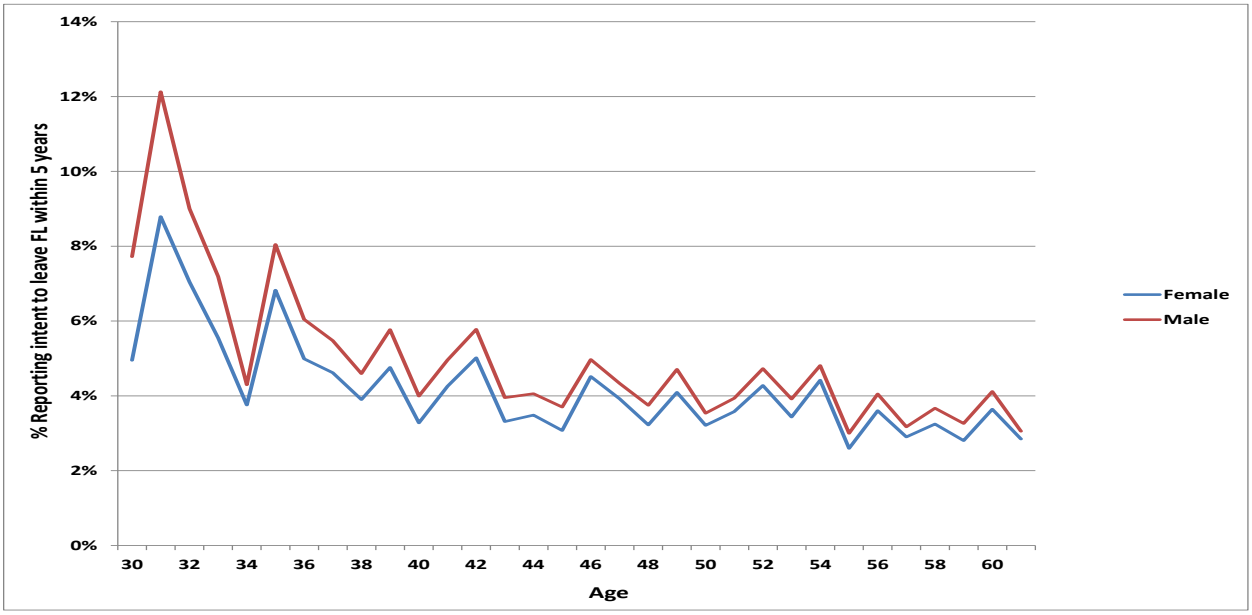
Applying these attrition patterns to the current workforce suggests that, on average, about 1,080 Florida physicians will retire each year between 2013 and 2025. The actual number retiring each year varies over time. The Bureau of Labor Statistics (BLS) reports that many older workers have been delaying retirement, with this pattern expected to exist even after economic recovery.[22] Among the age 65 and older population, labor force participation rates grew slightly from 11.8% in 1990 to 12.9% in 2000. This was followed by a substantial increase to 17.4% in 2010, and in 2020 BLS projects that 22.6% of individuals age 65 and older will remain part of the labor force.

Physician migration patterns were identified from analysis of the combined 2012 and 2013 Florida Physician Workforce Survey which includes a question asking respondents if they plan to relocate to another state within the next five years. Probability of intention leave Florida to

[22] Toossi, M. "Labor force projections to 2010: a more slowly growing workforce," Monthly Labor Review, January 2012, pp. 43–64, http://www.bls.gov/opub/mlr/2012/01/art3full.pdf

work in another state was modeled using logistic regression, with probabilities estimated by physician age, gender and specialty. Summary findings by age and gender (Exhibit 12) find that probability of outmigration is highest for younger physicians and slightly higher for men versus women (controlling for medical specialty). However, once established in their careers, data suggests that physicians have a lower propensity to relocate than do many professions because of the large investments made into their practice.

Exhibit 12: Florida Physician Outmigration Patterns by Age and Gender, 2012-2013



Physicians in some specialties expressed greater intention to leave Florida. For example, physicians in emergency medicine had 2.7 times the odds of intention to leave compared to family practice. The relative odds for neonatal & perinatal were 2.9, and the odds for preventive medicine were 1.9. Physicians in most office-based, non-primary care specialties were less likely to express an intention to leave Florida relative to family practitioners. Intention-to-relocate rates were similar for family medicine, internal medicine, and pediatrics.

D. Patient Care Hours Worked

The supply estimates and projections take into consideration the changing demographics of the Florida physician workforce and that average patient care hours worked per week differ by provider age, sex, and specialty. The supply estimates and projections are all expressed in terms of full time equivalent (FTEs), where 1 FTE is defined as the average weekly hours worked by physicians in a particular specialty as reported in Florida's combined 2012 and 2013 biannual Physician Licensure Workforce Surveys. The few physicians who reported working more than

100 hours per week and physicians reporting fewer than eight hours weekly were excluded from the hours worked analysis.

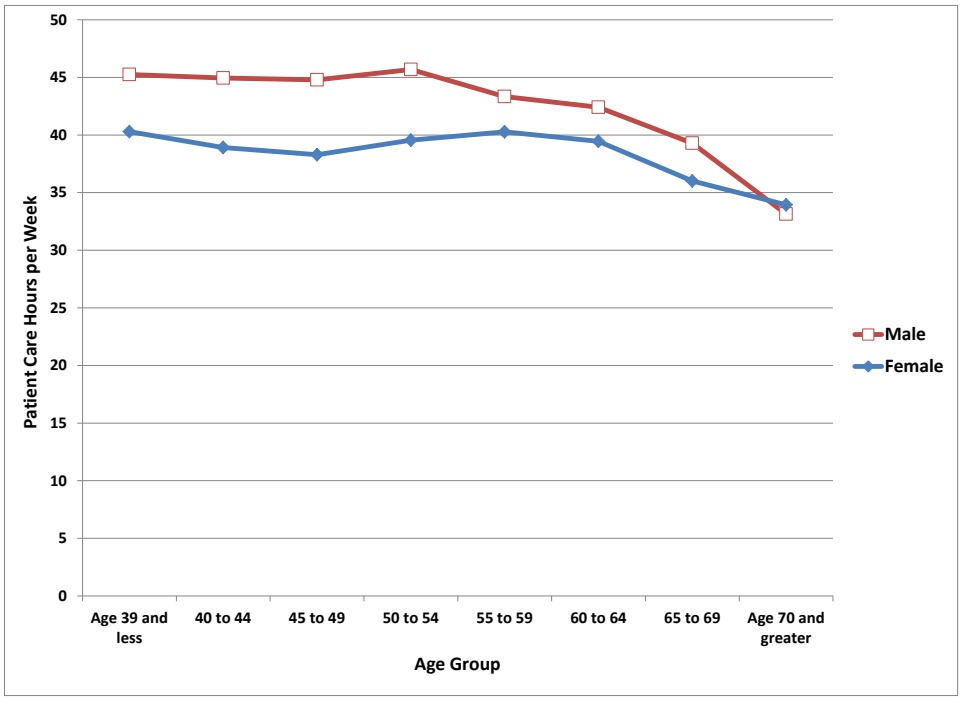
Exhibit 13 and Exhibit 14 show differences in average patient care weekly hours worked by active male and female physicians across age groups. The average across all physicians is about 41 patient care hours worked weekly, with male physicians working an average of 42 hours weekly compared to 39 weekly hours reported by female physicians. Average patient care hours worked per week tend to remain relatively constant through the 50-54 age group, and then decline. Similarly, gender differences in average hours worked also by and large remain consistent through the 50-54 age group before narrowing as both genders reduce their patient care workload.

However, males age 40-54 exceed the overall average weekly hours worked by about 10%. Therefore, males in this age group are counted as 1.10 FTEs. On the other hand, both males and females age 70 and older tend to work only about 73% of the statewide average and thus are counted as 0.73 FTEs. By applying these FTE factors to a physician by age and gender the likely impact of changing physician demographics on patient care hours worked can be modeled. Average patient care hours per week differ by specialty, so 1 FTE is counted differently in each specialty to reflect patterns of hours worked in that specialty.

For example, relative to family practice, physicians in dermatology and emergency medicine work about 4 patient care hours less per week. Specialties with higher patient care hours worked per week, relative to family practice, are nephrology (+9), neurological surgery (+8), general surgery (+7), cardiology (+7), and gastroenterology (+6).

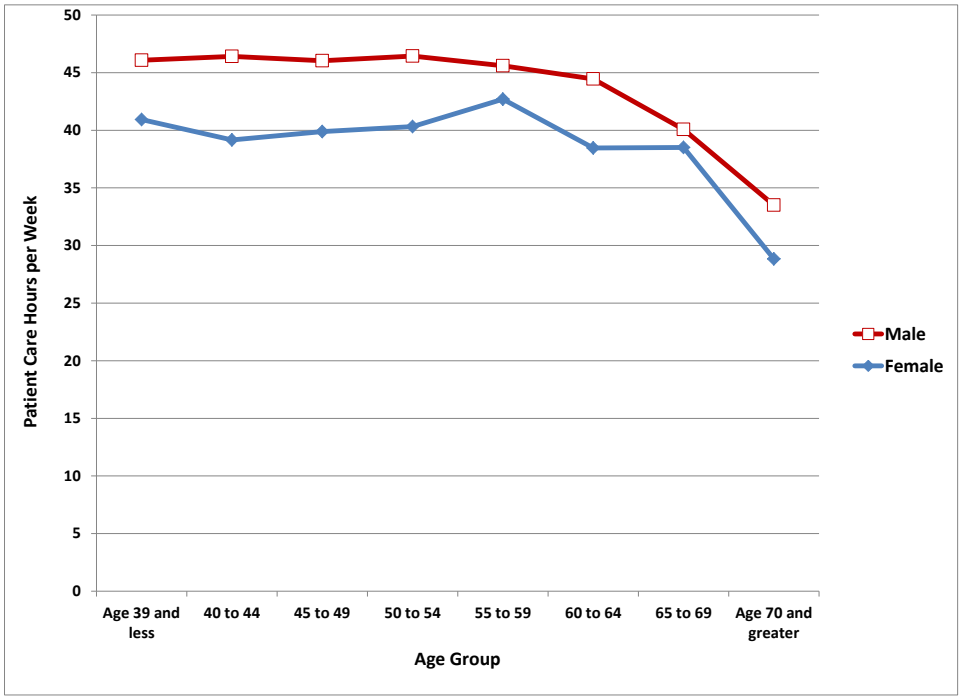
The increasing proportion of women entering the physician workforce and the aging of the workforce portend a possible decline over time in average patient care hours worked per week. Other trends with potential implications for modeling future average hours worked include: (1) generational shifts in work-life balance expectations, (2) magnitude of imbalances between supply and demand for physician services, (3) changes in the economics of practice, and (4) changes in technology and care delivery patterns that could affect distribution of patient care hours across settings.

Exhibit 13: Average Weekly Patient Care Hours by Primary Care Physicians



Note: Specialties included in this expanded definition of primary care are general and family practice, general internal medicine, general pediatrics, geriatric medicine, general surgery, obstetrics and gynecology, and emergency medicine.

Exhibit 14: Average Weekly Patient Care Hours Worked by Specialists



E. Supply Estimates and Projections

If current workforce participation patterns and number of new entrants to the workforce remain unchanged, then between 2013 and 2025 Florida's physician workforce is projected to grow by about 12,360 FTEs (29%), reaching 54,970 physicians in 2025 (Exhibit 15). The supply of primary care physicians is projected to grow about 34% and supply of specialists is projected to grow by 23%.

Supply projections for individual specialties likely have a larger degree of prediction error than do projections of total physicians—as physician choices (e.g., specialty choice, hours worked, cross-state migration) will be influenced by whether there appears to be current or projected future surpluses or shortages in a particular specialty. Likewise, projections for smaller specialties likely have a greater degree of precision error compared to larger specialties—as the sample size for determining the number of new entrants to Florida's workforce is smaller for these specialties.

Specialties with the highest projected growth rate between 2013 and 2025 are nephrology (56%) and endocrinology (54%). Specialties with low projected growth rates over this period are ophthalmology (6%), rheumatology (8%), and urology (9%).

These projections assume that the number of new entrants to Florida's physician workforce remain constant at current levels, and assume that future retirement patterns reflect current probabilities of intention to will retire.

A scenario that could increase patient care average hours worked was postulated by Blanchfield et al. (2010), who estimated that streamlining the clinical services billing process could save four hours per physician each week.[23] The American Board of Internal Medicine (ABIM) Practice Characteristics Survey findings are that geriatricians and general internists spend approximately 13% and 15%, respectively, of their professional hours handling paperwork associated with patient care.[24]

[23] Blanchfield BB, Heffernan JL, Osgood B, Sheehan RR, Meyer GS. 2010. Saving Billions of Dollars—And Physicians' Time—By Streamlining Billing Practices. *Health Affairs*. Web Exclusive, April 29, 2010

[24] ABIM Practice Characteristics Survey data reported at the AAMC 6th Annual Workforce Conference (May 2010). Survey reflects 61,758 diplomates who completed surveys between January 2006 and February 2010.

