

Expanding Primary Care in Oklahoma: OSU Center for Health Sciences Responds

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Abstract

The Oklahoma State University (OSU) Center for Health Sciences (OSU-CHS) has undertaken aggressive initiatives over the past 60 months to close the gap between the current physician supply and the overwhelming need for access in rural and underserved Oklahoma. These initiatives focused on three primary objectives: 1) creating a rural education pipeline into the OSU medical school, 2) expanding the number of students in the OSU medical school and 3) providing more residency training opportunities in primary care for the state of Oklahoma. In furtherance of these objectives, OSU-CHS created programs to educate middle school and high school students on careers in medicine and biomedical sciences. The institution implemented early admission partnerships with undergraduate institutions across the state to allow qualified students to gain early admission into the medical school. Additionally, specific programs were implemented to attract and recruit American Indian students to the physician training program. In order to accommodate the increased student pipeline, the number of seats in the medical school was increased dramatically, including the establishment of a tribal-affiliated, additional location campus. Finally, new primary care residency programs were initiated in cooperation with community hospitals to allow residents to be trained in rural settings.

Introduction

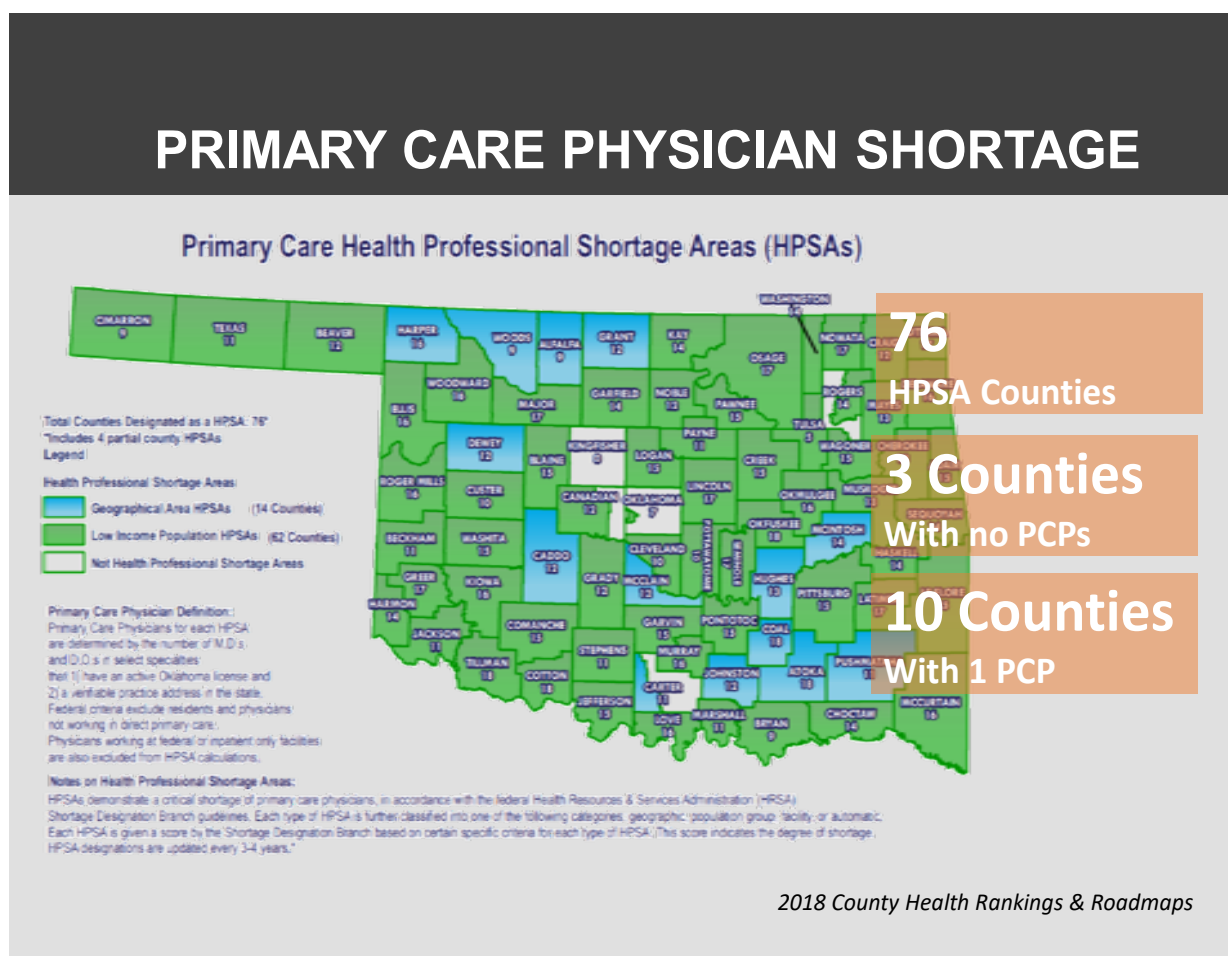
Over the past decade a great deal of attention has been focused on the declining number of primary care physicians and the restricted pipeline of new physicians entering practice. To meet the projected patient need in 2025, the primary care workforce needs to grow by nearly 24,000 new physicians.¹ Predominately rural states like Oklahoma, where nearly every county is designated a primary care Health Professional Shortage Area, are poised to be the hardest hit. The current shortage of providers in Oklahoma is expected to increase by 54% to a deficit of 830 by 2025.¹

