

2023 Healthcare Workforce Capacity Report

TEAM 
KENTUCKY[®]

CABINET FOR HEALTH
AND FAMILY SERVICES
OFFICE OF DATA ANALYTICS



I. EXECUTIVE SUMMARY

- Approximately 184,000 licensed or certified healthcare providers were identified in Kentucky's licensure boards' data.
- There were 318 M.D. and 126 D.O. graduates from Kentucky higher education institutions in the class of 2022. The number of physician graduates has trended upwards over the last ten years, but the number of those graduates who are retained to become licensed in Kentucky has trended downwards.
- Applied behavior analysts, audiologists, diabetes educators, marriage and family therapists, mental health counselors, physicians, physician assistants, and radiation therapists and nuclear medicine technologists had people per provider ratios worse than the national rate.
- Advanced practice registered nurses, registered nurses, and state registered nurse aides had people per provider ratios both statewide and within each area development districts better than the national rate. Licensed practical nurses also had better statewide rate than the national rate, though worse rates in the Green River and Northern Kentucky area development districts.
- Improvements to data collection by licensing boards could contribute to a more accurate assessment of the healthcare workforce capacity in Kentucky.
- Kentucky should target interventions to attract additional healthcare workforce capacity to areas of the state with relatively lower population to provider ratios.

II. INTRODUCTION

This report is dedicated to Kentucky's healthcare professionals, past, present and future. Their poise and sacrifice in recent years serves as a testament to some of the very best things about our nature as human beings. May they continue to care for us, to alleviate our suffering, and to walk with us through life's poignant moments.

A vibrant healthcare workforce is a critical component of a healthy society. Populations that have access to professionals who can prevent, diagnose, treat, and manage their illnesses and injuries are populations that can more meaningfully engage with their work, enjoy their leisure, and support their families.

HEALTHCARE WORKFORCE SHORTAGES

The rise in the capabilities of healthcare professionals has coincided with what many media outlets report as a healthcare workforce shortage.¹ When workforce shortages emerge, they can reveal themselves in many ways, such as difficulty filling open positions for nurses, physicians, mental healthcare providers, and other practitioners or patients experiencing concerning long wait times to see a doctor or dentist. Personnel shortages can lead to increased workloads among providers, increasing their risk for burnout or clinical errors. Research suggests this shortage is expected to worsen due to provider burnout and an aging workforce nearing retirement.²

While healthcare administrators and journalists note the presence of this phenomenon broadly in Kentucky and across the nation, there is evidence that this shortage of healthcare professionals may be more significant in certain regions of Kentucky.³ Moreover, the COVID-19 pandemic has exposed the degree that Kentucky relies on its healthcare workers to respond to the needs of its population.

Kentucky's healthcare workforce must contend with notable population health concerns. According to the most recent America's Health Rankings Annual Report (AHR), Kentucky's overall health outcomes ranked 45th in the nation. Within that broader measure of health outcomes, Kentucky ranks 45th in terms of people experiencing frequent mental distress, 48th in terms of frequent physical distress, and 48th in people with multiple chronic health conditions. Unfortunately, Kentucky's years-long substance use crisis also persists, as the state ranks 49th in drug deaths with a reported rate of 47.3 drug-related deaths per 100,000 Kentuckians in 2022.⁴ High smoking rates, high e-cigarette rates, high obesity rates, frequent multiple chronic conditions, and low exercise rates relative to other states also contribute to the complexity of patient care that providers encounter in their work.⁴ Kentucky's overall ranking for measures of clinical care stood at 31st in the nation.⁴

THE 2013 HEALTHCARE WORKFORCE REPORT AUTHORED BY DELOITTE

In 2013, at the direction of the Cabinet for Health and Family Services, consultants from Deloitte conducted a healthcare workforce capacity review (hereafter referred to as the ‘2013 report’). The 2013 report found that Kentucky’s supply of physicians, dentists, and optometrists was below a set of recommended thresholds to meet the state’s need. The 2013 report also found that, based on metrics devised by the Deloitte team, Kentucky had a statewide surplus of mental health providers, nursing professionals, and physician assistants. Importantly, the 2013 report notes that, despite these surpluses, significant regions of Kentucky were still underserved by these healthcare professionals. Kentucky’s healthcare professional shortages tended to be more significant in the state’s rural areas when compared to its larger metropolitan areas such as Fayette, Jefferson, and Kenton counties. The Kentucky Hospital Association (KHA) also released a 2022 hospital workforce report that highlighted the shortages of various providers whose primary practice occurs within a hospital setting, finding that hospital job vacancies for registered nurses and licensed practical nurses were both over 20%.³

THE NEED FOR UPDATED KNOWLEDGE SINCE THE RELEASE OF THE 2013 REPORT

The Office of Data Analytics (ODA) was commissioned to compose this document to examine how Kentucky’s workforce has changed in the intervening years since the 2013 report. Beyond the typical changes in Kentucky’s workforce that would be expected due to demographics and technology advancements, critical healthcare milestones have occurred in the decade since the previous report’s findings and recommendations. First among these would be Kentucky’s expansion of Medicaid under the Affordable Care Act (ACA) in 2014. When the 2013 report was published, roughly 14.5% of Kentucky’s population was without health insurance (617,200 people). Eight years later, largely as a result of the ACA, that number had fallen to 5.6% by 2021 (244,400 people).⁵ This increase in the number of people with access to healthcare consequently increased the demand for healthcare providers in the state.

Second, the COVID-19 pandemic was an extreme shock to the healthcare system. Professionals who practice in hospitals were particularly impacted by the consequences of the pandemic.^{6,7} This situation created extreme fatigue and burnout among healthcare providers. A 2021 survey by the Kentucky Nursing Association (KNA) found that one in four nurses reported being very likely or extremely likely to leave their current job as a nurse in the next three months.⁸

This report will focus on individual groups of healthcare providers and the regions where they are located throughout the Commonwealth. It will also expand upon the list of provider types in the 2013 report. For example, the 2013 report did not include physical therapists, occupational therapists, or speech/language pathologists. This report includes those three provider types and several more that were not featured in the 2013 report.

III. METHODS

METHODS

This report’s methodology is based on the methodology described in the 2013 report with some key additions. This report incorporated healthcare licensure board data to produce counts of healthcare professionals across Kentucky. Additionally, the present report incorporates data from the Centers for Medicare and Medicaid Services (CMS) to link with Kentucky licensure board data to fill in missing data, such as the providers’ practice locations. The result is an extension of Deloitte’s findings with current data and comparisons of Kentucky’s counts of healthcare professionals with national rates.

Records from 18 of Kentucky’s healthcare licensure boards and 2 credentialing departments within the Kentucky Cabinet for Health and Family Services were used as the primary data sources to determine the distribution of providers across the state. These 20 organizational entities include 26 distinct healthcare provider categories outlined in Table III-1. Files containing these records are publicly available and were obtained by issuing data requests to each organization described in Table III-1. Once the licensure data files were obtained, ODA reviewed and compiled them into a common data model to begin the process of analysis.