Exhibit 15: Current and Projected Physician Supply in Florida, 2013-2025

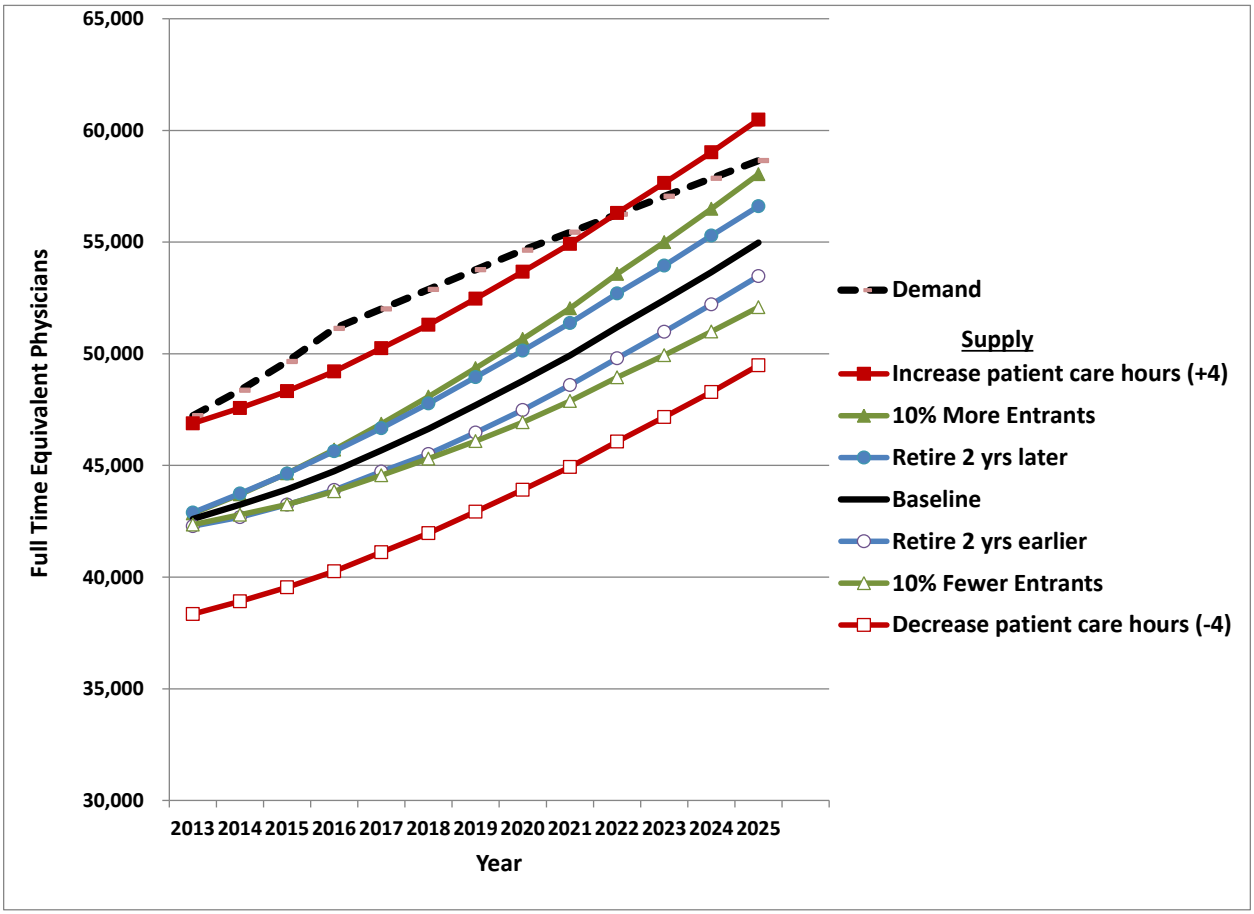
Specialty	2013	2015	2020	2025	Growth 2013-2025	
					#	%
Total Primary Care	**21,830**	**22,220**	**24,930**	**29,180**	**7,350**	**34%**
Traditional primary care	**16,430**	**16,740**	**18,810**	**22,000**	**5,570**	**34%**
General/Family Practice	5,580	5,650	6,190	7,180	1,600	29%
General Internal Medicine	6,870	7,040	8,060	9,530	2,660	39%
Pediatrics	3,440	3,510	3,990	4,680	1,240	36%
Geriatric Medicine	540	540	570	610	70	13%
General Surgery	1,090	1,100	1,240	1,450	360	33%
Emergency Medicine	2,300	2,360	2,700	3,220	920	40%
Obstetrics/Gynecology	2,010	2,020	2,180	2,510	500	25%
Total Non-Primary Care	**20,760**	**21,030**	**22,770**	**25,800**	**5,040**	**24%**
Allergy, Immun. & Infect Dis.	650	660	730	830	180	28%
Anesthesiology	2,200	2,240	2,430	2,790	590	27%
Cardiology	1,640	1,660	1,760	1,930	290	18%
Colon & Rectal Surgery	140	150	180	210	70	50%
Critical Care Medicine	270	280	340	410	140	52%
Dermatology	920	930	1,000	1,140	220	24%
Endocrinology	370	380	460	570	200	54%
Gastroenterology	920	930	1,020	1,100	180	20%
Hematology & Oncology	740	760	870	1,010	270	36%
Nephrology	450	470	570	700	250	56%
Neurological Surgery	320	330	380	460	140	44%
Neurology	1,060	1,070	1,170	1,320	260	25%
Ophthalmology	1,170	1,160	1,160	1,240	70	6%
Orthopedic Surgery	1,380	1,390	1,450	1,630	250	18%
Otolaryngology	510	510	530	610	100	20%
Other	30	40	40	40	10	33%
Pathology	860	880	950	1,090	230	27%
Physical Med & Rehab	400	410	490	580	180	45%
Plastic Surgery	630	630	660	720	90	14%
Preventive Medicine	140	140	130	140	-	0%
Psychiatry	1,820	1,830	1,930	2,150	330	18%
Pulmonology	420	420	450	540	120	29%
Radiation Oncology	340	350	400	490	150	44%
Radiology	1,910	1,930	2,130	2,450	540	28%
Rheumatology	260	260	270	280	20	8%
Thoracic Surgery	240	240	250	260	20	8%
Urology	650	650	660	710	60	9%
Vascular Surgery	230	240	260	290	60	26%
Total	**42,610**	**43,250**	**47,700**	**54,980**	**12,370**	**29%**

Note: Numbers might not sum to totals because of rounding.

Exhibit 16 summarizes projected growth in Florida's physician supply compared to demand for six alternative supply scenarios. These include: 1) retiring two years earlier, on average; 2) retiring two years later, on average; 3) increasing by 10% annually the number of new physician entrants to the Florida workforce; 4) decreasing by 10% annually the number of new physician entrants to the Florida workforce; 5) increasing the weekly number of patient care hours worked by four; and 6) decreasing the weekly number of patient care hours worked by four.

Relative to the baseline scenario, by 2025 physician supply would be higher relative to current patterns under the increased patient care hours (+13,000) and increased numbers of new entrants (+14,500) scenarios. Supply would be lower if the physician workforce decreases patient care hours worked relative to current patterns (-12,000), or reduces number of new entrants by 10% (-9,500). By 2025 projected physician demand will continue to exceed supply under all scenarios modeled except for the increased number of patient care hours worked scenario.

Exhibit 16: Alternative Physician Supply Projections, 2013-2025



V. Discussion

This study combined data on the physician workforce in Florida, data on the demographics, socioeconomics, and health risk factors of the population in Florida, data from national sources on patient care use and delivery patterns, and health workforce simulation models of supply and demand to estimate the current and future demand and supply of physicians in Florida through 2025. In this section we discuss the key findings and their implications. We also discuss study strengths and limitations.

A. Key Findings and Implications

The following are key study findings and implications.

- **Small primary care shortfall**. Florida's total current supply of primary care physicians falls short of the number needed to provide a national average level of care (-6%)—taking into consideration differences between Florida and the rest of the nation in terms of demographics, prevalence of health risk factors, insurance coverage rates. Under a traditional definition of primary care specialties (i.e., general and family practice, general internal medicine, general pediatrics and geriatric medicine) supply falls short of demand by -3%, in line with the national average shortfall. Over the next several years, this shortfall will grow slightly as more people obtain insurance coverage as mandated by ACA. However, if current trends continue, this shortfall should disappear within a decade. While supply may be adequate at the state level to provide a national average level of care, there is substantial geographic variation in adequacy of care as evidenced by the state's numerous designated Primary Care Health Professional Shortage Areas.
- **Modest specialist physician shortfall**. The supply of specialists in Florida is insufficient to provide a level of care consistent with the national average, after taking into consideration differences in the demographics and health risk factors between Florida and the nation. The current 18% shortfall is likely to persist over the foreseeable future.
- **Severe shortfall for some medical specialties**. Specialties where the state's supply of physicians is much smaller than the number required to provide a level of care consistent with the national average include: general surgery, psychiatry, endocrinology, hematology & oncology, radiology, nephrology, thoracic surgery, and rheumatology.
- **Abundance of some specialists**. Florida appears to have more than sufficient plastic surgeons and dermatologists to provide a level of care consistent with the national average, though there may be environmental factors in Florida that increase demand for these specialties beyond those characteristics in the demand model used.
- **Impact of the Affordable Care Act**. ACA has numerous provisions that affect care use and delivery. The primary impact, which is modeled in this study, is expanded medical coverage. Based on the characteristics of the uninsured (prior to ACA) in Florida and the number and

characteristics of those likely to obtain coverage, ACA will likely increase demand for general internists and family practitioners by about 790 physicians. Most of this increase in demand will occur between 2014 and 2017. In percentage terms, the impact is also high for otolaryngology (+8.2%), dermatology (+7.7%), general internal medicine (+6.7%), obstetrics & gynecology (+6.4%), radiology (+6.4%), and ophthalmology (+6.4%).

- **Total increase in demand**. The major driver of demand growth is changing demographics—particularly, the growing elderly population. The projected 24% growth in total demand for physicians consists of 4% growth associated with expanded coverage under ACA and 20% growth associated with changing demographics. Specialties with the highest projected growth in demand predominantly provide care to the elderly, with growth rates highest for geriatric medicine (+41%), vascular surgery (+33%), general internal medicine (+30%), and cardiology (+29%).
- **Total increase in supply**. An estimated 2,230 new physicians enter Florida's workforce each year and, on average, approximately 1,080 physicians will retire each year between 2013 and 2025. The state's physician supply is projected to increase by 12,360 FTEs (29%) from 42,610 in 2013 to 54,970 in 2025.

As noted in a recent *Health Affairs* article, the demographic trends and ACA impact affecting Florida are contributing to demand for physicians across the entire nation. [25] Consequently, Florida's efforts to attract and retain physicians will come at a time when other states are also ramping up their efforts to attract and retain physicians. As national and state shortages grow, this could exacerbate the mal-distribution of physicians across the state as smaller cities and towns find it increasingly difficult to complete with larger metropolitan areas in their efforts to attract and retain physicians.

Of interest is the need to better understand the factors driving future trends in Florida's physician supply, projected to increase about 29% between 2013 and 2025. One contributing factor to these physician supply projections is recent trends in annual numbers of newly licensed physicians, which increased between 2007 and 2013 from about 2,610 to 4,100 (57%). However, based on historical trends, we estimate that about 2,230 new physicians are entering active practice in Florida each year (including those completing their graduate medical education and those migrating from other states). After factoring out physicians who leave the workforce through retirement, mortality, and migrating out of state, as well as trends in hours worked as the physician workforce ages and women constitute a larger portion of the physician workforce, the state's supply is growing by about 1,030 physicians per year.

Contributing to growth in Florida's physician workforce is the addition of five new medical schools since 2000. Between 2001-2013 the number of students in undergraduate medical education (UME) grew by 77%. However, over almost the same period, between 2001-2011 the

[25] Dall TM, Gallo PD, Chakrabarti R, West T, Semilla AP, Storm, MV. An Aging Population and Growing Disease Burden Will Require A Large and Specialized Health Care Workforce By 2025. *Health Affairs*.2013; 32:2013-2020.

AAMC reports that Florida's GME resident positions only grew by 29%. Consequently, over this period the number of students in UME grew by about 2.6 times the growth in number of GME/residency positions. This shortfall in GME resident positions is also apparent when compared to other states. Florida ranks near the bottom (at 42nd) in terms of number of GME residents and fellows per 100,000 population. Florida's shortcomings in residents' growth may be slightly offset by higher retention rates of GME graduates. Nearly fifty nine percent (59%) of physicians who complete their GME residency remain in Florida to practice; 78% of students who complete medical school and GME in Florida remain and practice in the state.

B. Study Strengths and Limitations

The primary strengths of this study are the use of Florida-specific data and the latest methods and tools for health workforce modeling.

- **Demand data**. Florida-specific data were used to model demand for health care services and providers, using detailed data on the demographics, socioeconomic characteristics, and health risk factors present among the state's population.
- **Supply data.** Florida-specific data on the number, characteristics, and workforce participation patterns of the physician workforce were used to estimate current and project future supply.
- **Models and modeling approach**. The demand and supply microsimulation models used for this analysis have been used by the federal government, states, professional associations, and other stakeholders for workforce studies across a range of health occupations and medical specialties. These models use the latest data and methods for workforce modeling, and the microsimulation approach allows for more precise adaptation of the models to Florida's physician workforce and population health care requirements.

Study limitations stem primarily from lack of data or the narrow scope of this study, and include the following:

- **Physician supply data gaps**. Data is needed to better understand what factors influence Florida's ability to attract and retain physicians, and the level of labor force participation for newly licensed physicians. For example, our supply analysis excludes newly licensed physicians over age 60 as many within this cohort could be temporarily practicing as locum tenens or otherwise not engaged in full time practice.
- **Physician demand data gaps**. On the demand side, there is a current paucity of information on how care delivery patterns might change over time in response to ACA and other evolving market factors. Efforts to expand use of the patient centered medical home model could increase demand for primary care providers. In the short term, greater use of team-based care could place additional demands on physician time. Over time, to the extent that these models and greater use of Accountable Care Organizations can

improve population health or shift care from expensive hospital settings to ambulatory settings, there could be both a shift in where care is provided (e.g., office versus inpatient) and the level of specialist care required. Although the projected demand implications of expanded medical coverage under ACA have been modeled, insufficient data is currently available to assess the health workforce supply and demand implications of other ACA provisions that support development of new care delivery models (e.g., accountable care organizations and patient centered medical homes) and expanded primary care capacity (e.g., federally qualified health centers). The speed of adoption and growth of these and other emerging care delivery models will be an important factor in assessing implications for future physician supply and demand.

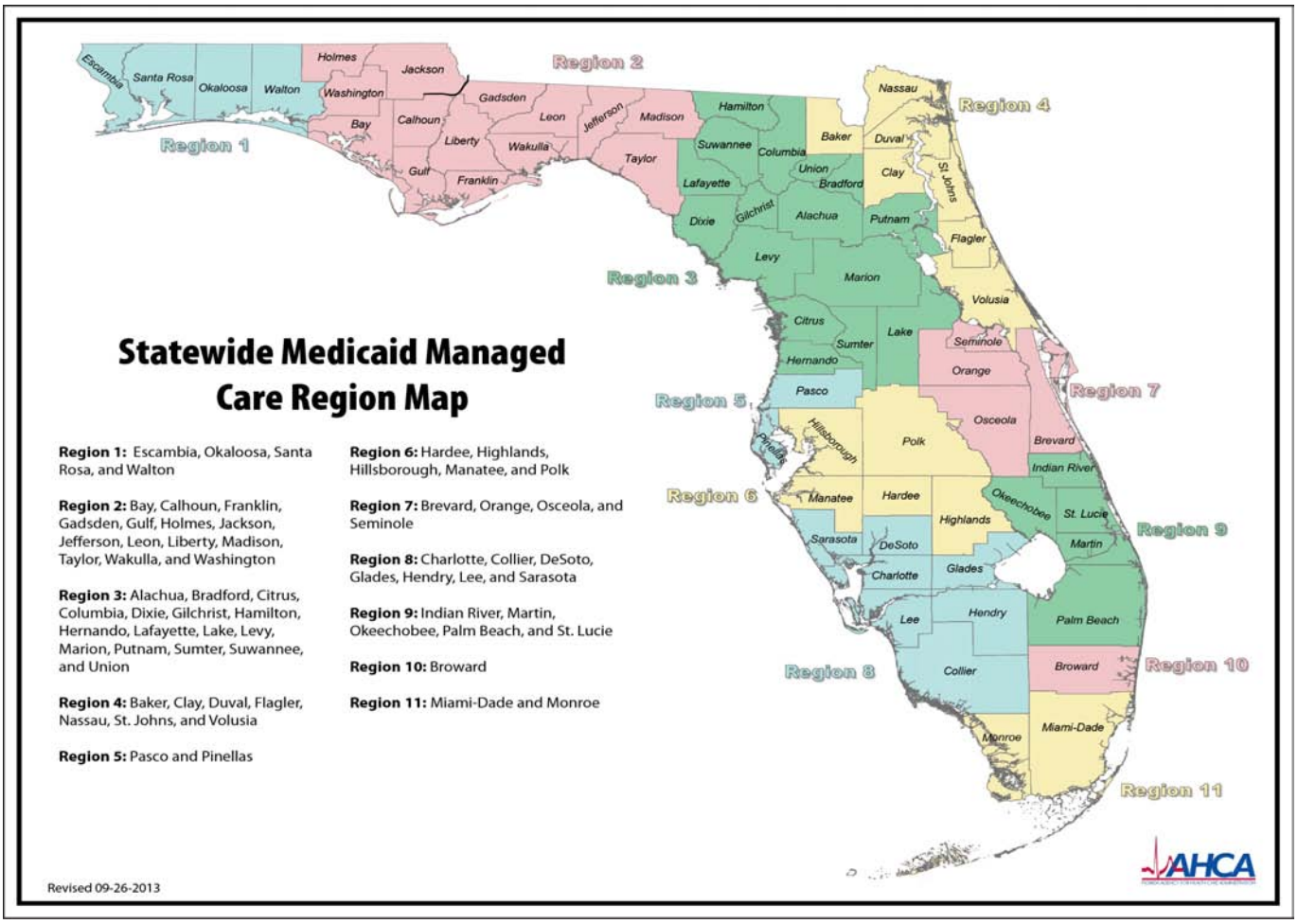
- **State versus local community supply**. The focus of this study is the entire state of Florida. An addendum to this report presents information by Medicaid region within Florida. At the county and local community level, there is even greater variation in adequacy of physician supply.
- **The non-physician workforce**. Understanding the adequacy of physician supply should be considered within the context of the adequacy of supply and scope of practice of physician extenders, such as advanced practice nurses and physician assistants. For example, study findings suggest that Florida has fewer anesthesiologists than is required to meet demand based on national patterns of care use and delivery. However, this shortfall is partially offset by the state's greater use of nurse anesthetists relative to national average staffing patterns.