Critical Needs of Oklahoma

Securing primary care physicians for practice in underserved areas has been a matter of public policy development within Oklahoma for more than three decades. The Physician Manpower Training Commission (PMTTC), created by statute in 1975, has statutory responsibility for the placement of practitioners across the state, particularly in communities with less than 10,000 in population. The Commission provides scholarships and loans to attract, recruit and retain medical students, residents and physicians to underserved areas across the state. Given the relatively small amount of funding received, PMTC has performed exceptionally in the placement of physicians practicing in non-urban settings.

The Health Resources and Services Administration (HRSA), a division of the U.S. Department of Health and Human Services, categorizes communities and counties within the country as being medically underserved. The medically underserved designation is based upon a calculation of four variables, a) the ratio of primary medical care physicians per 1,000 of population, b) the infant mortality rate, c) the percentage of the population with incomes below the poverty level and d) the percentage of the population age 65 or over.² The value of each of these variables for the service area is converted to a weighted value, according to the established criteria. The four values are then summed to obtain the area's medically underserved score. Not surprisingly, the HRSA data bank classifies 76 of Oklahoma's 77 counties as medically underserved populations.² Figure 1 graphically details the prevalence of the physician shortage within the state.

Figure 1 – Primary Care Health Professional Shortage Areas



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Comparing Oklahoma's number of active physicians to that of other states reveals a significant disparity. According to comprehensive data collected by the AAMC, Oklahoma ranks 45th among all states in the number of active physicians (all specialties) per 100,000 of population.³ Specifically, while the national average is 237 physicians per 100,000 of population, Oklahoma has only 189.³ The number of primary care physicians available is perhaps the best measure of patient accessibility. The national average is 83 primary care physicians per 100,000 of

population.³ Oklahoma currently ranks 45th among the states with 70 primary care physicians per 100,000 of population.³

Table 1 below compares the number of active physicians in Oklahoma to the national average for all specialties and primary care, as well as the primary care patient load.

Table 1 –Physician Supply: National Averages Compared toOklahoma³

Oklahoma vs. National Average	Active Physicians Per 100,000 Population (All Specialties)	Active Physicians Per 100,000 Population (Primary Care)	Patients Per Primary Care Physician
National Avg.	237	83	1,090
Oklahoma	189	70	1,328

Aging Physician Population

Further exacerbating Oklahoma’s health care access circumstance, is the demographic reality of the aging of the existing physician population. Many states experiencing primary care shortages are also faced with the dilemma of their existing physician pool shrinking due to retirements. This condition is occurring simultaneously with the baby boomers becoming Medicare eligible, a perfect storm if-you-will. ***Greater than one of every three physicians in Oklahoma is over 60 years of age.***³ This condition, coupled with an already shallow pool of practicing physicians, creates a crisis of care that may very well be the greatest social and economic issue of our time.

Methods

The OSU Center for Health Sciences (OSU-CHS) has undertaken aggressive initiatives over the past 60 months to close the gap between the current physician supply and the overwhelming need for access in rural and underserved Oklahoma. These initiatives focused on three primary objectives: 1) creating a rural education pipeline into the OSU medical school, 2) expanding the number of students in the OSU medical school and 3) providing more residency training opportunities in primary care.