Table III-1. *Provider Types included in this Report and their Associated Licensure Board.*

Healthcare Licensure Board	Healthcare Provider Type
Kentucky Applied Behavior Analysis Licensing Board	Applied Behavior Analysts
Kentucky Board of Alcohol and Drug Counselors	Licensed Clinical Alcohol and Drug Counselors
Kentucky Board of Chiropractic Examiners	Chiropractors
Kentucky Board of Dentistry	Dentists
Kentucky Board of Examiners of Psychology	Licensed Clinical/Counseling Psychologists
Kentucky Board of Licensure and Certification for Dietitians and Nutritionists	Dietitians And Nutritionists
Kentucky Board of Licensed Diabetes Educators	Diabetes Educators
Kentucky Board of Licensure for Marriage and Family Therapists	Marriage And Family Therapists
Kentucky Board of Licensed Professional Counselors	Licensed Professional Counselors
Kentucky Board of Medical Imaging and Radiation Therapy	Limited X-Ray Machine Operators
	Nuclear Medicine Professionals
	Radiation Therapy Professionals
	Radiographers
	Radiologist Assistants
Kentucky Board of Medical Licensure	Physicians
	Physician Assistants

Kentucky Board of Nursing	Advanced Practice Registered Nurses
	Licensed Practical Nurses
	Registered Nurses
	State Registered Nurse Aides
Kentucky Board of Occupational Therapy	Occupational Therapists
Kentucky Board of Optometric Examiners	Optometrists
Kentucky Board of Pharmacy	Pharmacists
Kentucky Board of Physical Therapy	Physical Therapists
Kentucky Board of Podiatry	Podiatrists
Kentucky Board of Social Work	Licensed Clinical Social Workers
Kentucky Board of Speech-Language Pathology & Audiology	Audiologists
	Speech Pathologists
Community Health Workers	Community Health Workers
	Peer Support Specialists

THE NECESSITY TO ADDRESS MISSING DATA IN THE LICENSURE BOARD FILES

The 2013 report noted many limitations of Kentucky’s licensure board data to estimate the size of Kentucky’s healthcare workforce. Many of the same inconsistencies in reporting practices and errors in data entry across license boards are still present. This was particularly problematic with respect to missing practice locations of providers making it difficult to accurately determine the geographic distribution of Kentucky’s healthcare workforce. This is important because Kentucky’s healthcare providers are often concentrated around the state’s larger metropolitan areas and sparser in the less populated counties, creating important implications regarding access to healthcare services around the state. To mitigate this missing data phenomenon, a second source of data was used to supplement the licensure board data. The National Plan and Provider Enumeration System (NPPES)⁹, a publicly available dataset published by CMS, was used to verify, correct, or add practice locations among licensure records where possible.

In cases where a licensed provider could not be found in the NPPES file, location information from their respective licensure board file was utilized to the greatest extent possible. Data quality issues were more common in these instances. For example, licensure boards often reported provider addresses that appeared to be residential rather than sites of patient care. In some cases, addresses were mistyped or did not exist at all. Because of this, a degree of variation in confidence exists between providers of different license boards in terms of the distribution of their workforce across Kentucky (e.g., because of data quality matters, there is a higher degree of confidence in the accuracy of physician data than audiologist data). As such, best efforts were taken to report and highlight these discrepancies throughout the results of this report. Notably, licensure boards for which less than 50% of provider addresses could be derived were not reported on the level of county or area development district (ADD), and instead, reported as a total count within the state.

QUALITY CONTROL AND ESTIMATING PROVIDERS THAT ARE ACTIVELY TREATING PATIENTS IN KENTUCKY

Licensed healthcare providers perform many functions in Kentucky's economy and society, from direct patient care in clinical settings to serving as business leaders, professors, researchers, and administrators. While these are all important features of the state's healthcare ecosystem, the purpose of this report is to gauge the capacity of Kentucky's healthcare workforce to deliver direct patient care services.

Therefore, further data cleaning involved excluding providers from the analysis deemed not actively delivering patient care, such as those noted in the data as retired, deceased, or otherwise not actively treating patients. "Active" providers were determined by the relevant fields available in the data files from their respective licensure boards. It should be noted, however, that not all license boards reported this information, which may result in overestimates of workforce figures in these cases.

Furthermore, because providers were not explicitly reported as practicing within a particular ADD, this information had to be manually derived from available address data – in most cases, zip codes were used for this purpose. While provider names and practice addresses were used for the purposes of linking across data sources, this information was analyzed inside a secure information technology environment, and no personally identifiable information for any provider appears in this report.

IV. RESULTS & DISCUSSION

The healthcare workforce is the primary medium in which health services are delivered to communities, making it a critical component in supporting the health and well-being of the Commonwealth of Kentucky. The results of this report indicate that a significant portion of the population devotes their professional lives to caring for their fellow Kentuckians. These providers have persevered through years of education, rigorous testing, and a public health emergency to provide an important service to the Commonwealth. Because of the crucial role that our healthcare professionals play in our lives, it is a high priority to have a healthcare workforce that can adequately meet the needs of Kentucky's people.

Between the 2013 report by Deloitte and this current report, several changes were seen in the overall healthcare workforce in Kentucky. First, the current iteration of the report contains information on 14 additional provider types not included in the 2013 report. Second, despite some areas where Kentucky's workforce appears deficient, an overall growth among healthcare workers, particularly physicians, was demonstrated nationwide between 2010 and 2021.¹⁰ These numbers are expected to continue to rise in the coming years.¹¹ However, with a growing and increasingly aging population, the need for additional workforce capacity will continue to increase in Kentucky and throughout the United States.

In 2013, Deloitte identified 10,475 physicians licensed within the state of Kentucky; this report, in 2022, identified 12,470 using a similar methodology, a 19% increase. During this same period, the number of dentists grew 49% (from 1,711 to 2,541), advanced practice registered nurses (APRNs) grew 191% (from 3,057 to 8,883), and the number of physician assistants grew 65% (from 985 to 1,622). According to the US Census, the population of Kentucky has grown 10.5%, or over 105 thousand, in that time (from 4.407 million in 2013 to 4.512 million in 2022). This suggests a growing healthcare workforce in Kentucky, adapting to meet the changing needs of the population within the state. However, several areas for improvement remain.

OVERALL WORKFORCE DISPARITIES

There is no widely agreed upon rate for what states should aim for when they evaluate their healthcare workforces. Therefore, in the absence of such benchmarks, this report chose to highlight the difference between Kentucky and the national rate of people per provider, a key difference between this report and the 2013 report.

Overall, rates of APRNs, occupational therapists, physical therapists, radiologic technologists and technicians, registered nurses, and state registered nurse aides are better than the national rate, statewide and within every ADD in the Commonwealth. The data indicates that nurses in Kentucky may be performing a vital role within the Kentucky workforce to relieve a significant amount of the healthcare labor burden.¹² This also suggests a need for a larger licensed practical nurse (LPN) workforce in the Northern Kentucky and Green River ADD to improve the people per provider rate in those areas..

Similarly, Kentucky is licensing occupational and physical therapists at a better rate than the national average. With a population that is rapidly aging, these services will continue to become more vital to patients in the Commonwealth.¹³

Physicians are a notable example of a statewide rate that is worse than the national average. While Kentucky meets the national rates for physicians in the Bluegrass and KIPDA ADDs, every other ADD in Kentucky is worse the national rate; with physicians in Lincoln Trail and Buffalo Trace needing to serve 2.4 times the number of patients compared to the national rate. This implies a pressing need for physicians in Kentucky outside the Louisville and Lexington metropolitan areas.

The rate of diabetes educators licensed in Kentucky is worse than the national average both statewide and within each ADD in Kentucky. With approximately 14% of people in Kentucky diagnosed with diabetes, this represents a critical disparity in the healthcare workforce of Kentucky. Similarly, statewide, the rate of applied behavior analysts is also worse than the national average, though more detailed information on individual ADD geographic level disparities are unavailable. As the mental health needs of the state become more apparent, especially children with autism spectrum disorders, these individuals also represent a growing need to ensure that every Kentuckian has the opportunity for improved health and wellbeing.¹⁴

Audiologists, marriage & family therapists (MFTs), mental health counselors, physician assistants, and radiation therapists & nuclear medicine technologists (RTNMTs) are all worse than the national rate, though some ADDs surpass the national rates. This suggests that, overall, there is a need for more these providers, but the geographic disparities within provider types may present meaningful information on the overall capacity of certain regions of the state.