Because patterns of care use and delivery continue to evolve, and economic and other considerations affect both supply and demand for services, it is important to continue to monitor the adequacy of provider supply to inform health workforce policies and training priorities.

VI. Addendum: Florida Medicaid Region Physician Workforce Analysis

Florida implemented the Statewide Medicaid Managed Care Managed Medical Assistance program in 2014. Under this program almost all of the State's approximately 3.6 million Medicaid recipients are required to enroll in an HMO or HMO-like plan. The statewide program is operated in eleven Medicaid managed care regions, each of which consists of two or more counties (Map 1).

Map 1: Florida's Medicaid Regions



The 14 hospitals and health systems represented by the Safety Net Hospital Alliance of Florida (SNHA) share a mission unique to safety net providers, including playing a critical role in caring for vulnerable populations and training many of the state's future physicians. Florida's safety-net hospitals provide nearly 50% of all statewide Medicaid hospital care and all include one or more of the new Medicaid managed care regions within their service areas. Therefore, obtaining an accurate picture of the current and projected numbers and distribution of physician specialties at the sub-state level is important to help identify possible imbalances and access barriers to care.

This addendum builds upon the findings of the Florida Physician Workforce Analysis and is intended to help SNHA members and Florida decision makers better understand how differences in the current and projected numbers and distribution of physicians and in demand for healthcare services may affect access to care across regions. This addendum provides estimates of the current and projected future adequacy of physician supply by Medicaid region through 2025.

A. Overview of Physician Modeling Approach

This regional analysis used the same IHS Healthcare Demand and Supply Micro-simulation as was used for the state-level analysis. Both models use a micro-simulation approach, where a person is the unit of analysis. This section of the addendum provides additional detail on how we adapted the models to each region.

1. Physician Supply Modeling by Florida Medicaid Region

The conceptual framework for modeling the future supply of physicians by Medicaid region begins with the current physician workforce, adds new entrants, and subtracts those who leave the workforce due to retirement or out-of-state migration to arrive at next year's supply. The level of workforce participation for each physician is then modeled as a function of his or her age, gender, and specialty.

The primary data source for analyzing the current physician workforce, attrition rates and hours worked patterns was the 2012 and 2013 physician licensure data furnished by the Florida Department of Health. This data is collected as part of the biannual physician licensure renewal application process. The file contains information on all physicians licensed and active in providing patient care in Florida, and using work address information we placed each physician within a region. Many physicians listed multiple practice locations, but very few listed practice locations in separate regions.

The mechanism for modeling new entrants to the physician workforce was based on recent licensure data of newly practicing physicians in Florida. The expected distribution of new physicians across regions was based upon the estimated growth in employment opportunities by region based upon projected growth in demand and physician retirements. Within a given specialty, if growth in physician demand plus retirements indicated that, say, 10% of the new job opportunities were in a particular region then we assumed that 10% of new entrants to the Florida workforce within that specialty would practice in that region.

2. Physician Demand Modeling by Florida Medicaid Region

The major components of the demand model include: 1) a population database that contains characteristics and health risk factors for a representative sample of the population in each Medicaid region, 2) predictive equations based on national data that relate a person's demographic, socioeconomic and health risk factor characteristics to his or her demand for healthcare services by care delivery setting, and 3) national care delivery patterns that convert demand for healthcare services to demand for FTE physicians. For purposes of physician

workforce modeling the relevant settings are physician offices, outpatient clinics, hospital emergency departments, and hospital inpatient settings.

While the forecasting equations and staffing patterns are based on national data, we constructed a population database that was representative of the population in each region. This was done using county-level population information (e.g., age-gender-race/ethnicity) and whether a county was considered metropolitan or non-metropolitan, and information from the Behavioral Risk Factor Surveillance System (BRFSS) for the population in Florida—including summary statistics by county for factors such as prevalence of obesity, diabetes, current smoking status, and other risk factors used in the model.

Applying the model to Florida, therefore, produced estimates of physician demand if people in each region were to receive a level of care consistent with the national average—but adjusting for differences across regions and the nation in demographics, health and economic factors that affect demand for health care services.

B. Summary of Regional Analysis Findings

1. Adequacy of Physician Supply by Florida Medicaid Region

As noted in the state-wide workforce projections, Florida currently (2013) has about 4,620 fewer physicians (-11%) than required to meet statewide demand. Between 2013 and 2025 the supply of primary care physicians is projected to grow faster than demand (34% versus 24% growth) while demand for non-primary care specialties is projected to exceed supply by about 19%, leading to a small overall shortage of about 3,690 physicians. To place these findings into context, when supply is within ±5% of demand then one might consider the workforce to be in equilibrium. Shortages or surpluses in the 5-10% range might be considered mild imbalances. More severe imbalances will disproportionately affect the Medicaid population and other vulnerable populations (e.g., uninsured without the financial means to pay full price for services).

Physician demand estimates by Medicaid region are influenced not only by population size, but also demographic profiles, prevalence of health risk factors and chronic diseases and levels of health insurance coverage. Across the state's Medicaid managed care regions there is substantial geographic variation in access to primary care specialties accompanied by even greater variation in access to non-primary care specialties.

Patients' healthcare seeking patterns complicate identifying and analyzing local geographic imbalances between supply and demand. For example, commuting patterns, levels of insurance coverage and network configurations and presence of large healthcare delivery capacity may cause some residents in Florida Medicaid regions with current physician shortfalls to seek some portion of their care from providers practicing in region 11or other regions with relatively small shortages.

Exhibit A-2 and Map 2 below show that current physician demand exceeds supply in 10 or 11 regions. In three regions there is an estimated physician shortfall of 20% or greater. Areas with

the largest percent shortfall are Region 2 (-30%), Region 8 (-26%), and Region 7 (-20%). In Region 11 (Miami- Dade and Monroe Counties) the supply of physicians is about 12% higher than the level needed to provide a national average level of care. Both counties in Region 11 are metropolitan areas with large concentrations of healthcare settings, physicians and other healthcare providers.

By 2025 physician demand will likely continue to exceed available supply in eight regions (Exhibit A-4 and Map 3). Regions with percent shortfalls of 20% or more are Region 8 (-33%), Region 2 (-30%) and Region 3 (-26%). Physician supply is projected to be more than adequate in 2025 to provide the current national average level of care in Region 11 (+22%), Region 10 (+8%) and Region 5 (+5%).

2. Regional Adequacy of Primary Care Physician Specialties

As depicted in Exhibit A-2 and Map 4, under a traditional definition of primary care specialties (i.e., general and family practice, general internal medicine, general pediatrics and geriatric medicine) overall, statewide physician supply and demand currently are roughly in equilibrium. Under Florida's more expansive definition of primary care specialties which also include general surgery, emergency medicine and obstetrics/gynecology a small shortfall exists (-6%).

While supply of primary care physicians may be adequate at the state level to provide a national average level of care, there is considerable geographic variation across Medicaid regions. Currently, demand for traditional primary care physicians exceeds supply in eight regions, and in Region 8 there is an estimated primary care physician shortfall of 21%.

With four regions currently experiencing shortages of 20% or more, general & family practice is the traditional primary care specialty with the most pervasive shortfalls across regions. Region 11 (Miami-Dade and Monroe) currently has about 30% more primary care providers than is required to provide a national average level of care, with pediatrics and general internal medicine specialties where there is an abundance of physicians (relative to national averages).

If current trends continue, the statewide supply of primary care physicians is projected to grow faster than demand. As a result, by 2025 supply of primary care specialties will exceed the level needed to provide the current national average level of care in four regions compared to the current three (Exhibit A-4 and Map 5). In addition, among the four regions currently experiencing shortfalls of 20% or more, only Region 8 will continue to do so. However, among primary care specialties, shortfalls among general & family practice and general internal medicine will likely remain across six regions.

3. Regional Adequacy of Non-Primary Care Physician Specialties

Statewide, current demand for non-primary care physician specialties is estimated to exceed supply by about 18%. Similar to the distribution of primary care physician specialties, current demand for non-primary care physicians exceeds supply in ten regions (Exhibit A-2 and Map 6).

In five regions there is an estimated non-primary care physician shortfall of 20% or greater and one (Region 2) with a shortage of more than 40%.

Other areas with large percent shortfalls in supply include Region 8 (-28%), Region 7 (-26%) and Region 1 (-24%). Supply and demand are currently at or near equilibrium in Regions 9, 10 and 11. Specialties currently experiencing shortfalls across all eleven regions include psychiatry, hematology & oncology, general surgery and radiology.

Looking to the future, if current patterns continue to 2025, statewide demand for non-primary care physicians will remain high, exceeding supply by about 19%. Nine regions will likely experience shortfalls in non-primary care physicians, and shortfalls of 20% or more are projected for six regions (Exhibit A-4 and Map 7). Five regions are likely to experience shortages of 30% or more compared to one currently. Supply and demand are projected to be at or near equilibrium in Regions 10 and 11. By 2025, medical and surgical specialties likely to experience shortfalls across all Medicaid regions include psychiatry, general surgery, hematology & oncology, pulmonology & critical care and thoracic surgery.

C. Conclusion

This analysis combined county- and Medicaid region-level data on the physician workforce in Florida; the demographic, socioeconomic and health risk factors of the population in Florida counties and Medicaid regions, data from national sources, and a Healthcare Workforce Micro-simulation Model to estimate the current and future supply and demand for physician specialties across Florida's eleven Medicaid regions. Substantial geographic imbalances in adequacy of supply currently exist, and these imbalances are likely to persist through 2025.

Despite geographic imbalances, some regions appear to have sufficient numbers of providers in some specialties to care for the population residing in their own region, and likely are providing care to populations in neighboring regions where supply may be inadequate to meet demand. Future work to assess trends in patient migration patterns, appointment wait times for emergent/urgent and routine care and other access indicators such as provider willingness to accept new Medicaid patients may help inform the issue of local adequacy of physician supply.

These findings heighten the importance of ensuring that Florida has a future physician workforce adequate in size and distribution to ensure continued access to high quality care. This includes optimizing the dynamics of Florida's medical school and GME/residency training pipeline in order to retain in-state a high proportion of graduates from medical school and GME/residency training programs to help close gaps in current and projected future adequacy of physician supply. Policies might explore not just how to attract and retain physicians in Florida, but how to attract and retain physicians in those areas experiencing large provider shortfalls.

D. Tables by Medicaid Region

1. Current and Projected Physician Supply minus Demand by Florida Region

Current (2013) and projected (2025) physician supply minus demand by specialty within Florida's eleven Medicaid regions is summarized in Exhibits A1-A4 below.

Exhibit A- 1: Physician Supply minus Demand by Specialty and Region, 2013

	Region											
Specialty	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**State**
Total Primary Care	**(65)**	**(169)**	**(297)**	**(23)**	**56**	**(270)**	**(373)**	**(479)**	**(224)**	**(57)**	**627**	**(1,274)**
Traditional Primary Care	**(53)**	**(98)**	**(108)**	**13**	**154**	**(177)**	**(213)**	**(323)**	**(134)**	**(71)**	**681**	(329)
General/Family Practice	14	(1)	(114)	71	2	(236)	(93)	(181)	(253)	(154)	(18)	(963)
General Internal Medicine	(66)	(64)	(59)	(91)	71	49	(151)	(132)	76	(18)	339	(46)
Pediatrics	(6)	(39)	31	22	61	(10)	1	(17)	22	59	304	428
Geriatric Medicine	5	6	34	11	20	20	30	7	21	42	56	252
General Surgery	(11)	(30)	(78)	(44)	(72)	(53)	(83)	(100)	(86)	(72)	(64)	(693)
Emergency Medicine	14	(7)	(23)	64	26	(1)	5	(5)	4	63	9	149
Obstetrics/Gynecology	(15)	(34)	(88)	(56)	(52)	(39)	(82)	(51)	(8)	23	1	(401)
Total Non-Primary Care	**(202)**	**(336)**	**(500)**	**(359)**	**(316)**	**(297)**	**(766)**	**(665)**	**(183)**	**(138)**	**128**	**(3,633)**
Allergy and Immunology	-	(2)	(14)	(1)	6	2	(1)	(7)	(4)	(4)	7	(18)
Anesthesiology	(10)	(50)	(69)	(44)	(86)	(48)	(96)	(140)	(75)	19	(21)	(620)
Cardiology	(17)	(35)	(31)	(17)	(13)	(53)	(33)	(46)	(13)	(7)	37	(228)
Dermatology	(1)	(3)	-	1	13	16	(19)	47	88	36	49	227
Endocrinology	(15)	(10)	(22)	(10)	(13)	(32)	(14)	(29)	(7)	(5)	3	(154)
Gastroenterology	(8)	(16)	-	28	2	1	(13)	(11)	30	14	19	46
Hematology & Oncology	(17)	(23)	(24)	(25)	(32)	(17)	(58)	(65)	(47)	(27)	(15)	(350)
Infectious Diseases	(9)	(7)	(19)	(3)	(15)	(5)	(10)	(17)	(19)	(13)	12	(105)
Nephrology	(14)	(10)	(14)	9	(2)	(20)	(13)	(24)	(23)	(7)	(17)	(135)
Neurological Surgery	3	(4)	1	4	(6)	3	(8)	(1)	-	(11)	6	(13)
Neurology	(8)	(14)	(13)	16	(6)	(3)	(22)	(15)	3	(7)	37	(32)
Ophthalmology	(12)	(12)	(14)	(17)	19	12	(38)	19	45	9	28	39
Orthopedic Surgery	10	(16)	(44)	(23)	(2)	(26)	(36)	(28)	26	9	4	(126)
Otolaryngology	(1)	(3)	(10)	(2)	(5)	-	(17)	5	13	(16)	(3)	(39)
Plastic Surgery	(2)	(4)	(16)	-	5	13	(7)	17	39	26	65	136
Psychiatry	(40)	(33)	(67)	(140)	(70)	(108)	(186)	(103)	(98)	(129)	(57)	(1,031)
Pulmonology & Critical Care	(19)	(28)	(54)	(56)	(47)	(67)	(76)	(68)	(56)	(47)	(64)	(582)
Radiology	(24)	(32)	(49)	(28)	(60)	(28)	(74)	(125)	(75)	(13)	(22)	(530)
Rheumatology	4	(7)	(10)	(18)	(5)	(8)	(17)	(9)	8	(5)	5	(62)
Thoracic Surgery	(8)	(5)	-	(11)	(1)	1	(15)	(11)	3	(12)	(4)	(63)
Urology	(2)	(3)	(9)	-	(4)	-	(4)	(3)	10	3	14	2
Vascular Surgery	-	4	(4)	-	1	9	-	5	(8)	3	10	20
Total (specialties modeled)	**(255)**	**(482)**	**(779)**	**(360)**	**(265)**	**(628)**	**(1,130)**	**(1,088)**	**(384)**	**(241)**	**720**	**(4,892)**
Specialties demand not modeled	(12)	(22)	(18)	(21)	5	60	(9)	(56)	(23)	46	34	(15)
Total	**(267)**	**(505)**	**(797)**	**(382)**	**(260)**	**(567)**	**(1,139)**	**(1,144)**	**(407)**	**(195)**	**755**	**(4,907)**