In furtherance of these objectives, OSU-CHS created programs to educate middle school and high school students on careers in medicine and biomedical sciences. The institution implemented early admission partnerships with undergraduate institutions across the state to allow qualified students to gain early admission into the medical school. Additionally, specific programs were implemented to attract and recruit American Indian students to the physician training program. In order to accommodate the increased student pipeline, the number of seats in the medical school was increased dramatically, including the establishment of a tribal affiliated branch campus. Finally, new primary care residency programs were initiated in cooperation with community hospitals to allow residents to be trained in rural settings.

Results

Early in 2012, the administration of OSU-CHS made a critical observation that not enough rural Oklahoma middle and high school students were drawn to medicine and biomedical sciences as a career option. The logical extension of this observation was that in the absence of altering this

trend, the ability to produce more primary physicians would be significantly curtailed. Thus to create a more robust educational pipeline, OSU-CHS initiated a number of efforts to attract rural Oklahoma students to medicine earlier in their academic career.

Operation Orange Traveling Camp

OSU-CHS launched the Operation Orange Traveling Camp in June 2013. A day-long summer camp with the goal of increasing interest in medicine and science among middle and high school students, Operation Orange is held in various rural communities across the state and targets students of diverse racial/ethnic backgrounds. Hands-on activities range from suturing to intubating a practice mannequin, as well as providing an educational experience around anatomy fundamentals using a human heart, lung and brain. OSU-CHS medical students and faculty lead demonstrations and answer questions about life as a medical student and the field of osteopathic medicine. In 2017, two new camps were designed in collaboration with and sponsored by the Cherokee and Choctaw Nations to attract American Indian students to the field of medicine. Camps occurred in tribal headquarter communities and tribal chiefs gave the opening keynote address at their respective camps.