WORKFORCE GEOGRAPHIC DISPARITIES

Workforce rates are below the national rate in the northern portion of the Commonwealth (i.e., the Northern Kentucky ADD) for audiologists, LPNs, licensed psychologists, physician assistants, and respiratory therapists. Some of this difference may be alleviated by the healthcare infrastructure in nearby Cincinnati.

In the eastern portion of the state (i.e., the Buffalo Trace, FIVCO, Gateway, Big Sandy, Kentucky River, Cumberland Valley, and Lake Cumberland ADDs), audiologists, chiropractors, dentists, LCSWs, licensed psychologists, mental health counselors, optometrists, pharmacists, physician assistants, and podiatrists have rates worse than the national rate in at least one ADD within this region. The Buffalo Trace, Kentucky River, and Cumberland Valley ADDs show workforce rates worse than the national average for a significant number of the listed providers, indicating a significant need for additional providers along the West Virginia border and along the southeastern portion of the state. While some of the shortfall along the West Virginia border may be relieved by nearby Huntington, like Cincinnati relieving Northern Kentucky.

In the western portion of the state (i.e., the Purchase, Pennyryle, Green River, Barren River, and Lincoln Trail ADDs), audiologists, dentists, LCSWs, LPNs, licensed psychologists, mental health counselors, optometrists, pharmacists, physicians, physician assistants, and podiatrists

have rates worse than the national rate in at least one ADD within this region. The Purchase, Pennyrite, and Green River ADDs consistently show rates worse than the national average for many of these professions.

The Bluegrass ADD, containing the Lexington metropolitan area, is below the national rate of diabetes educators, MFTs, and mental health counselors. KIPDA, which contains the Louisville metropolitan area, only demonstrates rates below the national rate among diabetes educators, mental health counselors, and physician assistants. This suggests that a need for these professions may exist within these larger metropolitan areas and may be being relieved by other professions.

For community health workers and peer support specialists, dieticians and nutritionists, and speech-language pathologists, statewide, the rate of these professions is better than the national rate of these professions. However, for these professions, less granular data for ADDs was available, and were therefore only calculated at the state level. This implies that, while Kentucky performs above the national rate in licensing these individual, geographic disparities unobserved in our data may exist and may be therefore unaccounted for in this report.

GROWING THE WORKFORCE

The report shows that, while total graduates from medical colleges within Kentucky have remained somewhat consistent over the years, the retention rate of those graduates that go on to obtain licensure in Kentucky is trending downward. This indicates that while Kentucky has a steady flow of graduates from its medical colleges, less graduates are becoming licensed within the Commonwealth. Interventions to improve the overall healthcare workforce may help to ensure that the healthcare capacity needs of Kentucky are being met.

Data from the Association of American Medical Colleges (AAMC) suggests that approximately 55% of medical residents, nationwide, will stay in the state in which they completed residency training.¹⁵ According to the most recent data available, Kentucky only retained 48% of its graduates. A key piece of improving the healthcare workforce in Kentucky is advocating for additional residency slots at medical training locations within the state of Kentucky.

Additionally, international medical school graduates (IMGs) may also play a role in improving Kentucky', with visa programs offering pathways to residency and citizenship within the United States for trained citizens of other countries.¹⁶ In addition to this, government interventions such as statewide loan forgiveness programs for healthcare workers may also attract medical professionals to Kentucky.

V. RECOMMENDATIONS

RECOMMENDATIONS FOR KENTUCKY LICENSING BOARDS

As previously noted in the Methods section, while preparing this report, many of the same data quality concerns that were noted in the 2013 report by Deloitte were observed. Principally, there is a high degree of missing data related to where Kentucky's healthcare professionals practice in the state. This problem was largely mitigated in this report by pairing licensure board data with data from CMS, but future efforts to investigate whether Kentucky's healthcare workforce is adequate to meet the demands of its people would benefit enormously from enhancing the quality of data collected by Kentucky's licensure boards. By adding additional information on practice location, demographics, language capacity, practice specialties, education/training backgrounds, utilization of telehealth services, and actively practicing medicine, a more accurate picture of Kentucky's healthcare workforce could be established. A list of suggested fields that would solve many of these data quality problems is supplied in the supplement to this report. These additional fields would enhance the ability to understand how workforce shortages may be arising, where shortages exist, and how patients are experiencing care from their practitioners.

In the 2023 Kentucky legislative session, House Bill 200 (HB 200) was passed and signed into law.¹⁷ HB 200 created the healthcare workforce investment fund as a means of addressing workforce shortages. HB 200 also includes language surrounding improved data collection, particularly among historically underserved counties. This law could assist in bringing about improvements in data quality to better understand the healthcare workforce of Kentucky.

KENTUCKY HEALTHCARE WORKFORCE RECOMMENDATIONS

To create a comprehensive healthcare workforce within the Commonwealth, Kentucky should focus on recruiting and training additional providers for occupations that show rates worse than national provider ratios. This may include reduced tuition for those enrolled in these programs, greater state assistance in expanding academic programs for universities, and collaboration with organizations such as the Kentucky Healthcare Workforce Collaborative to invest in the future of the healthcare workforce.¹⁸

Retaining healthcare graduates within the state may be another way of building the workforce. Data from KYSTATS has shown that healthcare graduates in Kentucky with more advanced credentials are less likely to seek employment in Kentucky compared to other healthcare graduates.¹⁹ This relationship also corresponds to a graduate's level of education, with only 42% of healthcare graduates with a doctorate from a Kentucky school employed in the state compared to 76% of healthcare graduates with an associate degree from a Kentucky school.¹⁸ Loan forgiveness programs, additional training opportunities, career assistance, childcare assistance, and home-buying benefits for these individuals may attract graduates to remain within the state after completing their degrees.

The report also shows that additional focus should be given to recruiting providers to southeastern Kentucky and western Kentucky. These regions tend to have worse provider rates and are not located near a larger metropolitan area where healthcare providers are more plentiful. Programs like the University of Kentucky's extension medical campuses in Bowling Green may help relieve some of this burden, as well as loan forgiveness programs and additional J-1 Visa opportunities for providers that choose to settle in more nonmetropolitan areas.¹⁹

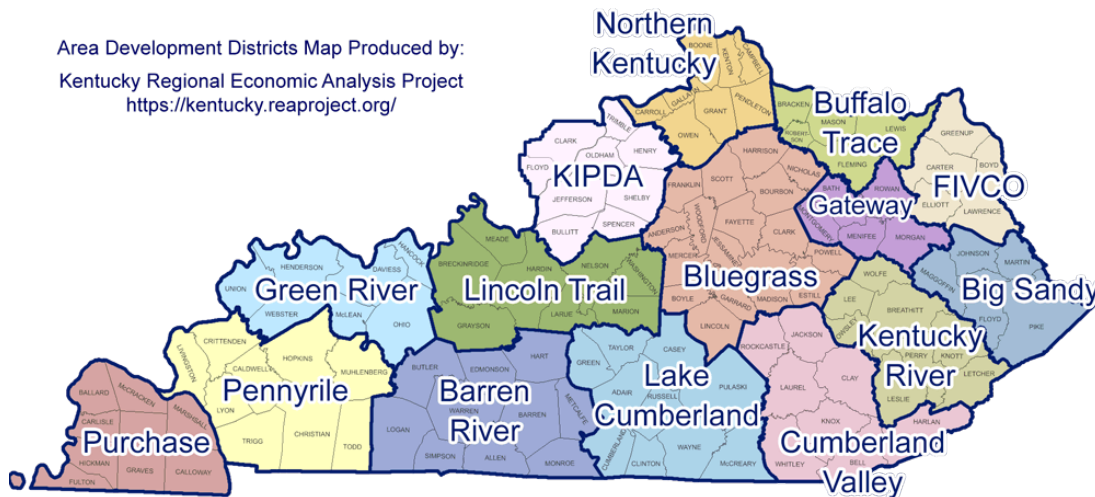
Another way to relieve some of the burden of provider shortages may be through the expansion of telehealth services. While providers must be licensed in Kentucky to serve Kentucky citizens, the provider need not be physically located within the geographic region they are servicing or within Kentucky at all. By expanding access to broadband internet and recruiting additional telehealth providers, the healthcare workforce capacity may increase within the Commonwealth.