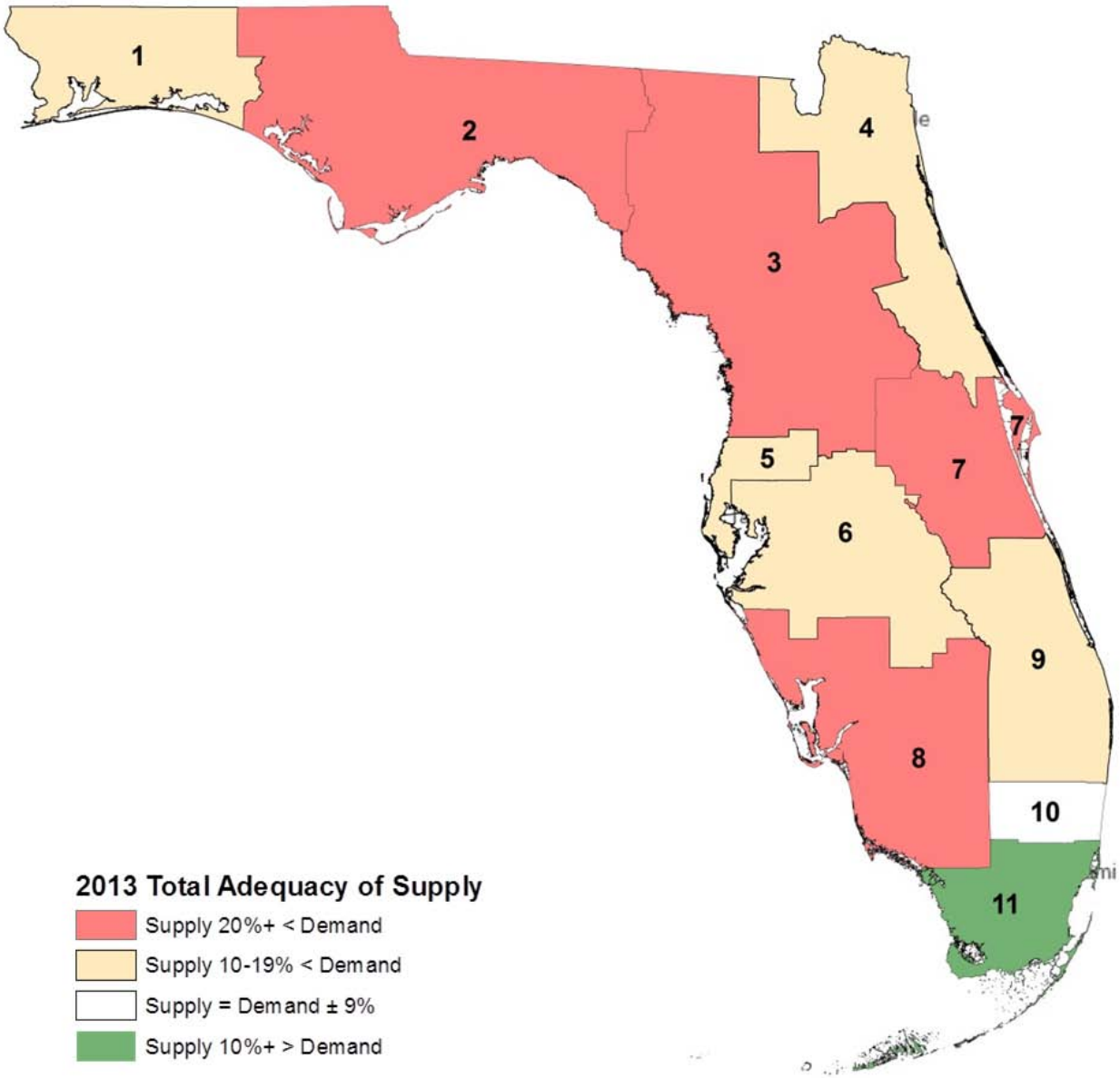
Exhibit A- 2: Physician Gap ÷ Demand by Specialty and Region, 2013

Specialty	1	2	3	4	5	6	7	8	9	10	11	State
Total Primary Care	**-8%**	**-20%**	**-15%**	**-1%**	**3%**	**-10%**	**-13%**	**-23%**	**-9%**	**-3%**	**20%**	**-6%**
Traditional Primary Care	**-9%**	**-16%**	**-8%**	**1%**	**12%**	**-9%**	**-10%**	**-21%**	**-7%**	**-5%**	**31%**	**-2%**
General/Family Practice	6%	0%	-19%	11%	0%	-30%	-12%	-31%	-37%	-26%	-2%	**-15%**
General Internal Medicine	-28%	-27%	-10%	-13%	13%	6%	-18%	-19%	10%	-3%	38%	**-1%**
Pediatrics	-5%	-36%	15%	7%	31%	-2%	0%	-8%	7%	19%	69%	**14%**
Geriatric Medicine	63%	86%	126%	42%	77%	63%	103%	18%	54%	183%	170%	**87%**
General Surgery	-19%	-51%	-50%	-26%	-55%	-26%	-42%	-60%	-46%	-47%	-29%	**-41%**
Emergency Medicine	18%	-9%	-12%	29%	17%	0%	2%	-3%	2%	31%	3%	**7%**
Obstetrics/Gynecology	-17%	-37%	-45%	-23%	-30%	-13%	-26%	-26%	-3%	10%	0%	**-17%**
Total Non-Primary Care	**-24%**	**-41%**	**-23%**	**-15%**	**-17%**	**-10%**	**-26%**	**-28%**	**-7%**	**-6%**	**4%**	**-15%**
Allergy and Immunology	0%	-22%	-58%	-4%	30%	6%	-3%	-28%	-14%	-17%	20%	**-7%**
Anesthesiology	-10%	-52%	-28%	-15%	-38%	-14%	-28%	-50%	-24%	7%	-6%	**-22%**
Cardiology	-27%	-56%	-17%	-9%	-9%	-24%	-16%	-24%	-6%	-4%	16%	**-12%**
Dermatology	-4%	-13%	0%	1%	24%	20%	-22%	70%	116%	58%	58%	**33%**
Endocrinology	-83%	-59%	-50%	-19%	-33%	-52%	-22%	-58%	-12%	-10%	4%	**-29%**
Gastroenterology	-26%	-52%	0%	32%	3%	1%	-12%	-13%	32%	18%	17%	**5%**
Hematology & Oncology	-45%	-64%	-23%	-23%	-35%	-13%	-46%	-57%	-38%	-30%	-13%	**-32%**
Infectious Diseases	-53%	-41%	-41%	-6%	-39%	-8%	-17%	-35%	-35%	-28%	18%	**-21%**
Nephrology	-74%	-43%	-24%	16%	-5%	-30%	-20%	-44%	-37%	-13%	-20%	**-23%**
Neurological Surgery	27%	-36%	4%	12%	-23%	8%	-20%	-3%	0%	-35%	14%	**-4%**
Neurology	-21%	-36%	-13%	14%	-7%	-2%	-17%	-15%	3%	-7%	27%	**-3%**
Ophthalmology	-29%	-29%	-14%	-15%	22%	9%	-27%	18%	38%	9%	19%	**3%**
Orthopedic Surgery	19%	-30%	-32%	-15%	-2%	-14%	-20%	-19%	16%	7%	2%	**-8%**
Otolaryngology	-5%	-15%	-22%	-4%	-12%	0%	-25%	10%	22%	-31%	-4%	**-7%**
Plastic Surgery	-11%	-24%	-36%	0%	13%	22%	-12%	35%	72%	60%	114%	**28%**
Psychiatry	-40%	-32%	-30%	-49%	-34%	-31%	-51%	-43%	-33%	-46%	-14%	**-36%**
Pulmonology & Critical Care	-56%	-80%	-57%	-57%	-61%	-57%	-66%	-69%	-51%	-54%	-48%	**-58%**
Radiology	-28%	-43%	-23%	-11%	-28%	-10%	-26%	-46%	-26%	-6%	-8%	**-22%**
Rheumatology	36%	-70%	-36%	-55%	-19%	-21%	-45%	-27%	22%	-17%	13%	**-19%**
Thoracic Surgery	-73%	-45%	0%	-37%	-5%	3%	-41%	-41%	9%	-43%	-10%	**-21%**
Urology	-9%	-13%	-15%	0%	-8%	0%	-5%	-5%	14%	5%	18%	**0%**
Vascular Surgery	0%	67%	-20%	0%	6%	38%	0%	21%	-32%	17%	37%	**9%**
Total (specialties modeled)	**-16%**	**-30%**	**-20%**	**-8%**	**-8%**	**-12%**	**-20%**	**-26%**	**-8%**	**-6%**	**12%**	**-11%**
Specialties demand not modeled	-17%	-33%	-10%	-11%	3%	25%	-4%	-29%	-10%	25%	13%	**-1%**
Total	**-16%**	**-30%**	**-19%**	**-8%**	**-7%**	**-10%**	**-20%**	**-26%**	**-8%**	**-4%**	**12%**	**-10%**

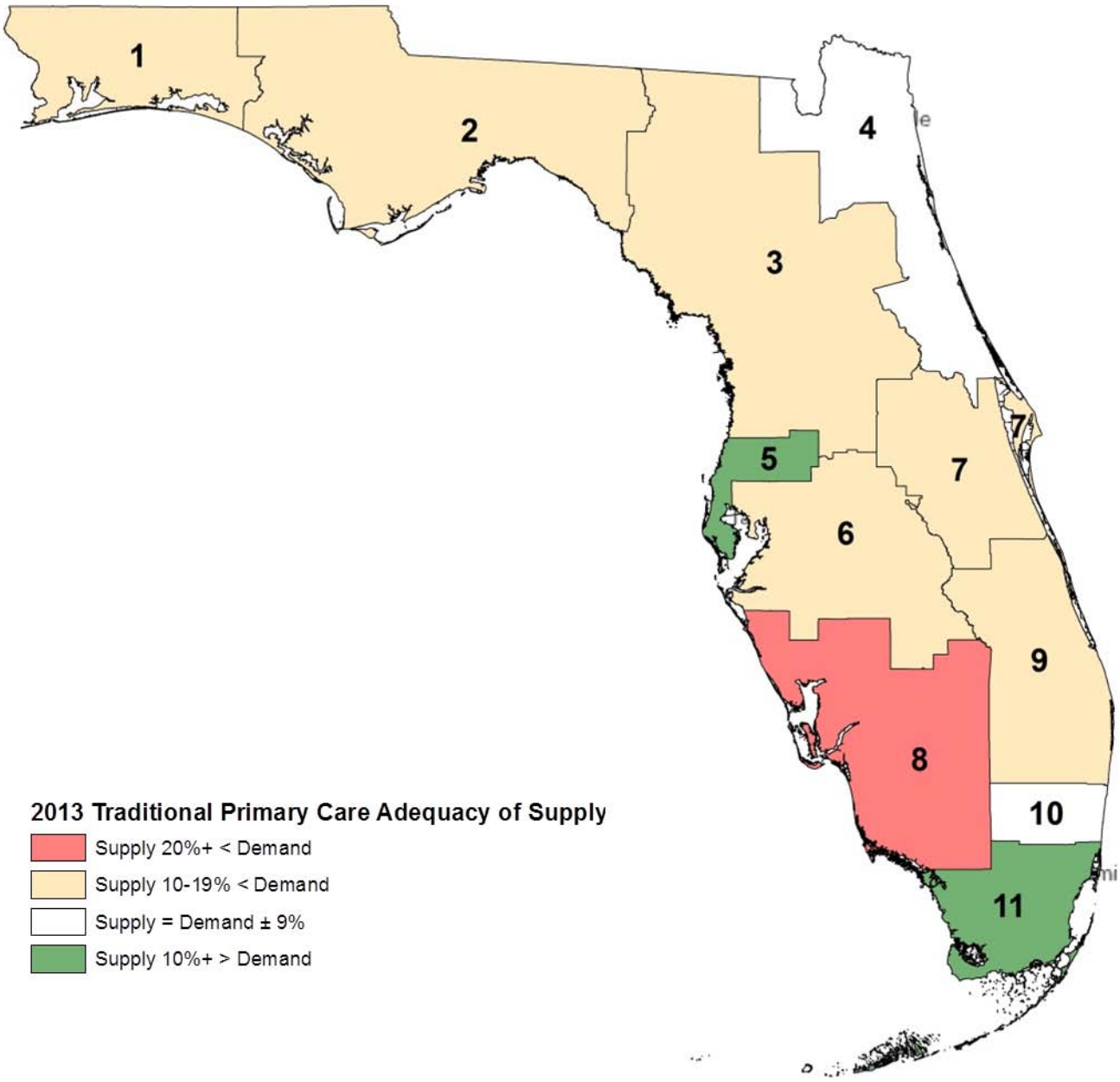
Key

Supply 10%+ > Demand	
Supply =demand ± 9%	
Supply 10-19% < Demand	
Supply 20%+ < Demand	