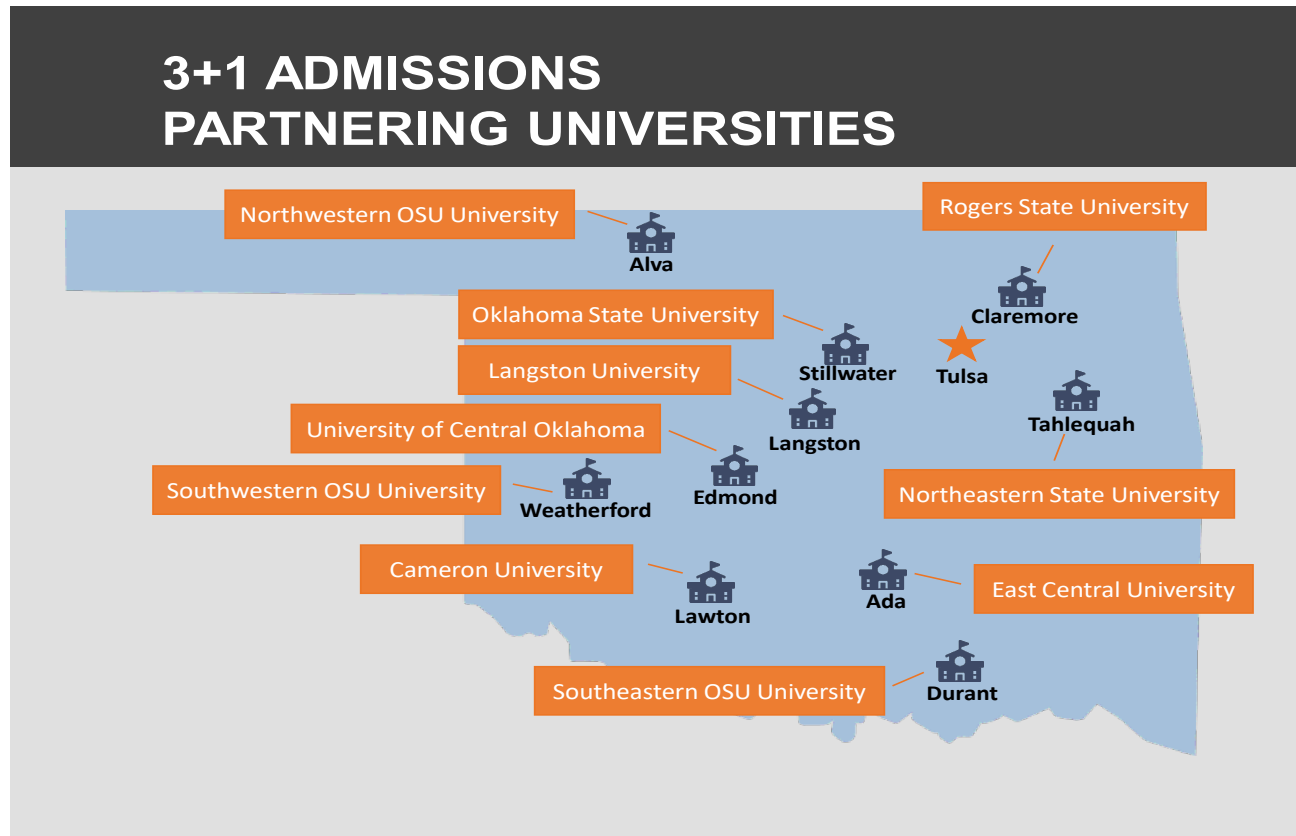
Blue Coat to White Coat

School systems and communities in rural Oklahoma have a long history of active participation in the Future Farmers of America (FFA) organization. The ubiquitous presence of this organization is readily recognized by the blue corduroy jackets worn proudly by its members. Originally formed to encourage rural students to consider careers in agriculture, FFA has transformed in to a broader leadership development program. However, the mission of retaining the best and brightest minds for rural communities has never wavered. Recognizing the similarities in its mission with FFA, the OSU-CHS administration saw the importance of the FFA organization as an early recruiting tool to address the rural primary care physician shortage. The Blue Coat to White Coat initiative educates FFA members on careers in medical sciences and encourages them to pursue primary care as a discipline. This effort has paid huge dividends in that 11% of the current medical school entering class (Fall 2018) are former FFA members.

Early Admission Partnerships

To actively engage talented college undergraduate students, OSU-CHS implemented early admission partnerships with undergraduate institutions across the state to recruit qualified students to enter medical school after accumulating 90 credit hours. Under the guidelines of this program, early admission students matriculate to the medical school after their junior year. The first year of the medical school curriculum is then counted as the coursework for the senior year of undergraduate curriculum, thereby granting the completion of the baccalaureate degree. This cooperative agreement between the undergraduate institutions and OSU-CHS shortens the physician preparation timeline by a full year. Figure 2 details the breadth of this initiative across the state higher education system.

Figure 2 – Early Admissions Partner Institutions



Tribal Affiliations

Despite decades-long efforts to diversify the physician workforce and better mirror population demographics,^{5,6} considerable gaps remain, particularly among American Indian and Alaska Native populations, collectively referred to herein as American Indian(s). While national data specific to American Indian osteopathic physicians is not available, the Association of American Medical Colleges reported in 2013, the most recent timeframe available, that an estimated 0.4% of M.D.s nationwide and 4.3% of Oklahoma’s M.D.s were American Indian.⁷ In comparison, from 2012 to 2016, approximately 2% of the U.S. population and 13% of Oklahomans identified as American Indian alone or in combination with another race.⁸ Of the nation’s total American Indian population, approximately 10% reside in Oklahoma.⁸

Through partnerships with tribal nations, OSU-CHS launched several American Indian outreach efforts targeting middle school students to undergraduates to introduce them to careers in medicine and biomedical sciences. To prioritize American Indian student recruitment, OSU-CHS established the Office for American Indians in Medicine and Science (OAIMS) in June 2014. OAIMS is guided by four goals: (1) recruit and train American Indian students in medicine and science; (2) increase the number of American Indian students pursuing careers as physicians, scientists and educators; (3) address OSU-CHS American Indian student enrollment and retention efforts; and (4) coordinate relationships between OSU-CHS and Oklahoma tribes to address tribal health and wellness needs. The OAIMS is working with 12 federally recognized tribes headquartered in Oklahoma to provide pre-medical and science programs for their citizens at all academic levels.

The OAIMS also supports four distinct American Indian pipeline programs: (1) Native Explorers, (2) Native OKstars, (3) Operation Orange Traveling Camp, and (4) Dr. Pete's Medical Immersion Camp. The programs were created in partnership with the state's four largest tribal nations: Cherokee, Choctaw, Muscogee (Creek) and Chickasaw.