VI. PROVIDER SUMMARIES

A PRACTICAL GUIDE TO THIS CHAPTER

This chapter will present a series of tables and graphics that describe the current state of Kentucky’s healthcare workforce. Each of the 30 healthcare provider types will be presented in alphabetical order, with associated counts broken down by ADD. ADDs are defined by Kentucky’s Council on Area Development Districts and exist to help coordinate government and civic organizations to improve the quality of life for Kentucky’s residents.²⁰ County-level counts and provider rates are reported in the supplement that accompanies this report. Figure VI-1 displays a map of Kentucky’s ADDs and their constituent counties.

Figure VI-1. Kentucky’s Area Development Districts.



PEOPLE PER PROVIDER RATES

Kentucky’s population is not evenly distributed throughout the Commonwealth. To contextualize the provider count numbers, provider counts are normalized against the total population of each ADD. The primary results of each section are presented as the number of Kentuckians divided by the number of providers in each region; what is going to be referred to as the region’s ‘rate’ or ‘ratio’. The number can be roughly interpreted as ‘the number of people each provider is responsible for’, but that does not consider the prevalence of need for the provider’s specialty in their community and assumes that everyone seeks care nearest to their residence. The national rates for each provider category were obtained by dividing the US Census Bureau’s reported total US population by the US Bureau of Labor Statistics’ (BLS) reported counts of healthcare workers from their Occupational Employment and Wage Statistics.

It is important to note that comparing Kentucky’s provider rates to the national rates is not meant to suggest whether Kentucky’s workforce is sufficient or insufficient, as healthcare needs can vary significantly from one region to another. Therefore, after a survey of the literature on healthcare workforce development and conversations with the National Center for Health Workforce Analysis (NCHWA), ODA determined that there exists no adequate set of

population-level benchmarks that would allow designations of sufficient supply of providers.^{21,22} In the absence of a broad consensus on optimal population-level provider ratios, this report presents a method of comparison that best balances accessibility of interpretation with analytical rigor.

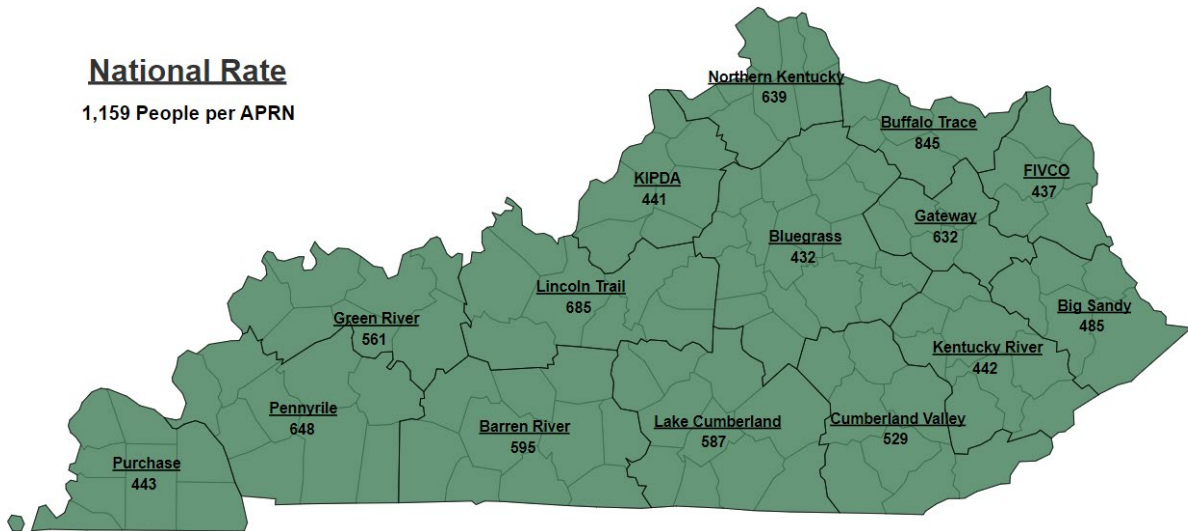
The words “better” and “worse” will be used when comparing Kentucky’s provider ratios to their national counterparts. In this instance, the rate values that are lower are better, indicating that each provider is responsible for less people; and higher values are reported as worse for similar reasoning. A green arrow pointing down (▼) will represent rates that are lower/better than the national rates and a red arrow pointing up (▲) will represent rates that are higher/worse.

ADVANCED PRACTICE REGISTERED NURSES (APRN)

National Rate National Rate of People per APRNs = 1,159

Area Development District	APRNs	People per APRN
Barren River	521	595 ▼
Big Sandy	291	485 ▼
Bluegrass	1,919	432 ▼
Buffalo Trace	66	845 ▼
Cumberland Valley	435	529 ▼
FIVCO	309	437 ▼
Gateway	135	632 ▼
Green River	386	561 ▼
Kentucky River	242	442 ▼
KIPDA	2,315	441 ▼
Lake Cumberland	352	587 ▼
Lincoln Trail	408	685 ▼
Northern Kentucky	729	639 ▼
Pennyrile	331	648 ▼
Purchase	444	443 ▼
Kentucky	8,883	506 ▼

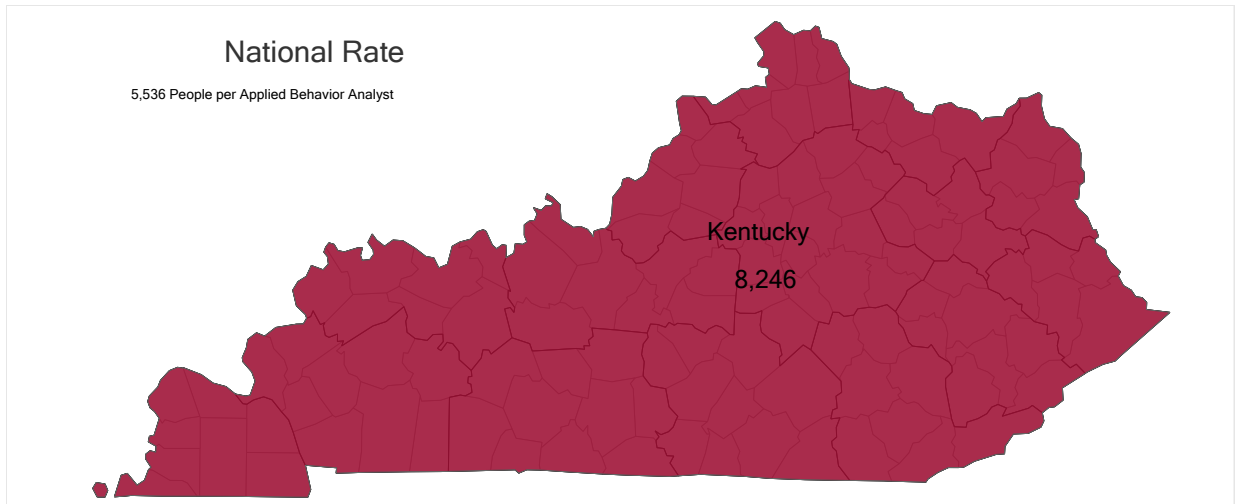
Notes: The counts of advanced practice registered nurses classified as Out of State and Unknown by these analyses were 0. Values below national rate indicated by downward green arrow (▼) and above national rate by upward red arrow (▲).