Map 2: Adequacy of Physician Supply by Region, 2013



Map 3: Adequacy of Primary Care Physician Supply by Region, 2013



Map 4: Adequacy of Non-Primary Care Physician Supply by Region, 2013

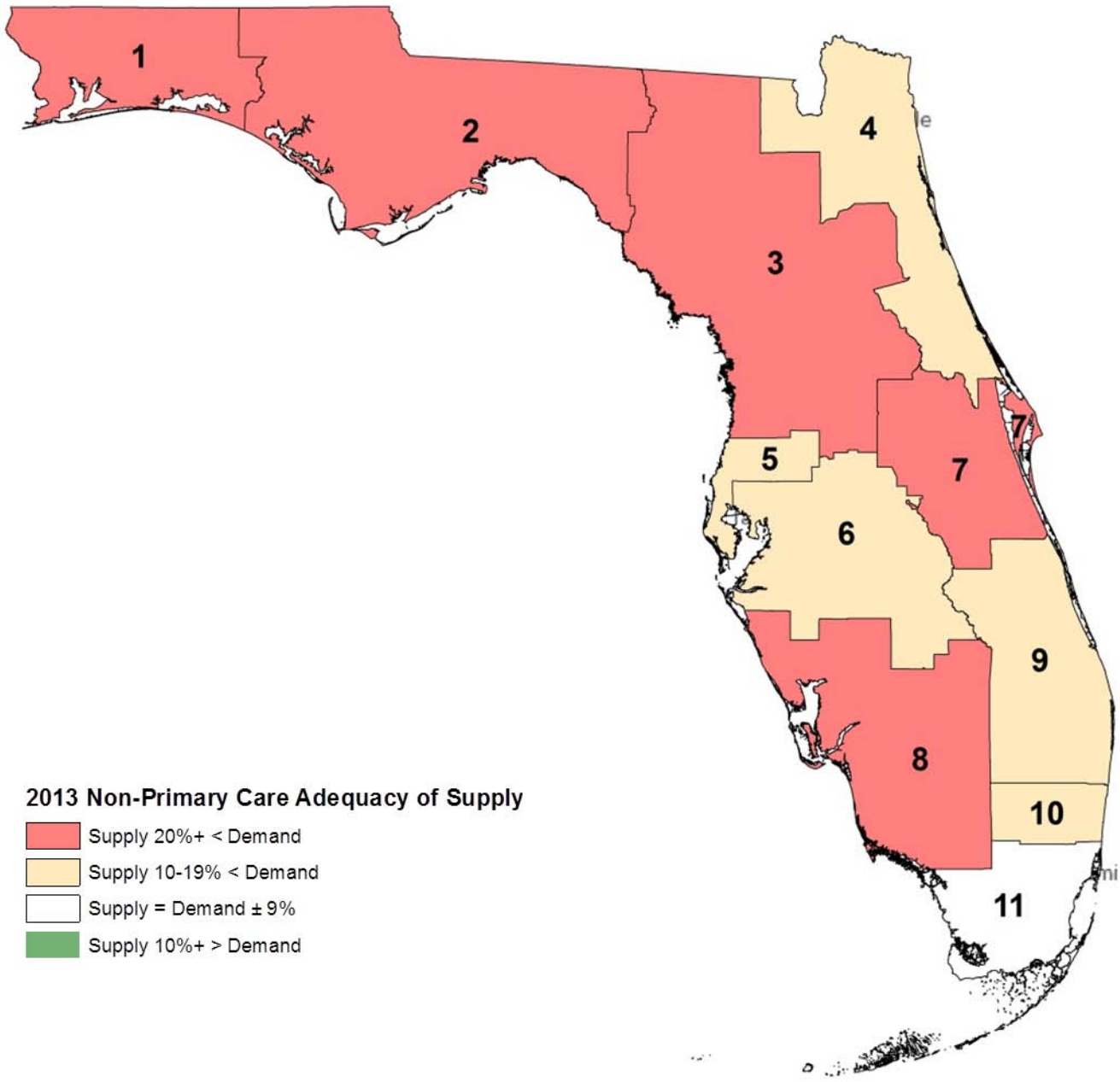


Exhibit A- 3: Physician Supply minus Demand by Specialty and Region, 2025

	Region											
Specialty	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**State**
Total Primary Care	**32**	**(103)**	**(290)**	**71**	**514**	**(92)**	**(62)**	**(578)**	**(145)**	**316**	**1,254**	**917**
Traditional Primary Care	**(11)**	**(71)**	**(49)**	**64**	**535**	**(37)**	**27**	**(377)**	**(57)**	**185**	**1,201**	**1,410**
General/Family Practice	23	22	(176)	101	104	(267)	(63)	(262)	(312)	(99)	16	(913)
General Internal Medicine	(69)	(68)	(18)	(97)	219	138	(78)	(141)	186	69	611	752
Pediatrics	33	(26)	96	62	195	75	135	16	68	166	514	1,334
Geriatric Medicine	2	1	49	(2)	17	17	33	10	1	49	60	237
General Surgery	(13)	(10)	(94)	(78)	(68)	(52)	(84)	(111)	(105)	(81)	(61)	(757)
Emergency Medicine	68	11	(26)	132	87	48	97	3	33	161	96	710
Obstetrics/Gynecology	(12)	(33)	(121)	(47)	(40)	(51)	(102)	(93)	(16)	51	18	(446)
Total Non-Primary Care	**(277)**	**(391)**	**(764)**	**(652)**	**(335)**	**(455)**	**(948)**	**(876)**	**(321)**	**23**	**99**	**(4,894)**
Allergy and Immunology	-	(6)	(22)	(12)	6	(3)	(12)	(15)	(16)	(15)	(4)	(99)
Anesthesiology	(2)	(60)	(80)	(61)	(83)	(49)	(120)	(176)	(67)	76	(15)	(637)
Cardiology	(39)	(40)	(81)	(75)	(23)	(88)	(68)	(64)	(38)	(19)	28	(507)
Dermatology	6	(6)	(4)	(3)	12	17	(45)	54	126	41	53	251
Endocrinology	(16)	(16)	(24)	(4)	1	(38)	(5)	(30)	6	12	14	(100)
Gastroenterology	(12)	(20)	(10)	47	(2)	(8)	(19)	(20)	32	16	8	12
Hematology & Oncology	(26)	(32)	(34)	(57)	(42)	(41)	(80)	(82)	(71)	(24)	(28)	(517)
Infectious Diseases	(9)	(8)	(16)	7	(10)	4	12	(16)	(24)	(6)	25	(41)
Nephrology	(18)	(7)	4	13	6	(4)	2	(15)	(23)	20	(17)	(39)
Neurological Surgery	10	(5)	1	9	7	5	(6)	(4)	17	(10)	22	46
Neurology	(6)	(13)	(22)	20	(17)	(1)	(23)	(20)	(16)	6	52	(40)
Ophthalmology	(24)	(18)	(38)	(50)	4	(10)	(50)	12	10	(5)	(2)	(171)
Orthopedic Surgery	5	(13)	(77)	(63)	(8)	(39)	(53)	(37)	20	13	5	(247)
Otolaryngology	-	(5)	(22)	(13)	(4)	(18)	(19)	(8)	15	(13)	(4)	(91)
Plastic Surgery	(2)	(1)	(18)	(4)	(2)	2	(9)	21	48	34	74	143
Psychiatry	(41)	(36)	(73)	(186)	(74)	(120)	(238)	(118)	(131)	(115)	(89)	(1,221)
Pulmonology & Critical Care	(30)	(35)	(77)	(80)	(57)	(102)	(101)	(82)	(66)	(38)	(74)	(741)
Radiology	(42)	(38)	(82)	(41)	(50)	(42)	(98)	(172)	(95)	(14)	(6)	(680)
Rheumatology	-	(9)	(22)	(26)	(7)	(19)	(30)	(11)	-	(9)	4	(129)
Thoracic Surgery	(10)	(3)	(3)	(18)	(1)	(10)	(16)	(12)	(9)	(14)	(5)	(101)
Urology	(5)	(4)	(13)	(27)	(8)	(3)	(8)	(13)	(1)	(7)	(7)	(96)
Vascular Surgery	1	4	(3)	(2)	(2)	4	7	3	(7)	(5)	10	10
Total (specialties modeled)	**(228)**	**(474)**	**(1,006)**	**(555)**	**160**	**(655)**	**(1,041)**	**(1,383)**	**(435)**	**240**	**1,298**	**(4,078)**
Specialties demand not modeled	(17)	(20)	(48)	(26)	19	108	31	(71)	(31)	99	55	101
Total	**(245)**	**(494)**	**(1,054)**	**(581)**	**179**	**(547)**	**(1,010)**	**(1,454)**	**(466)**	**339**	**1,353**	**(3,977)**

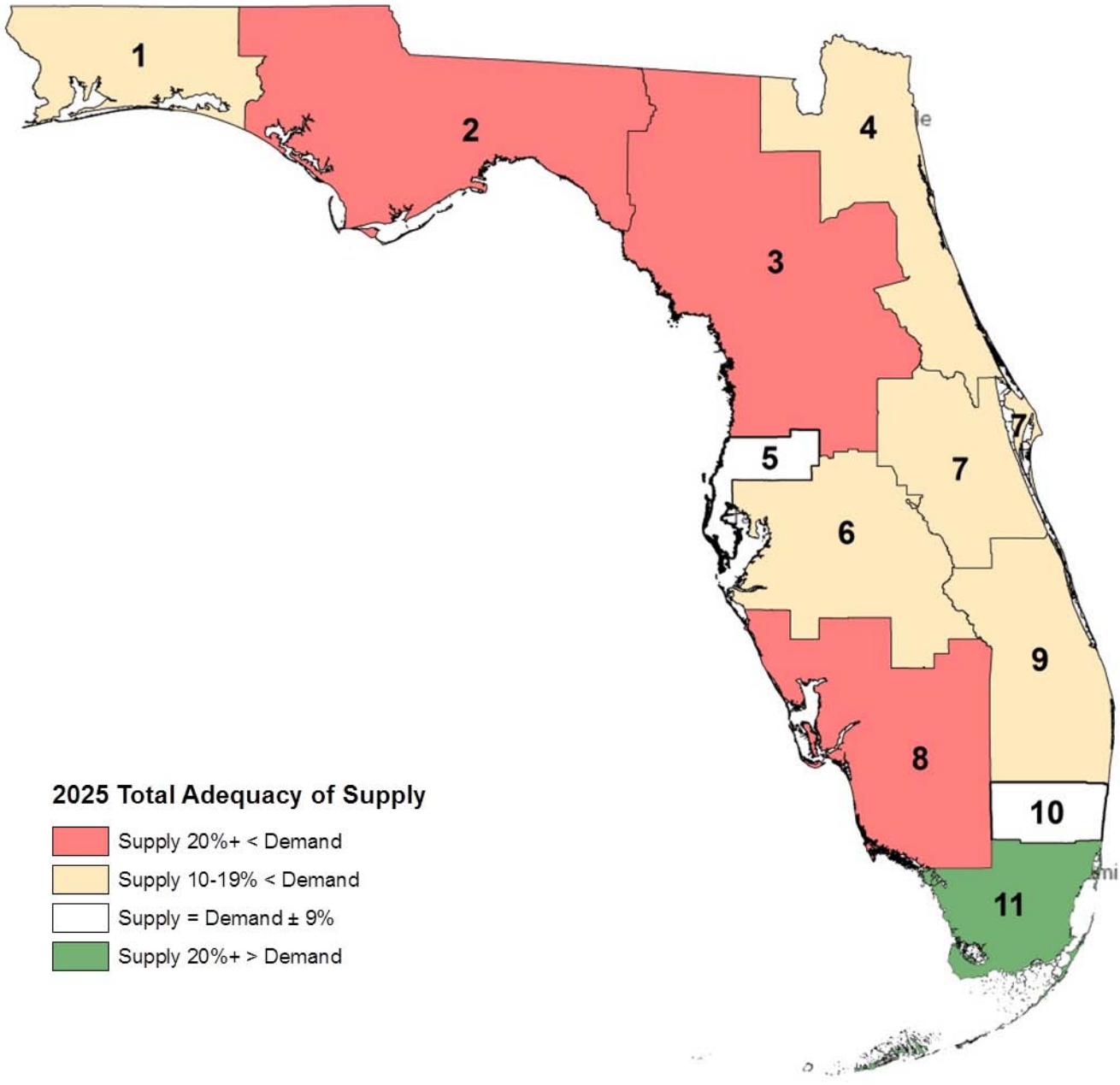
Exhibit A- 4: Physician Gap/Demand by Specialty and Region, 2025

	Region											
Specialty	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**State**
Total Primary Care	**4%**	**-12%**	**-15%**	**3%**	**30%**	**-3%**	**-2%**	**-28%**	**-6%**	**15%**	**41%**	**4%**
Traditional Primary Care	**-2%**	**-12%**	**-3%**	**4%**	**42%**	**-2%**	**1%**	**-25%**	**-3%**	**12%**	**54%**	**8%**
General/Family Practice	10%	9%	-29%	15%	21%	-34%	-8%	-44%	-45%	-17%	2%	-14%
General Internal Medicine	-29%	-29%	-3%	-14%	40%	17%	-9%	-21%	24%	11%	69%	11%
Pediatrics	28%	-24%	45%	19%	98%	18%	31%	7%	23%	53%	117%	43%
Geriatric Medicine	25%	14%	181%	-8%	65%	53%	114%	26%	3%	213%	182%	82%
General Surgery	-22%	-17%	-60%	-46%	-52%	-26%	-42%	-66%	-56%	-53%	-27%	-44%
Emergency Medicine	87%	14%	-14%	60%	56%	18%	36%	2%	15%	80%	33%	33%
Obstetrics/Gynecology	-14%	-36%	-62%	-19%	-23%	-17%	-32%	-48%	-7%	22%	5%	-18%
Total Non-Primary Care	**-33%**	**-47%**	**-36%**	**-27%**	**-18%**	**-16%**	**-33%**	**-37%**	**-12%**	**1%**	**3%**	**-20%**
Allergy and Immunology	0%	-67%	-92%	-46%	30%	-9%	-38%	-60%	-55%	-63%	-11%	-37%
Anesthesiology	-2%	-63%	-33%	-21%	-36%	-15%	-35%	-63%	-21%	30%	-4%	-23%
Cardiology	-62%	-63%	-44%	-41%	-16%	-41%	-32%	-33%	-18%	-12%	12%	-27%
Dermatology	24%	-26%	-7%	-4%	22%	21%	-53%	81%	166%	66%	62%	36%
Endocrinology	-89%	-94%	-55%	-8%	3%	-61%	-8%	-60%	10%	24%	19%	-19%
Gastroenterology	-39%	-65%	-13%	53%	-3%	-8%	-18%	-24%	34%	20%	7%	1%
Hematology & Oncology	-68%	-89%	-33%	-52%	-46%	-32%	-64%	-71%	-57%	-26%	-24%	-48%
Infectious Diseases	-53%	-47%	-35%	14%	-26%	7%	20%	-33%	-44%	-13%	37%	-8%
Nephrology	-95%	-30%	7%	23%	15%	-6%	3%	-28%	-37%	36%	-20%	-7%
Neurological Surgery	91%	-45%	4%	27%	27%	13%	-15%	-13%	46%	-32%	50%	14%
Neurology	-15%	-33%	-23%	18%	-20%	-1%	-17%	-20%	-14%	6%	38%	-4%
Ophthalmology	-59%	-44%	-39%	-43%	5%	-7%	-36%	12%	8%	-5%	-1%	-15%
Orthopedic Surgery	9%	-24%	-57%	-41%	-7%	-22%	-29%	-26%	12%	9%	3%	-16%
Otolaryngology	0%	-25%	-48%	-23%	-10%	-27%	-28%	-16%	26%	-25%	-6%	-17%
Plastic Surgery	-11%	-6%	-41%	-8%	-5%	3%	-15%	43%	89%	79%	130%	29%
Psychiatry	-41%	-35%	-33%	-65%	-36%	-35%	-65%	-50%	-45%	-41%	-22%	-43%
Pulmonology & Critical Care	-87%	-98%	-81%	-82%	-74%	-87%	-88%	-84%	-60%	-42%	-56%	-74%
Radiology	-49%	-51%	-39%	-16%	-23%	-15%	-34%	-64%	-33%	-7%	-2%	-28%
Rheumatology	0%	-90%	-79%	-79%	-27%	-50%	-79%	-33%	0%	-31%	10%	-40%
Thoracic Surgery	-91%	-27%	-12%	-60%	-5%	-28%	-43%	-44%	-28%	-50%	-13%	-34%
Urology	-22%	-17%	-22%	-42%	-16%	-4%	-10%	-20%	-1%	-12%	-9%	-15%
Vascular Surgery	14%	67%	-15%	-10%	-12%	17%	30%	13%	-28%	-28%	37%	5%
Total (specialties modeled)	**-14%**	**-30%**	**-26%**	**-12%**	**5%**	**-12%**	**-19%**	**-33%**	**-9%**	**6%**	**22%**	**-9%**
Specialties demand not modeled	-25%	-29%	-26%	-13%	12%	45%	13%	-36%	-14%	54%	21%	5%
Total	**-15%**	**-30%**	**-26%**	**-12%**	**5%**	**-10%**	**-18%**	**-33%**	**-9%**	**8%**	**22%**	**-8%**