The OSU-CHS and OSU-COM administration and staff contributing to program development included the president and dean of osteopathic medicine; provost, senior associate dean for academic affairs, and associate dean for rural health; associate deans for enrollment management and biomedical sciences; and director of outreach and special events. The four programs share the following goals: (1) recruit geographically diverse cohorts that represent Oklahoma's tribal nations; (2) incorporate American Indian cultural traditions and history into activities; (3) encourage participant interactions with undergraduate medical and graduate students; (4) provide information about applying for college and strategies for success; and (5) help participants identify educational objectives and paths forward. Financial support from multiple sources, including tribal nations (see the disclosures section below) allows OSU-CHS to offer these programs free for participants.

Native Explorers Program

Before the formal creation of OAIMS, the Native Explorers (NE) program came into existence in 2010. Native traditions and culture are an integral part of Native Explorers, which exposes American Indian college students to careers in science and medicine. Each year, 10 to 12 American Indian undergraduates are selected from a nationwide pool of applicants. Activities begin on the OSU-COM campus where students learn about anatomy, osteopathic medicine, healthy lifestyles and paleontology through a variety of hands-on activities. Native Explorers' primary activities are field experiences that introduce American Indian students to the scientific method and traditional ways. At active paleontological field sites across the west, participants work side-by-side with research scientists from OSU-CHS, other universities, and research-based museums to learn how to prospect for and collect vertebrate fossils, explore the natural history of the region, and gain an appreciation for the culture of the region's present and past inhabitants.

Native Explorers' successes are due in part to its professional partners, which include archeologists, geologists and biologists from the U.S. Forest Service, Bureau of Land Management, and Oklahoma Department of Wildlife Conservation. The program aims to profoundly influence participants' professional trajectories, inspiring an appreciation of the natural sciences and tying the meaningfulness of scientific careers to stewardship and an understanding of the natural world central to many American Indian beliefs. Participants receive three hours of upper-level undergraduate college credit through OSU. Native Explorers is free to all participants.

Native OKstars

In the summer of 2014, OSU-COM launched Native OKstars (Oklahoma Science Training and Research Students), a seven week non-residential research internship for promising American Indian high school juniors and seniors. The program emerged from a lack of American Indian student participation in OSU-CHS' inaugural OKstars program in 2013. Native OKstars operates concurrently with OKstars and serves 5 to 10 American Indian students each summer. Both programs were designed to address issues related to low self-efficacy and lack of peer/mentor support as contributing factors to high attrition.⁹ As research participation has been found to increase persistence in STEM and medical fields,¹⁰ peer and faculty-mentored biomedical research is fundamental to both programs. Participants are recruited through presentations made at high schools in areas with large American Indian populations and outreach by tribal partners. Selection

criteria include a 3.0 minimum grade point average, demonstrated interest in biology, and a short essay describing how participation would contribute to their career goals.

Native OKstars participants are paired with a second-year American Indian medical student; each pair is mentored by an American Indian faculty member. Participants select a disease or disorder relevant to their tribe. In the laboratory, students observe the anatomy associated with their project on prosected cadaveric specimens. Through daily interaction with medical students, American Indian students benefit from first-person perspectives on the various paths to and realities of medical school and reasons for pursuing osteopathic medicine. Participants meet twice weekly for a group lunch with discussions about successful life transitions, strategies for success in college, medicine and science career opportunities, and pathways to medical school. Students present their research to peers and OSU-COM faculty and administration at the end of the internship and are invited to present their work at the OSU-CHS Research Day and other local conferences.

Dr. Pete's Medical Immersion Camp

The newest of OSU-COM's American Indian outreach programs, Dr. Pete's Medical Immersion Camp began in the summer of 2017. High school participants spend three days on the OSU-CHS campus and participate in hospital simulation exercises, shadow a physician in OSU-CHS clinics, take a behind-the-scenes tour of OSU Medical Center, and learn from OSU-CHS faculty members through lectures and seminars. Although not exclusively dedicated to American Indian students, targeted efforts are made to recruit these students.