Kentucky is considered better than the national rate for nurse practitioners both among the area development districts (ADDs) and as a state Kentucky has 506 people per APRN, which is better than the national rate of 1,159 individuals per APRN. The areas with the highest rate of people to nurse practitioners are Bluegrass, at 432 people per nurse practitioner and FIVCO, at 437 people per nurse practitioner. However, both rates are 2.7 times better than the national average of people per nurse practitioner.

APPLIED BEHAVIOR ANALYSTS

National Rate of People per Applied Behavior Analyst = 5,536



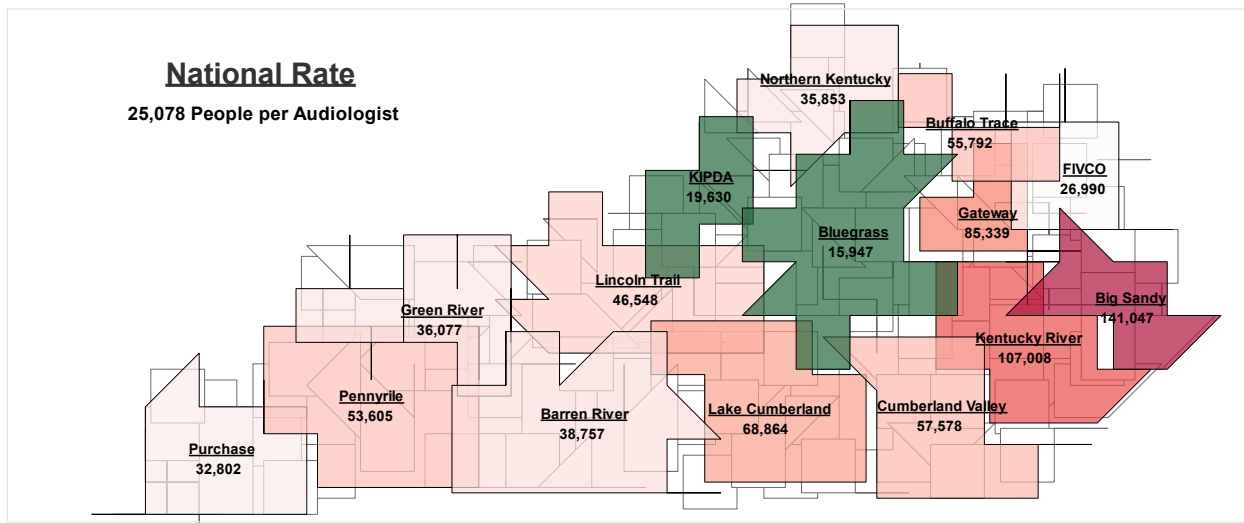
According to the Kentucky Applied Behavior Analyst Licensing Board, 545 applied behavior analysts are licensed in Kentucky. This amounts to a rate of 8,246 Kentuckians per provider, worse than the national rate of 5,536. The Bureau of Labor Statistics does not have publicly available reporting on nationwide counts of applied behavior analysts, so this national rate is based on data from the national Behavior Analyst Certification Board (BACB). Of these 545 Kentucky-licensed individuals, only 13 were associated with address data in the license file, and linkage to the NPPES did not improve data quality. This results in only an aggregated, statewide total being shown. Comparing Kentucky's rate to the national rate, Kentucky has worse access to applied behavior analysts. Better data could alter the reported rates by ADD and shift regions closer to or better than the national average.

AUDIOLOGISTS

National Rate of People per Audiologist = 25,078

Area Development District	Audiologists	People Per Audiologist
Barren River	8	38,757 ▲
Big Sandy	1	141,047 ▲
Bluegrass	52	15,947 ▼
Buffalo Trace	1	55,792 ▲
Cumberland Valley	4	57,578 ▲
FIVCO	5	26,990 ▲
Gateway	1	85,339 ▲
Green River	6	36,077 ▲
Kentucky River	1	107,008 ▲
KIPDA	52	19,630 ▼
Lake Cumberland	3	68,864 ▲
Lincoln Trail	6	46,548 ▲
Northern Kentucky	13	35,853 ▲
Pennyrile	4	53,605 ▲
Purchase	6	32,802 ▲
Kentucky	163	27,571 ▲

Notes: The counts of audiologists classified as Out of State and Unknown by these analyses are 92 and 28, respectively. Values below national rate indicated by downward green arrow (▼) and above national rate by upward red arrow (▲).



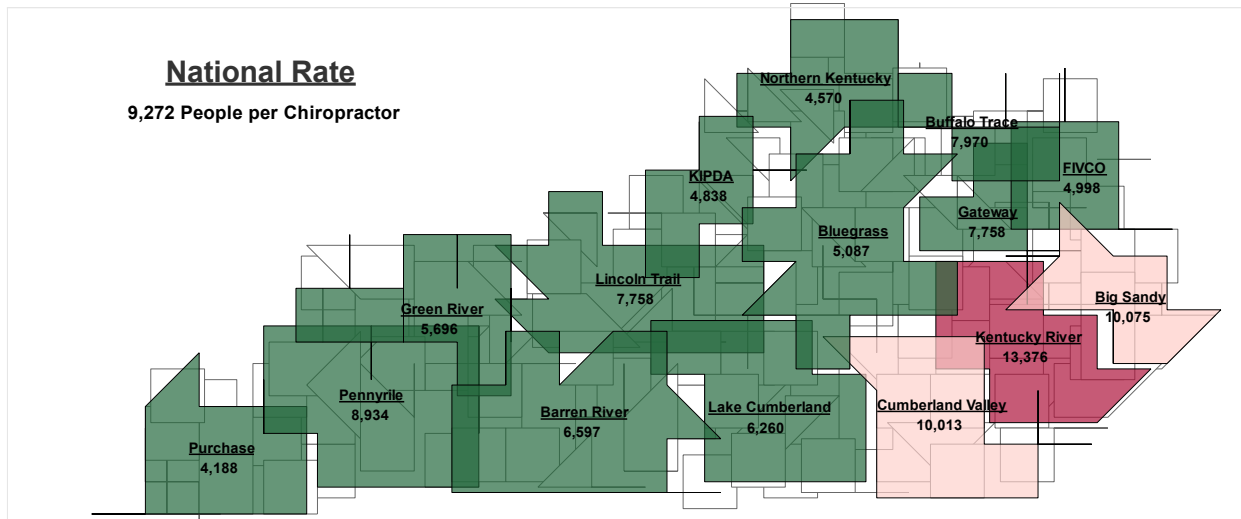
Kentucky has 27,571 people per audiologist, which is slightly worse than the national rate of 25,078 individuals per audiologist. There is a large variance in the workforce capacity between ADD regions. The only ADD regions that are better than the national rate are Bluegrass and KIPDA (containing UofL and UK). Big Sandy, Buffalo Trace, Gateway, and Kentucky River regions have only a single audiologist within our data set.