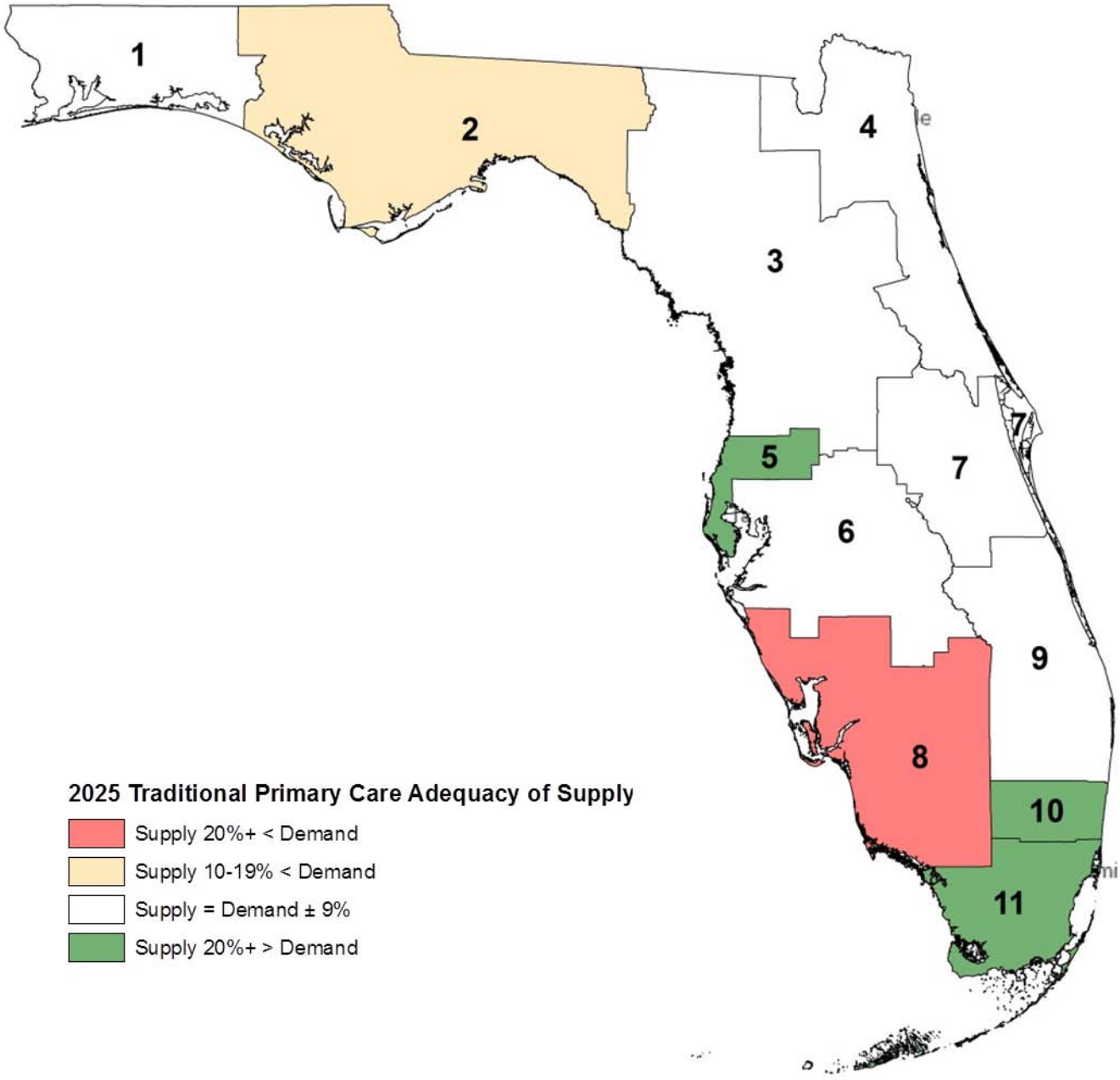
Key

Supply 20%+ > Demand	
Supply =demand ± 9%	
Supply 10-19% < Demand	
Supply 20%+ < Demand	

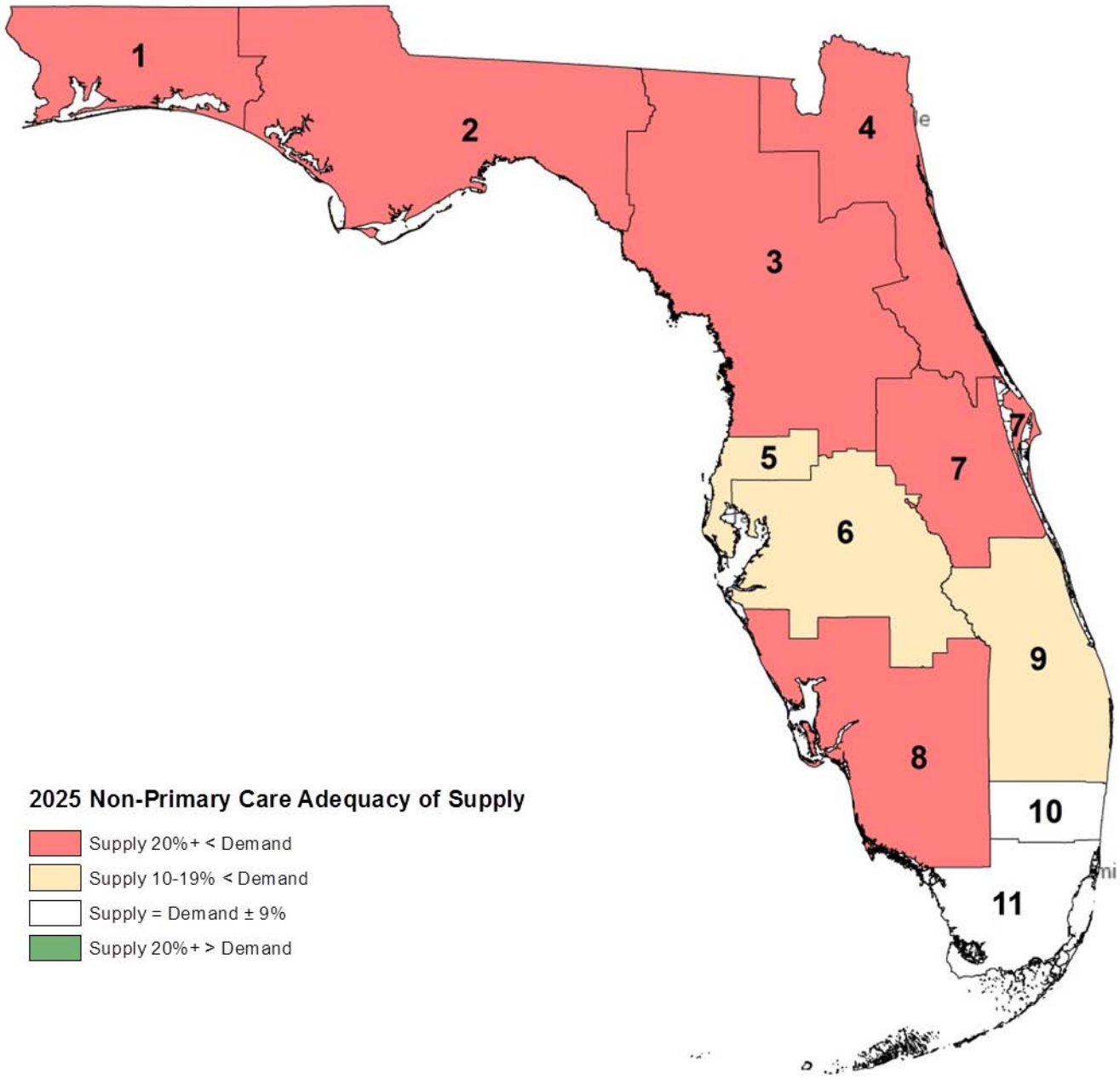
Map 5: Adequacy of Physician Supply by Medicaid Region, 2025



Map 6: Adequacy of Traditional Primary Care Physician Supply by Medicaid Region, 2025



Map 7: Adequacy of Non-Primary Care Physician Supply by Medicaid Region, 2025



2. Current and Projected Physician Demand by Florida Region

Current and projected physician demand by specialty within Florida region is summarized in Exhibits B-1-B2 below.

Exhibit B- 1: Estimated Demand for Physicians by Specialty and Region, 2013

	Region											
Specialty	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**State**
Total Primary Care	**827**	**827**	**1,978**	**2,348**	**1,721**	**2,790**	**2,876**	**2,072**	**2,455**	**2,156**	**3,072**	**23,122**
Traditional Primary Care	**603**	**596**	**1,438**	**1,712**	**1,260**	**2,035**	**2,089**	**1,526**	**1,802**	**1,569**	**2,221**	**16,851**
General/Family Practice	235	246	600	663	485	779	796	589	687	600	862	6,542
General Internal Medicine	240	234	600	696	551	813	830	680	775	634	887	6,940
Pediatrics	120	109	211	327	198	411	434	218	301	312	439	3,080
Geriatric Medicine	8	7	27	26	26	32	29	39	39	23	33	289
General Surgery	59	59	157	169	132	201	200	167	189	154	223	1,710
Emergency Medicine	78	80	188	219	155	260	270	185	222	201	292	2,150
Obstetrics/Gynecology	87	92	195	248	174	294	317	194	242	232	336	2,411
Total Non-Primary Care	**845**	**827**	**2,132**	**2,428**	**1,890**	**2,856**	**2,891**	**2,343**	**2,658**	**2,186**	**3,055**	**24,111**
Allergy and Immunology	9	9	24	26	20	32	32	25	29	24	35	265
Anesthesiology	100	96	243	290	229	332	340	278	314	257	342	2,821
Cardiology	63	63	183	182	148	217	210	195	212	163	235	1,871
Dermatology	25	23	58	70	55	82	85	67	76	62	85	688
Endocrinology	18	17	44	53	40	62	63	50	58	50	73	528
Gastroenterology	31	31	79	88	67	103	105	82	94	79	112	871
Hematology & Oncology	38	36	104	110	91	129	125	115	124	91	117	1,080
Infectious Diseases	17	17	46	50	38	61	60	48	55	46	68	506
Nephrology	19	23	58	56	41	66	65	54	62	55	83	582
Neurological Surgery	11	11	26	33	26	39	40	32	37	31	44	330
Neurology	39	39	97	111	84	129	132	102	118	100	138	1,089
Ophthalmology	41	41	98	115	86	134	140	103	120	105	149	1,132
Orthopedic Surgery	54	54	136	154	118	180	184	144	165	138	193	1,520
Otolaryngology	20	20	46	56	41	67	69	49	58	51	72	549
Plastic Surgery	18	17	44	50	39	59	59	49	54	43	57	489
Psychiatry	101	102	224	288	203	344	367	238	294	279	410	2,850
Pulmonology & Critical Care	34	35	95	98	77	117	116	98	110	88	132	1,000
Radiology	86	75	212	250	217	288	286	270	290	207	259	2,440
Rheumatology	11	10	28	33	26	38	38	33	36	29	39	321
Thoracic Surgery	11	11	26	30	22	36	37	27	32	28	39	299
Urology	23	23	60	65	51	77	77	64	71	58	80	649
Vascular Surgery	7	6	20	20	17	24	23	24	25	18	27	211
Total (specialties modeled)	**1,603**	**1,586**	**3,929**	**4,576**	**3,457**	**5,406**	**5,529**	**4,219**	**4,889**	**4,158**	**5,861**	**45,213**
Specialties demand not modeled	69	68	181	200	154	240	238	196	224	184	266	2,020
Total	**1,672**	**1,654**	**4,110**	**4,776**	**3,611**	**5,646**	**5,767**	**4,415**	**5,113**	**4,342**	**6,127**	**47,233**

Exhibit B- 2: Estimated Demand for Physicians by Specialty and Region, 2025

	Region											
Specialty	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**State**
Total Primary Care	**1,020**	**984**	**2,600**	**3,059**	**2,015**	**3,561**	**3,551**	**2,640**	**3,086**	**2,429**	**3,633**	**28,578**
Traditional Primary Care	**752**	**713**	**1,900**	**2,251**	**1,485**	**2,610**	**2,580**	**1,946**	**2,276**	**1,777**	**2,640**	**20,930**
General/Family Practice	292	291	787	870	568	996	982	747	866	679	1,023	8,101
General Internal Medicine	315	294	834	969	674	1,085	1,066	887	1,009	759	1,098	8,990
Pediatrics	132	117	241	369	209	484	492	264	350	306	476	3,440
Geriatric Medicine	13	11	38	43	34	45	40	48	51	33	43	399
General Surgery	76	73	212	233	158	262	252	211	241	182	271	2,171
Emergency Medicine	91	90	233	268	172	316	316	225	266	213	328	2,518
Obstetrics/Gynecology	101	108	255	307	200	373	403	258	303	257	394	2,959
Total Non-Primary Care	**1,067**	**997**	**2,829**	**3,244**	**2,232**	**3,667**	**3,578**	**2,945**	**3,349**	**2,515**	**3,649**	**30,071**
Allergy and Immunology	11	11	32	35	23	41	39	31	36	28	42	329
Anesthesiology	123	113	315	376	264	417	412	343	386	289	402	3,440
Cardiology	85	80	251	262	181	288	267	244	274	197	291	2,420
Dermatology	32	29	80	97	68	109	108	88	100	74	105	890
Endocrinology	23	21	60	71	48	81	80	63	74	59	90	670
Gastroenterology	39	37	105	117	80	133	130	105	119	91	134	1,090
Hematology & Oncology	49	44	137	149	107	165	155	142	155	107	140	1,350
Infectious Diseases	22	21	61	67	45	78	75	60	69	53	81	632
Nephrology	25	27	77	78	49	85	80	66	78	64	102	731
Neurological Surgery	15	13	36	45	31	51	50	41	48	37	53	420
Neurology	49	47	130	149	100	168	165	131	151	115	166	1,371
Ophthalmology	51	49	130	153	102	174	175	132	154	120	180	1,420
Orthopedic Surgery	68	65	179	204	138	231	227	182	208	158	231	1,891
Otolaryngology	26	24	62	76	49	88	88	64	76	59	88	700
Plastic Surgery	22	20	56	64	45	73	71	59	66	48	66	590
Psychiatry	118	115	279	354	226	420	429	292	356	296	464	3,349
Pulmonology & Critical Care	44	43	127	133	91	150	143	122	138	103	157	1,250
Radiology	111	94	291	341	263	381	370	350	371	250	319	3,141
Rheumatology	14	13	38	44	32	49	49	42	46	34	48	409
Thoracic Surgery	13	12	33	39	25	45	45	33	39	30	45	359
Urology	30	28	81	90	61	100	95	80	91	67	96	819
Vascular Surgery	9	8	27	30	22	32	30	30	33	24	35	280
Total (specialties modeled)	**1,999**	**1,898**	**5,187**	**6,033**	**4,065**	**6,920**	**6,834**	**5,340**	**6,154**	**4,732**	**6,968**	**56,129**
Specialties demand not modeled	88	83	242	270	182	308	295	245	281	212	314	2,520
Total	**2,087**	**1,981**	**5,429**	**6,303**	**4,247**	**7,228**	**7,129**	**5,585**	**6,435**	**4,944**	**7,282**	**58,649**

3. Current and Projected Physician Supply by Florida Region

Current estimated and projected future physician supply by Medicaid region is summarized in Exhibits C-1-C2 below.