All of the aforementioned efforts, coupled with the development of strategic relationships, led the OSU-CHS administration to the concept of a tribal affiliated medical school. This vision was realized in the fall of 2018 with the announcement of the nation's first tribally affiliated medical school functioning as a fully accredited (through COCA) additional location of OSU-CHS. The campus, located in Tahlequah, Oklahoma, will admit up to 50 American Indian students each year. The figure below graphically details the historic nature of the campus.

Figure 3 – Tribal Affiliation



The Operation Orange Traveling Camps have attracted nearly 200 American Indian students, with participation increasing from 14% (59) in summer 2016 to 18% (129) in 2017 with the launch of tribally sponsored camps. American Indian students composed approximately 37% (14) of participants in the 2017 Dr. Pete’s Medical Immersion Camps.

Data from the American Association of Colleges of Osteopathic Medicine shows that among all American Indian students entering any college of osteopathic medicine across the country in 2017, nearly 27% (22) matriculated to OSU-CHS for an absolute increase of seven percentage points from 2015.¹¹ Of American Indian students graduating from any college of osteopathic medicine nationally in 2017, 38% (16) graduated from OSU-CHS for an increase of 4 percentage points from 2015.¹²

Medical School Class Size Expansion

In addition to increasing the educational pipeline, OSU-CHS pursued efforts to expand the number of available seats in the medical school. This effort was initially begun by increasing the number of seats in the entering class size on the OSU-CHS campus in Tulsa, Oklahoma by 27. This effort was further expanded by the establishment of the aforementioned additional location campus in cooperation with the Cherokee Nation in Tahlequah, Oklahoma which is anticipated to begin operations in August of 2019. These expansion efforts will have increased the overall medical school class size by 87.5%. Table 2 details the medical school class size expansion effort over the past five years.

Table 2 – OSU-CHS Medical School Class Size Expansion*

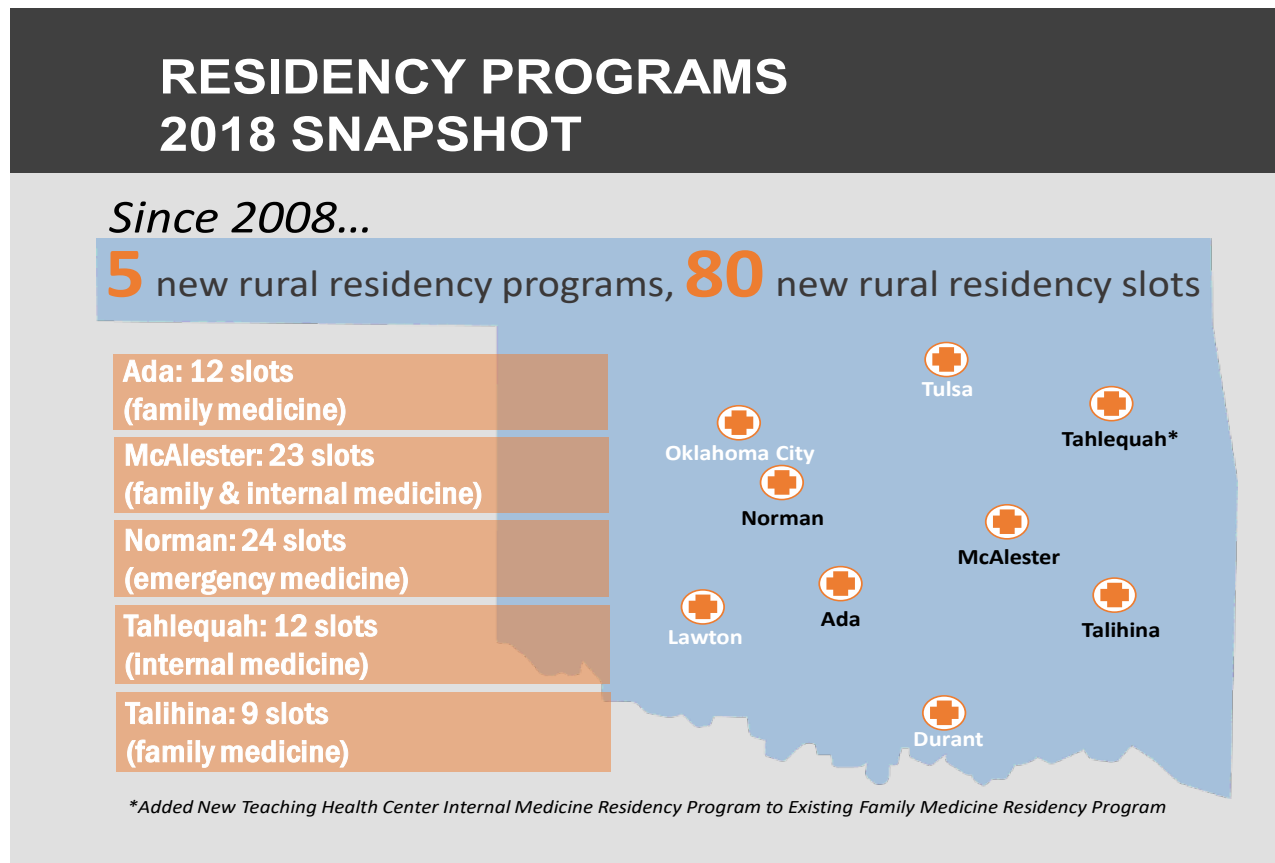
	Pre-2013	2019	2020+	% Change Since 2013
OSU Medical School Class Size	88	115	165	87.5%+