CHIROPRACTORS

National Rate of People per Chiropractor = 9,272

Area Development District	Chiropractors	People Per Chiropractor
Barren River	47	6,597 ▼
Big Sandy	14	10,075 ▲
Bluegrass	163	5,087 ▼
Buffalo Trace	7	7,970 ▼
Cumberland Valley	23	10,013 ▲
FIVCO	27	4,998 ▼
Gateway	11	7,758 ▼
Green River	38	5,696 ▼
Kentucky River	8	13,376 ▲
KIPDA	211	4,838 ▼
Lake Cumberland	33	6,260 ▼
Lincoln Trail	36	7,758 ▼
Northern Kentucky	102	4,570 ▼
Pennyrile	24	8,934 ▼
Purchase	47	4,188 ▼
Kentucky	791	5,682 ▼

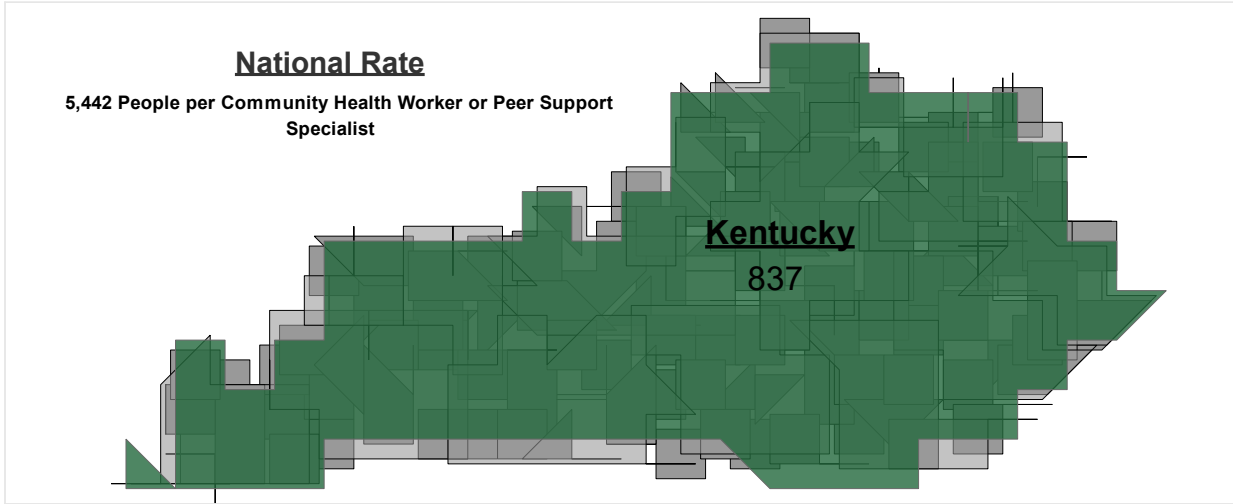
Notes: The counts of chiropractors classified as Out of State and Unknown by these analyses are 39 and 73, respectively. Values below national rate indicated by downward green arrow (▼) and above national rate by upward red arrow (▲).



Most of Kentucky’s ADD regions have a better rate of individuals per chiropractor compared to the national rate. The three regions that fair worse than the national rate are in the southeastern part of the Commonwealth: Cumberland Valley, Kentucky River, and Big Sandy. Of those, Kentucky River has the worst provider rate, with 13,376 individuals for every chiropractor. Purchase in far western Kentucky performs the best among the different ADD regions, with a rate of 4,188 individuals per chiropractor.

COMMUNITY HEALTH WORKERS AND PEER SUPPORT SPECIALISTS (CHW AND PSS)

National Rate of People per CHWs and PSSs = 5,442



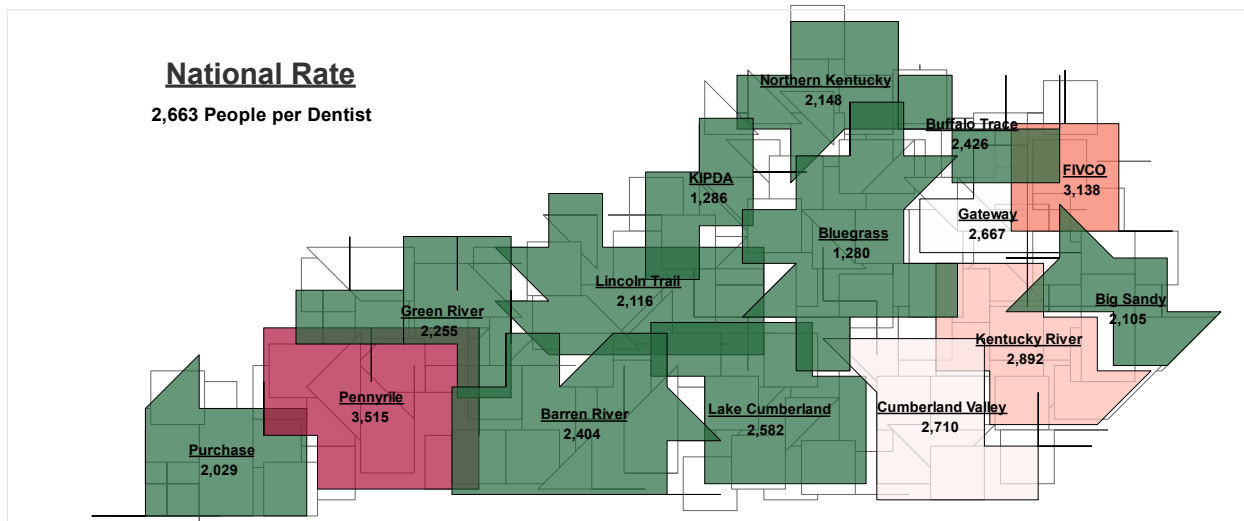
Practice location information could not be identified for most CHWs and PSSs resulting in only an aggregated, statewide total being shown. Statewide, 5,368 CHWs and PSSs are licensed to practice in Kentucky, which is a rate of 837 people per CHW or PSS. Kentucky's rate is better than the national average of 5,442 people per CHW or PSS. However, due to data limitations, this may not account for provider shortages or surpluses that may exist on a regional level.

DENTISTS

National Rate of People per Dentist= 2,663

Area Development District	Dentist	People Per Dentist
Barren River	129	2,404 ▼
Big Sandy	67	2,105 ▼
Bluegrass	648	1,208 ▼
Buffalo Trace	23	2,426 ▼
Cumberland Valley	85	2,710 ▲
FIVCO	43	3,138 ▲
Gateway	32	2,667 ▲
Green River	96	2,255 ▼
Kentucky River	37	2,892 ▲
KIPDA	80	1,286 ▼
Lake Cumberland	132	2,582 ▼
Lincoln Trail	132	2,116 ▼
Northern Kentucky	217	2,148 ▼
Pennyrile	61	3,515 ▲
Purchase	97	2,029 ▼
Kentucky	2,541	1,769 ▼

Notes: The counts of dentists classified as Out of State and Unknown by these analyses are 523 and 19, respectively. Values below national rate indicated by downward green arrow (▼) and above national rate by upward red arrow (▲).