Exhibit C- 1: Estimated Supply of Physicians by Specialty and Region, 2013

	Region											
Specialty	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**State**
Total Primary Care	**762**	**658**	**1,681**	**2,325**	**1,777**	**2,520**	**2,503**	**1,593**	**2,231**	**2,099**	**3,699**	**21,848**
Traditional Primary Care	**550**	**498**	**1,330**	**1,725**	**1,414**	**1,858**	**1,876**	**1,203**	**1,668**	**1,498**	**2,902**	**16,522**
General/Family Practice	249	245	486	734	487	543	703	408	434	446	844	5,579
General Internal Medicine	174	170	541	605	622	862	679	548	851	616	1,226	6,894
Pediatrics	114	70	242	349	259	401	435	201	323	371	743	3,508
Geriatric Medicine	13	13	61	37	46	52	59	46	60	65	89	541
General Surgery	48	29	79	125	60	148	117	67	103	82	159	1,017
Emergency Medicine	92	73	165	283	181	259	275	180	226	264	301	2,299
Obstetrics/Gynecology	72	58	107	192	122	255	235	143	234	255	337	2,010
Total Non-Primary Care	**643**	**492**	**1,632**	**2,070**	**1,574**	**2,558**	**2,125**	**1,678**	**2,475**	**2,048**	**3,182**	**20,478**
Allergy and Immunology	9	7	10	25	26	34	31	18	25	20	42	247
Anesthesiology	90	46	174	246	143	284	244	138	239	276	321	2,201
Cardiology	46	28	152	165	135	164	177	149	199	156	272	1,643
Dermatology	24	20	58	71	68	98	66	114	164	98	134	915
Endocrinology	3	7	22	43	27	30	49	21	51	45	76	374
Gastroenterology	23	15	79	116	69	104	92	71	124	93	131	917
Hematology & Oncology	21	13	80	85	59	112	67	50	77	64	102	730
Infectious Diseases	8	10	27	47	23	56	50	31	36	33	80	401
Nephrology	5	13	44	65	39	46	52	30	39	48	66	447
Neurological Surgery	14	7	27	37	20	42	32	31	37	20	50	317
Neurology	31	25	84	127	78	126	110	87	121	93	175	1,057
Ophthalmology	29	29	84	98	105	146	102	122	165	114	177	1,171
Orthopedic Surgery	64	38	92	131	116	154	148	116	191	147	197	1,394
Otolaryngology	19	17	36	54	36	67	52	54	71	35	69	510
Plastic Surgery	16	13	28	50	44	72	52	66	93	69	122	625
Psychiatry	61	69	157	148	133	236	181	135	196	150	353	1,819
Pulmonology & Critical Care	15	7	41	42	30	50	40	30	54	41	68	418
Radiology	62	43	163	222	157	260	212	145	215	194	237	1,910
Rheumatology	15	3	18	15	21	30	21	24	44	24	44	259
Thoracic Surgery	3	6	26	19	21	37	22	16	35	16	35	236
Urology	21	20	51	65	47	77	73	61	81	61	94	651
Vascular Surgery	7	10	16	20	18	33	23	29	17	21	37	231
Total (specialties modeled)	**1,348**	**1,104**	**3,150**	**4,216**	**3,192**	**4,778**	**4,399**	**3,131**	**4,505**	**3,917**	**6,581**	**40,321**
Specialties demand not modeled	57	46	163	179	159	300	229	140	201	230	300	2,005
Total	**1,405**	**1,150**	**3,313**	**4,395**	**3,351**	**5,078**	**4,628**	**3,271**	**4,706**	**4,147**	**6,881**	**42,326**

Exhibit C- 2: Projected Supply of Physicians by Specialty and Region, 2025

	Region											
Specialty	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**State**
Total Primary Care	**1,052**	**881**	**2,310**	**3,130**	**2,529**	**3,469**	**3,489**	**2,062**	**2,941**	**2,745**	**4,887**	**29,495**
Traditional Primary Care	**741**	**642**	**1,851**	**2,315**	**2,020**	**2,573**	**2,607**	**1,569**	**2,219**	**1,962**	**3,841**	**22,340**
General/Family Practice	315	313	611	971	672	729	919	485	554	580	1,039	7,188
General Internal Medicine	246	226	816	872	893	1,223	988	746	1,195	828	1,709	9,742
Pediatrics	165	91	337	431	404	559	627	280	418	472	990	4,774
Geriatric Medicine	15	12	87	41	51	62	73	58	52	82	103	636
General Surgery	63	63	118	155	90	210	168	100	136	101	210	1,414
Emergency Medicine	159	101	207	400	259	364	413	228	299	374	424	3,228
Obstetrics/Gynecology	89	75	134	260	160	322	301	165	287	308	412	2,513
Total Non-Primary Care	**790**	**606**	**2,065**	**2,592**	**1,897**	**3,212**	**2,630**	**2,069**	**3,028**	**2,538**	**3,748**	**25,177**
Allergy and Immunology	11	5	10	23	29	38	27	16	20	13	38	230
Anesthesiology	121	53	235	315	181	368	292	167	319	365	387	2,803
Cardiology	46	40	170	187	158	200	199	180	236	178	319	1,913
Dermatology	38	23	76	94	80	126	63	142	226	115	158	1,141
Endocrinology	7	5	36	67	49	43	75	33	80	71	104	570
Gastroenterology	27	17	95	164	78	125	111	85	151	107	142	1,102
Hematology & Oncology	23	12	103	92	65	124	75	60	84	83	112	833
Infectious Diseases	13	13	45	74	35	82	87	44	45	47	106	591
Nephrology	7	20	81	91	55	81	82	51	55	84	85	692
Neurological Surgery	25	8	37	54	38	56	44	37	65	27	75	466
Neurology	43	34	108	169	83	167	142	111	135	121	218	1,331
Ophthalmology	27	31	92	103	106	164	125	144	164	115	178	1,249
Orthopedic Surgery	73	52	102	141	130	192	174	145	228	171	236	1,644
Otolaryngology	26	19	40	63	45	70	69	56	91	46	84	609
Plastic Surgery	20	19	38	60	43	75	62	80	114	82	140	733
Psychiatry	77	79	206	168	152	300	191	174	225	181	375	2,128
Pulmonology & Critical Care	14	8	50	53	34	48	42	40	72	65	83	509
Radiology	69	56	209	300	213	339	272	178	276	236	313	2,461
Rheumatology	14	4	16	18	25	30	19	31	46	25	52	280
Thoracic Surgery	3	9	30	21	24	35	29	21	30	16	40	258
Urology	25	24	68	63	53	97	87	67	90	60	89	723
Vascular Surgery	10	12	24	28	20	36	37	33	26	19	45	290
Total (specialties modeled)	**1,771**	**1,424**	**4,181**	**5,478**	**4,225**	**6,265**	**5,793**	**3,957**	**5,719**	**4,972**	**8,266**	**52,051**
Specialties demand not modeled	71	63	194	244	201	416	326	174	250	311	369	2,621
Total	**1,842**	**1,487**	**4,375**	**5,722**	**4,426**	**6,681**	**6,119**	**4,131**	**5,969**	**5,283**	**8,635**	**54,672**

VII. Technical Appendix: Data and Methods

This study used a Healthcare Demand Microsimulation Model (HDMM) to estimate current and future demand for health care services and providers, and a Health Workforce Supply Model (HWSM) to forecast future supply. Both models use a microsimulation approach, where a person is the unit of analysis. Additional information about these models and model validation activities has been published elsewhere.[26] This appendix provides additional detail on how the model was adapted for Florida.

1. Physician Demand Modeling

As depicted in Exhibit D-1, the major components of the demand model include: 1) a population database that contains characteristics and health risk factors for a representative sample of the population in Florida, 2) equations based on national data that relate a person's characteristics to his or her demand for healthcare services by care delivery setting, and 3) national care delivery patterns that convert demand for healthcare services to demand for FTE physicians. While the HDMM simulates demand for health care services across the health care system, for purposes of physician workforce modeling the relevant settings are physician offices, outpatient clinics, hospital emergency departments, and hospital inpatient settings.

The forecasting equations and staffing patterns are based on national data, while the population database was constructed to be representative of the population in Florida. Applying the model to Florida, therefore, produces estimates of demand for providers if people in Florida were to receive a level of care consistent with the national average—but adjusting for differences between Florida and the nation in health and economic factors that affect demand for health care services.

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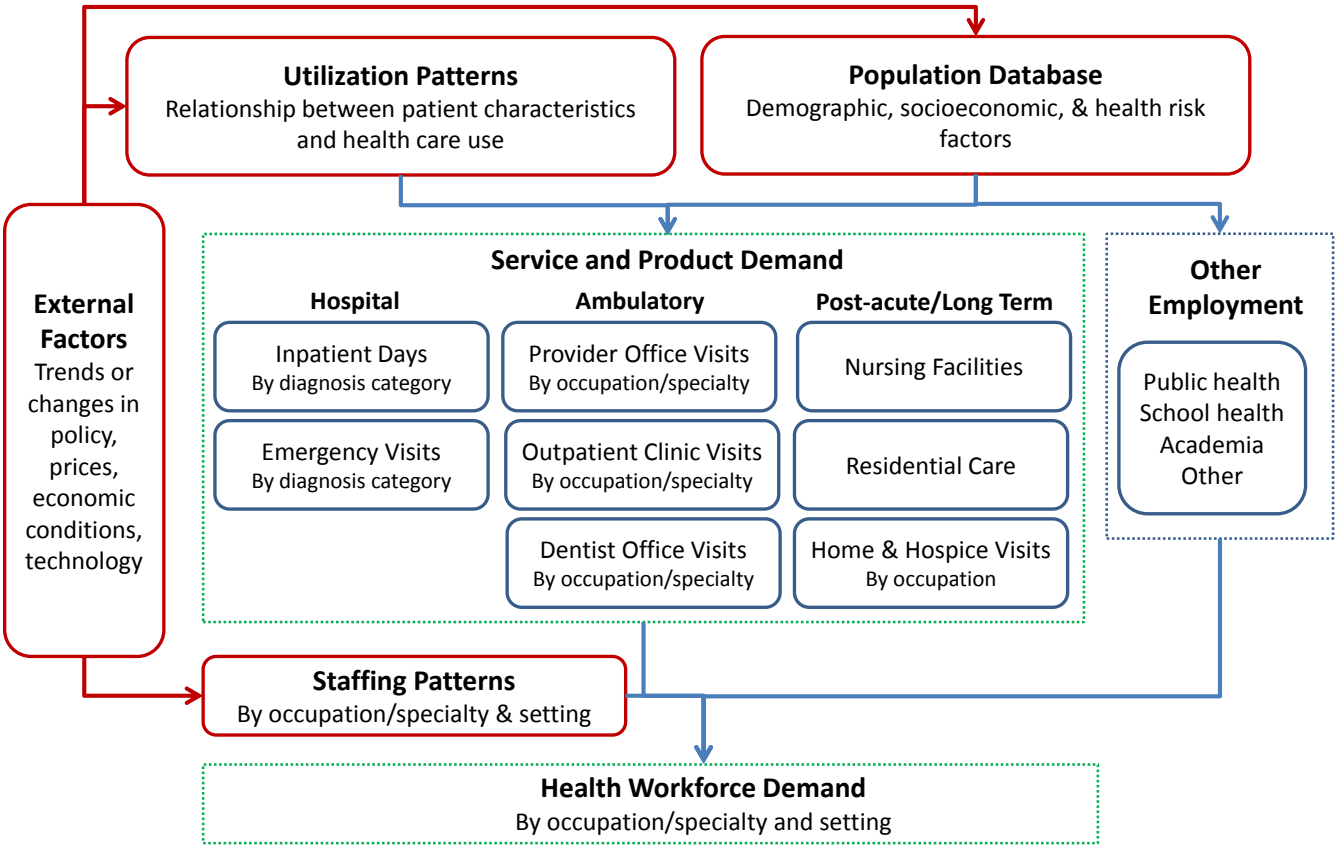
[26] Dall TM, Gallo PD, Chakrabarti R, West T, Semilla AP, Storm, MV. An Aging Population and Growing Disease Burden Will Require A Large and Specialized Health Care Workforce By 2025. *Health Affairs*. 2013; 32:2013-2020. http://content.healthaffairs.org/content/32/11/2013.abstract

Dall TM, Chakrabarti R, Storm MV, Elwell EC, and Rayburn WF. Estimated Demand for Women's Health Services by 2020. *Journal of Women's Health*. 2013; 22(7): 643-8. http://www.ncbi.nlm.nih.gov/pubmed/23829185

Dall TM, Storm MV, and Chakrabarti R. Supply and demand analysis of the current and future US neurology workforce. *Neurology*. 2013; 81(5): 470-478. http://www.neurology.org/content/early/2013/04/17/WNL.0b013e318294b1cf.short

Exhibit D- 1: Health Care Demand Microsimulation Model Overview



a) Creating the Florida Population Database

The demand model contains health, demographic, and socioeconomic characteristics for each person in a stratified random sample of the state's population. The database was populated with information for Florida gathered from the United States Census Bureau's 2012 American Community Survey (ACS), and the 2011 and 2012 Centers for Disease Control and Prevention's Behavioral Risk Factor Surveillance System (BRFSS) files. Information from the 2004 National Nursing Home Survey (NNHS) is also used in the model.

Information for each individual in this population database used to model demand for health care services includes:

- Demographics
  - Age group (0-2, 3-5, 6-13, 14-17 years for children; 18-34, 35-44, 45-64, 65-74, 75+ years for adults)
  - Sex

  - Race/ethnicity (non-Hispanic white, non-Hispanic black, non-Hispanic other, Hispanic)
- Health-related lifestyle indicators
  - Body weight status (unknown, normal, overweight, obese)
  - Current smoker status
- Socioeconomic conditions
  - Household annual income (<$10,000, $10,000 to <$15,000, $15,000 to < $20,000, $20,000 to < $25,000, $25,000 to < $35,000, $35,000 to < $50, 000, $50,000 to < $75,000, $75,000+)
  - Medical insurance type (private, public, self-pay)
- Chronic conditions
  - Diagnosed with arthritis, asthma, cardiovascular disease, diabetes, or hypertension
  - History of heart attack, or history of stroke
- Geographic location
  - Living in a metropolitan area

Creating a representative population sample for Florida involved the following steps:

1. We first employed a statistical matching process that combined (1) socioeconomic data from approximately 3 million people in the 2012 ACS, (2) health risk factors and chronic conditions from over 1 million people in the combined 2011 and 2012 files of the BRFSS which covers the non-institutionalized population, and (3) health data from approximately 16,000 nursing home residents in the 2004 NNHS. Use of data on nursing home residents is important because this institutionalized population has poorer health and different health care use patterns compared to their peers living in the community.

   Using information on residence type, we divided the ACS population in Florida into those in nursing facilities to be matched to people in the NNHS, and those not in nursing facilities to be matched to people in the BRFSS. For the non-institutionalized population, each ACS individual in Florida was randomly matched with someone in the BRFSS from Florida with the same sex, age (15 age groups used), race/ethnicity, insured/uninsured status, and household income level (8 income levels used).

   Individuals categorized as residing in a nursing home were randomly matched to a person in the NNHS in the same age group, sex and race-ethnicity strata. The final matched ACS-BRFSS-NNHS database includes a sample weight for each person. This weight reflects the number of people he or she represents among the general population. Applying the sample weights to this population produces estimates for the population in Florida in 2012.

   Using population estimates and projections from the University of Florida, we recalibrated the sample weights in the ACS-BRFSS-NNHS matched population file, by demographic, such that the sum of the sample weights were consistent with population projections for each

year through 2025 by age, sex, and race/ethnicity.[27] This process created a health and socioeconomic profile for each individual in a representative sample of the State's population.

b) Developing Health Care Use Forecasting Equations

Patterns of health seeking behavior were generated by regression analysis using data from approximately 169,000 participants in the pooled 2007-2011 files of the Medical Expenditure Panel Survey (MEPS). There are several hundred prediction equations in the simulation model. We estimated each equation using either Poisson regression (to model annual number of physician office and outpatient visits with a particular provider type); or using logistic regression (to model annual probability of hospitalization or emergency department visit for one of approximately 30 diagnosis categories (e.g., hospitalization for a cardiovascular condition). The dependent variable reflected annual use of health care services, while the explanatory variables consisted of the demographic characteristics, health risk factors, medical conditions, and socioeconomic factors described previously. We pooled multiple years of data to provide a sufficient sample size for regression analysis. Applying the health forecasting equations estimated through regression analysis to the population data described above provided projections of health care use by care delivery setting and type of care provided.

An example of the regressions is provided in Exhibit D-2 where findings are presented for adult cardiology services. Controlling for patient characteristics, men had 13% more office visits and 61% more outpatient visits to a cardiologist relative to women. People categorized as non-Hispanic other race and non-Hispanic white had similar patterns for cardiology-related ambulatory services. Hispanics had only 86% as many office visits and non-Hispanic blacks had only 79% as many office visits as the comparison group (non-Hispanic other race). Use of cardiology services is highly correlated with older age. The presence of endocrine and cardiovascular conditions is correlated with significantly higher use of cardiology services.