*Includes Cherokee Additional Location Campus in Tahlequah anticipated start date of August 2019.

Primary Care Residency Program Expansion

Since 1977 OSU-CHS has produced a significant number of primary care physicians by directing as many medical school graduates as possible into primary care residency programs. However, in order to accommodate OSU-CHS’ successful efforts to graduate more medical students, it became readily apparent that more residency programs needed to be developed. The goal of the OSU-CHS administration was to be certain that every graduate of the medical school could be provided a residency training opportunity within the state of Oklahoma. This initiative was a massive undertaking given the restrictive federal rules on initiating new programs. Federal regulations only allow for new residency programs to be established if the startup costs for the first three years can be covered from a non-federal source.¹³ Numerous funding sources were developed to achieve what may be described as the most important accomplishment in primary care since 1972. Some of these funding sources included direct state appropriation from the legislature, as well as a grant award from the Oklahoma Tobacco Settlement Endowment Trust. The result of this important initiative was the creation of 80 new rural residency slots across the state to prepare physicians for rural service. The figure below outlines the new residency slots and their geographic locations.

Figure 4 – Primary Care Rural Residency Program Expansion



In addition to the initiation of the rural residency programs, OSU-CHS has aggressively pursued the expansion of residency programs within its teaching hospital, OSU Medical Center, as well as primary care residencies funded through federal grant programs. Table 3 outlines the total residency program growth from all sources since 2008.

Table 3 – Total Residency Program Growth 2008-2018

Residency Programs - Affiliation	2008	2018
<i>OSU-CHS and OSU Medical Center</i>		
Anesthesiology	6	10
Cardiology	6	5
Diagnostic Radiology	8	11
Emergency Medicine	11	22
Family Medicine	14	22
General Surgery	9	15
Internal Medicine	15	30
Internship (PGY1)	23	-
Interventional Cardiology	1	1
OBGYN	9	10
OMM	-	1
Ophthalmology	3	2
Orthopedic Surgery	8	10
Otolaryngology	3	5
Pediatrics	7	14
Psychiatry	-	15
Emergency Medicine - Lawton	-	16
Emergency Medicine - Norman	-	30
Family Medicine - Ada	-	4
Family Medicine - Durant	-	13
Family Medicine - Lawton	-	12
Family Medicine - McAlester	-	11
Family Medicine - Tahlequah	-	11
Oncology - Cancer Treatment Center	-	1
<i>OMECSO – Consortium OSU-CHS</i>		
Family Medicine - Talihina	-	7
Family Medicine - Tulsa	-	10
Internal Medicine - Tahlequah	-	13
OBGYN - Tulsa	-	13
Pediatrics - Tulsa	-	15
<i>OMECSO-Non-OSU-CHS</i>		
OBGYN-St. Anthony	6	9
Family Medicine-St. Anthony	6	18
Orthopedics-St. Anthony	6	10
Rotating Internship-St. Anthony	16	12
Total Resident Count	157	378

All of the aforementioned initiatives will have a dramatic impact on the primary care physician supply for decades to come. However much more work needs to be done. The immediate need of course is to acquire additional state and private funding to increase the number of seats within the medical school and to increase the number of residency programs in primary care. The investment in these two initiatives will greatly increase the number of primary care physicians and enhance the quality of life for the citizens of our state.