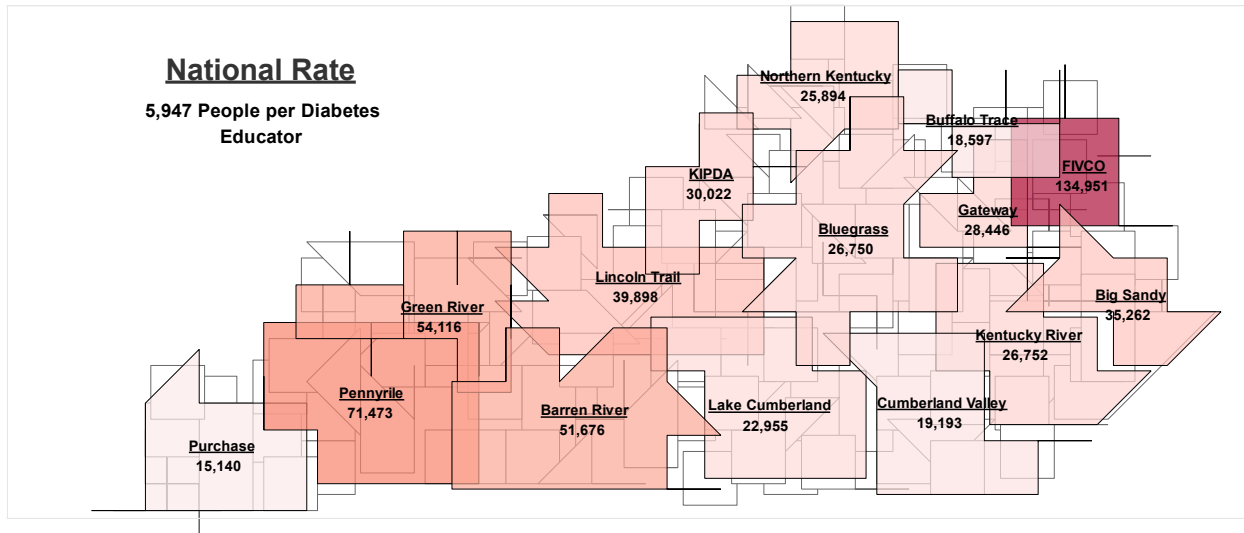
The national average of dentists to people is approximately 2,663 people per dentist. Kentucky has an average of 1,769 people per dentist, with ten ADD regions being better than the national rate and five below. Bluegrass and KIPDA have the lowest average populations per provider and outperform the national average. Pennyrile and FIVCO were worse than the national average.

DIABETES EDUCATORS

National Rate of People per Diabetes Educator = 5,947

Area Development District	Diabetes Educators	People Per Diabetes Educators
Barren River	6	51,676 ▲
Big Sandy	4	35,262 ▲
Bluegrass	31	26,750 ▲
Buffalo Trace	3	18,597 ▲
Cumberland Valley	12	19,193 ▲
FIVCO	1	134,951 ▲
Gateway	3	28,446 ▲
Green River	4	54,116 ▲
Kentucky River	4	26,752 ▲
KIPDA	34	30,022 ▲
Lake Cumberland	9	22,955 ▲
Lincoln Trail	7	39,898 ▲
Northern Kentucky	18	25,894 ▲
Pennyrile	3	71,473 ▲
Purchase	13	15,140 ▲
Kentucky	152	29,567 ▲

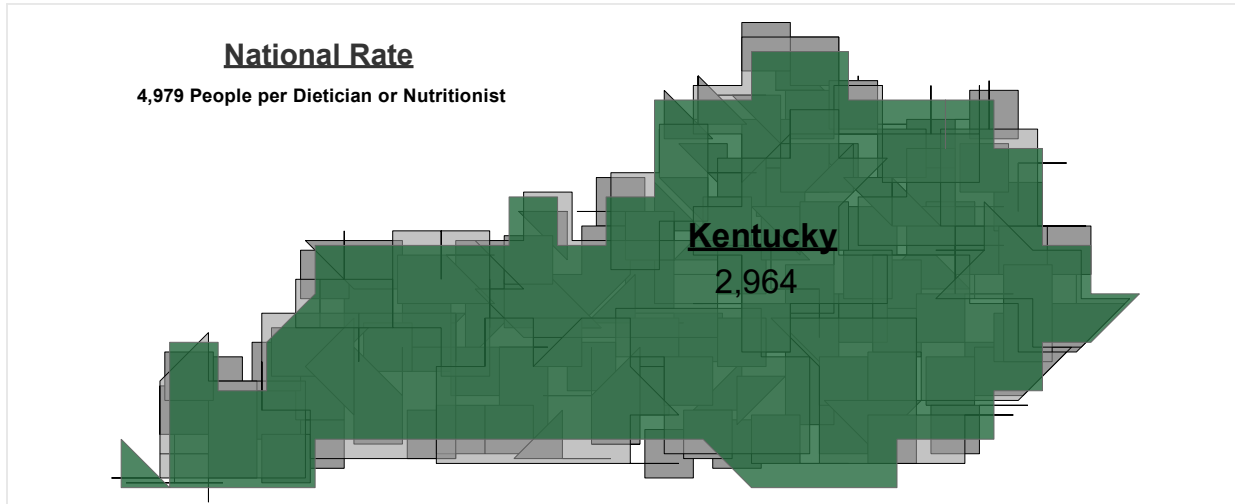
Notes: The counts of diabetes educators classified as Out of State and Unknown by these analyses are 15 and 134, respectively. Values below national rate indicated by downward green arrow (▼) and above national rate by upward red arrow (▲).



Kentucky has 29,567 people per diabetes educator, considerably worse than the national rate of 5,947 people per educator. FIVCO is drastically worse relative to the other ADD regions, with a rate of 134,951 people per diabetes educator. All ADD regions are underserved relative to the national rate. This suggests that all regions would benefit from increased diabetes educators in their workforce. However, there are a large amount of Diabetes Educators with unknown address information, which could impact allocation needs.

DIETITIANS AND NUTRITIONISTS

National Rate of People per Dietitians and Nutritionists = 4,979



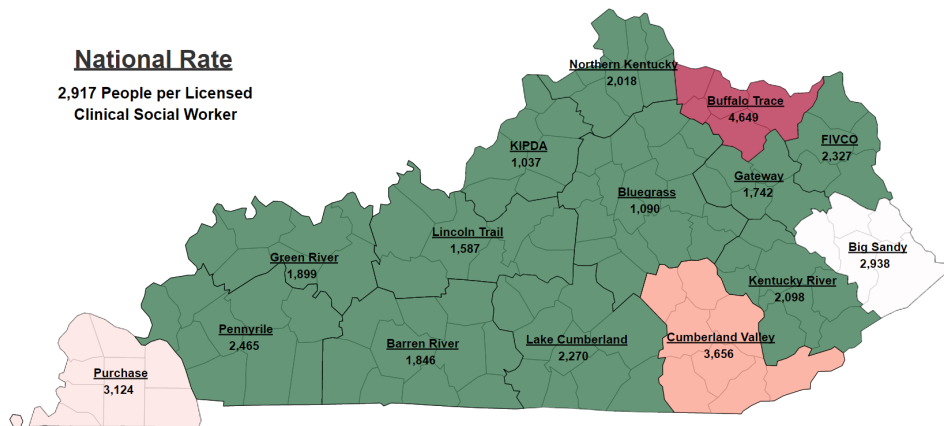
Because practice location information could not be identified for the majority of dietitians and nutritionists, only aggregated totals will be provided. Statewide, 1,658 dietitians and nutritionists are licensed to practice in Kentucky. Of these, 142 are estimated to be practicing out of state; however, due to the data limitations noted, this number will likely be underreported. Under the assumption that all dietitians and nutritionists that are licensed to practice in Kentucky are doing so (excluding those determined to be out of state), this would place Kentucky at a rate of 2,964 people per dietitian/nutritionist, which is better than the national average. Due to the uncertainty in this estimate, its implications should be interpreted with a degree of caution.