Applying the prediction equations to the current and projected future population in Florida produced estimates of the growth in demand for health care services by specialty and care delivery setting (Exhibit D-3). For primary care specialties, the growth estimates for care delivered in hospital inpatient settings represents potential growth in hospital rounds. Florida's licensure database, similar to the American Medical Association Masterfile, lists few physicians as hospitalists. A large portion of these physicians are trained as general internists or other specialties, and both the supply and demand projections list these physicians by their trained specialty.

[27] All Races Population Projections by Age and Sex for Florida and Its Counties, 2015–2040, With Estimates for 2012, Bureau of Economics and Business Research, University of Florida, June 2013.

Exhibit D- 2: Health Care Use Regression Example (Adult Cardiology Services)

	Parameter	Office Visits [a]	Outpatient Visits [a]	Emergency Visits [b]	Hospitalization [b]
Race-Ethnicity	Hispanic	0.86 **	0.63 **	0.93	0.84 **
	Non-Hispanic black	0.79 **	1.68 **	1.34 **	1.31 **
	Non-Hispanic white	1.04	1.04	0.88 **	0.97
	Non-Hispanic other race	1.00	1.00	1.00	1.00
	Male	1.13 **	1.61 **	0.89 *	0.98
Age	18-34 years	0.11 **	0.11 **	0.53 **	0.35 **
	35-44 years	0.25 **	0.47 **	0.94	0.74 **
	45-64 years	0.51 **	0.67 **	1.14 **	1.20 **
	65-74 years	0.83 **	1.18 **	1.23 **	1.64 **
	75+ years	1.00	1.00	1.00	1.00
	Current smoker	0.81 **	0.71 **	1.06	1.03
Diagnosed with	Hypertension	1.66 **	1.53 **	3.41 **	2.24 **
	Coronary heart disease	8.83 **	8.59 **	2.96 **	4.20 **
	History of heart attack	1.58 **	2.00 **	2.58 **	2.58 **
	History of stroke	1.09 **	0.79 **	2.87 **	3.15 **
	Diabetes	1.19 **	1.50 **	1.02	1.24 **
	Arthritis	1.06 **	1.48 **	0.98	0.95
	Asthma	1.08 **	1.08 **	1.12	1.12
	History of cancer	1.16 **	0.83 **	0.89	0.91
	Insured	2.10 **	1.62 **	0.86	1.10
	Medicaid	1.27 **	1.47 **	1.56 **	1.58
Household Income	<$10,000	0.91 **	0.76 **	1.29 **	1.20 **
	$10,000 to <$15,000	0.92 **	0.63 **	1.16 *	1.23 **
	$15,000 to < $20,000	0.86 **	0.86 **	0.88	0.99
	$20,000 to < $25,000	0.98	0.47 **	1.17 *	1.05
	$25,000 to < $35,000	0.88 **	0.80 **	1.18 **	1.03
	$35,000 to < $50,000	1.03	0.77 **	0.91	0.94
	$50,000 to < $75,000	0.98	0.90 **	0.82 **	0.85 **
	$75,000 or higher	1.00	1.00	1.00	1.00
Body Weig	Normal	0.96 **	1.00	0.85 **	0.78 **
	Obese	1.05 **	0.74 **	0.91 *	0.96 *
	Overweight	1.00	1.00		
	Metro Area	1.29 **	1.00	1.05	0.92

[a] Rate ratios estimated by Poisson regression using annual visits as the dependent variable. [b] Odds ratios estimated by logistic regression using any emergency visit or hospitalization where the primary ICD-9 diagnosis code indicated a cardiovascular condition as the primary diagnosis. * Indicates statistically significant at the 0.05 level. ** Indicates statistically significant at the 0.01 level.

Exhibit D- 3: Projected Growth in Service Demand from Changing Demographics, 2013-2025

Specialty	Hospital Inpatient	Hospital ED	Physician Office	Outpatient
Allergy & Infectious Diseases	30%	15%	17%	20%
Cardiology	30%	22%	24%	24%
Dermatology	26%		20%	20%
Endocrinology	30%	23%	25%	21%
Gastroenterology	25%	17%	20%	18%
General & Family Medicine	26%		19%	19%
General Internal Medicine	27%		21%	21%
General Surgery	27%	16%	21%	19%
Geriatrics	40%		42%	42%
Hematology & Oncology	24%	19%	22%	21%
Nephrology	35%		24%	23%
Neurological Surgery	23%			
Neurology	27%	18%	20%	18%
Obstetrics & Gynecology	14%	17%	17%	19%
Ophthalmology	24%	18%	19%	18%
Orthopedic Surgery	29%	17%	20%	16%
Otolaryngology	23%	14%	18%	17%
Pediatrics	14%		11%	12%
Physical Medicine & Rehab	27%		18%	21%
Plastic Surgery	19%	16%	19%	22%
Psychiatry	18%	16%	17%	15%
Pulmonology	30%	17%	20%	20%
Rheumatology	27%	19%	23%	25%
Thoracic Surgery	26%	18%	20%	11%
Urology	26%	18%	21%	22%
Vascular Surgery	32%			
Total	**27%**	**17%**	**19%**	**20%**

c) FTE Physician Staffing to Meet Demand for Health Care Services

The number and mix of physicians by specialty required to provide the level of health care services demanded is influenced by how the care system is organized and care is reimbursed, provider scope of practice requirements, economic constraints, technology, and other factors. To convert projected demand for services into demand for physicians we determined how each unit of service demanded (e.g., psychiatrist office visits, hospital inpatient days) translates into

demand for a partial FTE provider (i.e., the fraction of an FTE provider's time to provide care during that one patient encounter).

Demand for psychiatrists, for example, was linked to projected numbers of office and outpatient visits to a psychiatrist, and emergency department visits and hospitalizations requiring psychiatry related services and procedures (e.g., ICD-9 CM codes 290-319). The demand estimates provided in this report are based on the current care delivery model and do not reflect emerging care delivery models.

Data on provider productivity to estimate the portion of a physician FTE associated with patient encounters in different care settings came from numerous sources—including the Medical Group Management Association's Physician Compensation and Production Survey, the American Board of Internal Medicine (ABIM) Practice Characteristics Survey, surveys and workforce studies conducted for individual medical specialties.

The following examples illustrate how provider demand varies by patient characteristics:

- The population of non-Hispanic, black, females, age 75+, insured, obese, and with diabetes and hypertension requires about 26 FTE providers in traditional primary care specialties (family practice, internal medicine, geriatric medicine) per 10,000 population.
- The population of non-Hispanic, black, females, age 75+, insured, normal weight, without diabetes or hypertension requires about 8.6 FTE primary care providers per 10,000 population.
- The population of non-Hispanic, black, females, age 18-34, insured, normal weight, without diabetes or hypertension requires about 2.4 FTE primary care providers per 10,000 population.

These estimates are based on patterns of how patient health risk factors affect the level health care services by medical specialty and care delivery setting, and how the health care system is currently staffed to meet the demand for services.

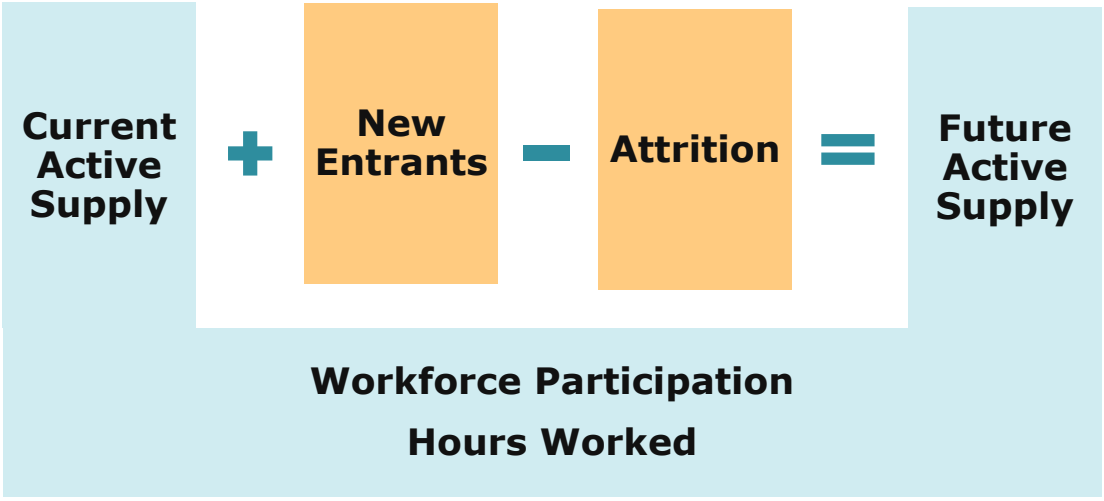
2. Modeling Supply of Florida Physician Specialties

The conceptual framework for modeling the future supply of physicians (Exhibit D-4) starts with the current workforce, adds new entrants, and subtracts those leaving due to retirement or out-of-state migration to arrive at next year's supply. The level of workforce participation for each physician is then modeled as a function of his or her age, gender, and specialty.

The primary data source for supply is the 2012 and 2013 physician licensure data furnished by the Florida Department of Health. This data is collected as part of the biannual physician renewal application process. The file contains information on all physicians licensed and active in providing patient care in Florida. Information on this list (including self-reported medical specialty) was compared to the American Medical Association's specialty codes to help group physicians by specialty category.

The mechanism for adding new entrants to the workforce is done via the creation of a "synthetic" population. This population is created such that the age, gender, and specialty distribution for each new cohort of providers reflects the demographic and specialty distribution seen in recent years. For each year from 2013 through 2025, "representative" physicians are created by the model to represent each new physician entering the Florida workforce. Each new physician is assigned an age, gender, and specialty that reflect current distributions for newly licensed physicians in Florida.

Exhibit D- 4: Conceptual Model for Health Workforce Supply



a) Patient Care Hours Worked

Supply projections reflect the changing demographic composition of Florida's physician workforce, and that hours worked differ by physician age, gender, and specialty. With survey data collected during the licensure process, we used ordinary least squares regression analysis to analyzed hours per week engaged in patient care activities. We limited our analysis to the 18,016 physicians who in 2012-2013 reported direct patient care hours worked per week, and we limited the analysis to physicians working at least 8 hours per week in professional activities.

As shown in Exhibit D-5, hours worked patterns differed systematically by specialty. Compared to vascular surgery (the comparison specialty), physicians in allergy & immunology and in dermatology work about 11 fewer patient care hours per week. Physicians in cardiology, obstetrics & gynecology, and many of the surgical specialties have about the same number of patient care hours per week as vascular surgeons. From age 55 onward, patient care hours per week start to decline. Female physicians tend to work about 3.3 hours fewer per week in patient care activities compared to their male peers (and controlling for specialty and age). Women under age 55 work about 5 hours per week less than their male peers, while women over age 55 work about 2 hours per week less than their male peers.

Exhibit D- 5: OLS Regression of Weekly Patient Care Hours Worked

	Parameter (Hours)	Probability
Intercept	49.5	<.0001
Specialty (Vascular Surgery is reference category)		
Allergy & Immunology	(11.0)	<.0001
Anesthesiology	(2.6)	0.099
Cardiology	0.5	0.739
Colon & Rectal Surgery	(0.9)	0.726
Critical Care Medicine	(0.8)	0.720
Dermatology	(10.8)	<.0001
Emergency Medicine	(10.6)	<.0001
Endocrinology	(3.7)	0.051
Gastroenterology	(0.8)	0.614
General & Family Practice	(6.9)	<.0001
General Internal Medicine	(3.5)	0.022
General Surgery	0.5	0.775
Geriatric Medicine	(6.7)	0.000
Hematology & Oncology	(1.3)	0.452
Infectious Diseases	(2.4)	0.194
Neonatal & Perinatal Medicine	4.8	0.143
Nephrology	2.7	0.129
Neurological Surgery	1.5	0.446
Neurology	(3.9)	0.019
Obstetrics & Gynecology	(1.4)	0.392
Ophthalmology	(8.8)	<.0001
Orthopedic Surgery	(3.7)	0.022
Otolaryngology	(5.4)	0.003
Pathology	(8.3)	<.0001
Pediatrics	(6.8)	<.0001
Physical Medicine & Rehab	(6.5)	0.001
Plastic Surgery	(7.8)	<.0001
Preventive Medicine	(14.2)	<.0001
Psychiatry	(8.1)	<.0001
Pulmonology	3.0	0.085
Radiation Oncology	(6.0)	0.002
Radiology	(5.4)	0.001
Rheumatology	(3.4)	0.087
Thoracic Surgery	1.7	0.413
Urology	(0.5)	0.769
Age (<40 is reference category)		
Age 40 to 44	0.3	0.615
Age 45 to 49	0.2	0.777
Age 50 to 54	0.6	0.290
Age 55 to 59	(0.4)	0.390
Age 60 to 64	(1.7)	0.001
Age 65 to 69	(5.5)	<.0001
Age 70+	(11.4)	<.0001
Female	(3.3)	<.0001
Female x Age 40 to 44	(1.9)	0.030
Female x Age 45 to 49	(1.8)	0.046
Female x Age 50 to 54	(1.4)	0.119
Female x Age 55 to 59	1.6	0.077
Female x Age 60 to 64	0.6	0.530
Female x Age 65 to 69	1.4	0.294
Female x Age 70+	4.1	0.010
Summary statistics: n=18,016; R^2=0.101; Mean hours worked=42.5		

b) Attrition

The supply model uses age-sex-specialty dependent annual attrition probabilities to simulate providers leaving the workforce. These attrition probabilities were created by summing (1) the probability of leaving the workforce due to career change or retirement, and (2) mortality probability. The model simulates whether a particular physician will remain in the workforce each year by generating a random number which is compared to the probability of retirement for a physician of his or her age, sex, and specialty.

Retirement patterns generated using the combined 2012 and 2013 Florida Physician Workforce Surveys are based on response to the question of whether the respondent plans to retire within the next five years. These responses were generally consistent with historical retirement patterns generated from analysis of a 2006 survey of physicians age 50 and older conducted by the Association of American Medical Colleges.[28] Included among this AAMC survey sample was a population of retired physicians who were asked at what age they retired.

Mortality rates by age and sex come from the Centers for Disease Control and Prevention. The rates used in the HWSM take into consideration that people in professional occupations tend to have lower mortality rates through age 65 as compared to national average mortality rates for men and women. Johnson et al. estimate age-adjusted mortality rates for professional and technical occupations are approximately 25% lower than national rates for men and 15% lower for women.[29]

Exhibit D-6 shows results of this analysis for male physicians, summarizing how many physicians are likely to still be in the workforce from an initial cohort of 100 physicians age 50. (Patterns for female physicians are similar.) For example, a cohort of 100 physicians in allergy & immunology will have about 68 still in active practice by age 65 and 45 still in practice by age 70. Emergency physicians have a much higher attrition rate. From a cohort of 100 emergency physicians age 50, only 47 are still active at age 65 and 23 are still active at age 70 (with many in this older age working reduced hours).

Specialties with the lowest attrition rates are allergy & immunology, cardiology, thoracic surgery, and gastroenterology. Specialties with the highest attrition rates are emergency medicine, anesthesiology, radiology, and general surgery.

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[28] These retirement patterns have been used to develop U.S. physician supply projections. See, for example,

Dill MJ and Salsberg ES. *The Complexities of Physician Supply and Demand: Projections through 2025*. Association of American Medical Colleges, November 2008.

U.S. Department of Health and Human Services. *The Physician Workforce: Projections and Research into Current Issues Affecting Supply and Demand.* 2008.

[29] Johnson NJ, Sorlie PD, Backlund E. The Impact of Specific Occupation on Mortality in the U.S. National Longitudinal Mortality Study. *Demography*. 1999;36(3):355-367.

Exhibit D- 6: Male Physician Retirement Patterns by Specialty and Age Cohort