Discussion

Recognizing the disparity between the primary care physician supply and the need to increase healthcare access in Oklahoma, OSU-CHS has grown its medical school enrollment by 26.7% over the past five years, not including its most recent establishment of a new branch campus. When the new branch campus is fully implemented, OSU will have grown its enrollment by over 87.5%. Another positive measure of OSU-CHS' efforts is the great majority of Oklahoma's medical students who come from within the state, estimated at about 85%.³ Moreover, as a result of OSU-CHS' initiatives, Oklahoma is more effective in retaining medical school and residency graduates than other states. The data reveals that 74.7% of physicians who complete both medical school and residency training in Oklahoma remain to practice in the state.³ Since 2013, OSU-CHS has greatly expanded the number of rural students in the entering medical school class each year, thereby increasing the likelihood of those students returning to their community to practice medicine. Equally important to this effort was the establishment of 80 new residency training slots within rural settings. In the aggregate, these initiatives represent the most significant accomplishment in primary care for Oklahoma over the past four decades.

References

1. *State-Level Projections of Supply and Demand for Primary Care Practitioners: 2013-2025*. U.S. Department of Health and Human Services, Health Resources and Services Administration, National Center for Health Workforce Analysis; 2016. <https://bhw.hrsa.gov/sites/default/files/bhw/health-workforce-analysis/research/projections/primary-care-state-projections2013-2025.pdf>.
2. Health Resources and Services Administration, available at <http://muafind.hrsa.gov>
3. Association of American Medical Colleges, Center for Workforce Studies, 2017 Physician Workforce Data Book, November 2017, available at: <https://www.aamc.org/data/>
4. Graduates by osteopathic medical college and race and ethnicity, 2000-2017. American Association of Colleges of Osteopathic Medicine, AACOM Reports on Graduates and GME. <http://www.aacom.org/reports-programs-initiatives/aacom-reports/graduates>. Accessed June 11, 2018.
5. Rumala BB, Cason FD. Recruitment of underrepresented minority students to medical school: Minority medical student organizations, an untapped resource. *J Natl Med Assoc*. 2007;99(9):1000-1009.
6. Gonzalez P, Stoll B. *The Color of Medicine: Strategies for Increasing Diversity in the US Physician Workforce*. Community Catalyst Boston, MA; 2002.
7. *Diversity in the Physician Workforce: Facts & Figures 2014*. Association of American Medical Colleges; 2014. <http://aamcdiversityfactsandfigures.org/>. Accessed May 27, 2018.
8. ACS demographic and housing estimates: 2012-2016 5-year estimates (DP05). U.S. Census Bureau. American Fact Finder. https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_16_5_YR_DP05&prodType=table. Accessed June 11, 2018.
9. Chen X, Soldner M. *STEM Attrition: College Students' Paths into and out of STEM Fields. Statistical Analysis Report*. National Center for Education Statistics; 2013. <https://eric.ed.gov/?id=ED544470>. Accessed October 4, 2017
10. Lopatto D. Survey of Undergraduate Research Experiences (SURE): First findings. *Cell Biol Educ*. 2004;3(4):270-277. doi:10.1187/cbe.04-07-0045
11. Total enrollment by osteopathic medical college and race and ethnicity, 2000-2018. American Association of Colleges of Osteopathic Medicine, AACOM Reports on Student Enrollment. <https://www.aacom.org/reports-programs-initiatives/aacom-reports/student-enrollment>. Accessed June 11, 2018.
12. Matriculant profile - Entering classes 2012-2015. American Association of Colleges of Osteopathic Medicine, AACOM Reports on Matriculants. http://www.aacom.org/docs/default-source/data-and-trends/2012-15-matprofilerpt.pdf?sfvrsn=ddf15497_8. Accessed June 11, 2018.

13. CMS Manual System Department of Health & Human Services (DHHS) Pub 100-20 One-Time Notification Centers for Medicare & Medicaid Services (CMS) Transmittal 1923 Date: September 22, 2017. Available at: <https://www.cms.gov/Regulations-and-Guidance/Guidance/Transmittals/2017Downloads/R1923OTN.pdf>

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