LICENSED CLINICAL SOCIAL WORKERS (LCSW)

National Rate of People per LCSW = 2,917

Area Development District	Licensed Clinical Social Workers	People Per Licensed Clinical Social Worker
Barren River	168	1,846 ▼
Big Sandy	48	2,938 ▲
Bluegrass	761	1,090 ▼
Buffalo Trace	12	4,649 ▲
Cumberland Valley	63	3,656 ▲
FIVCO	58	2,327 ▼
Gateway	49	1,742 ▼
Green River	114	1,899 ▼
Kentucky River	51	2,098 ▼
KIPDA	984	1,037 ▼
Lake Cumberland	91	2,270 ▼
Lincoln Trail	176	1,587 ▼
Northern Kentucky	231	2,018 ▼
Pennyrile	87	2,465 ▼
Purchase	63	3,124 ▲
Kentucky	2,956	1,520 ▼

Notes: The counts of licensed clinical social workers classified as Out of State and Unknown by these analyses are 674 and 5, respectively. Values below national rate indicated by downward green arrow (▼) and above national rate by upward red arrow (▲).



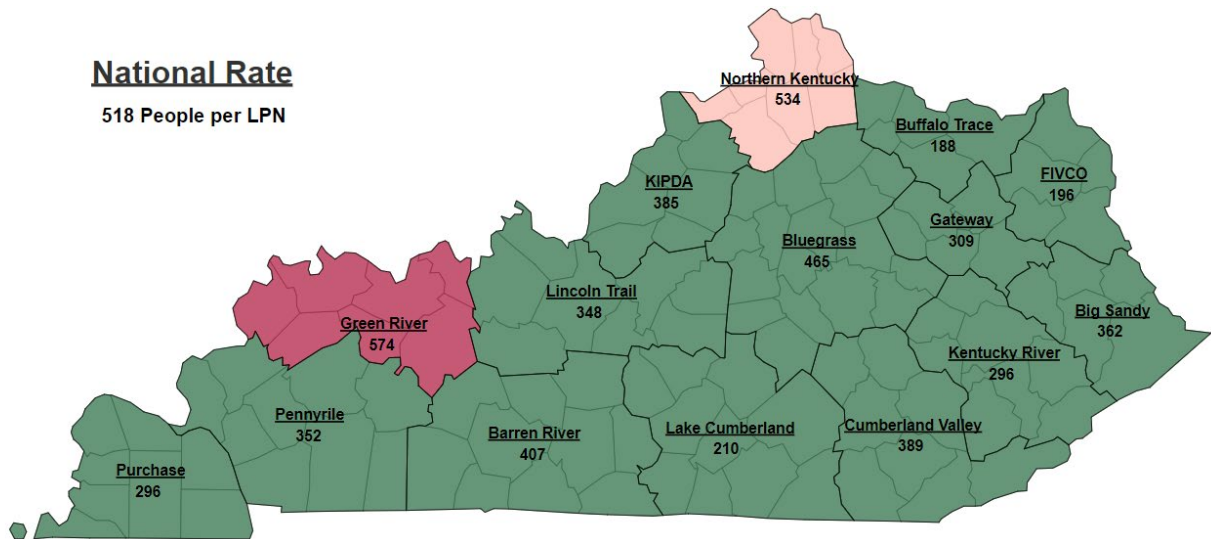
Statewide, Kentucky has 1,520 people per licensed clinical social worker (LCSW), which is considerably better than the national rate of 2,917 individuals per LCSW. There is some regional variation in terms of this distribution in Kentucky, and four ADD regions have rates that are worse than the national one (Big Sandy, Buffalo Trace, Cumberland Valley, and Purchase). Patients in the KIPDA ADD have the most favorable rate at 1,037 people per licensed clinical social worker, while the Buffalo Trace ADD has the least favorable rate at 4,649 people per therapist.

LICENSED PRACTICAL NURSES (LPN)

National Rate of People per LPNs = 518

Area Development District	LPNs	People per LPN
Barren River	762	407 ▼
Big Sandy	390	362 ▼
Bluegrass	1,784	465 ▼
Buffalo Trace	297	188 ▼
Cumberland Valley	592	389 ▼
FIVCO	687	196 ▼
Gateway	276	309 ▼
Green River	377	574 ▲
Kentucky River	362	296 ▼
KIPDA	2,651	385 ▼
Lake Cumberland	984	210 ▼
Lincoln Trail	803	348 ▼
Northern Kentucky	873	534 ▲
Pennyrile	610	352 ▼
Purchase	666	296 ▼
Kentucky	12,114	371 ▼

Notes: The counts of licensed practical nurses classified as Out of State and Unknown by these analyses were 0. Values below national rate indicated by downward green arrow (▼) and above national rate by upward red arrow (▲).



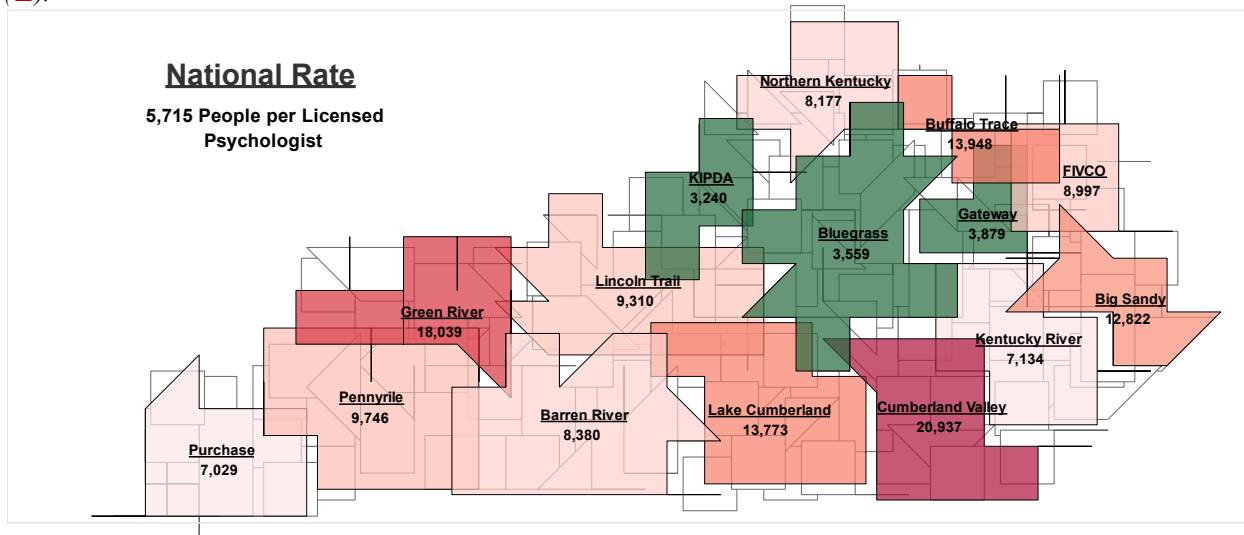
Kentucky has 371 people per LPN, which is better than the national rate of 518 individuals per LPN. Green River and Northern Kentucky regions have rate that are slightly worse than the national rate. These regions have people per nurse rate that are 10% and 3% lower than the national rate. Buffalo Trace ADD has the most favorable rate of 188 people per LPN, 2.8 times the national rate.

LICENSED PSYCHOLOGISTS

National Rate of People per Licensed Psychologists = 5,715

Area Development District	Licensed Psychologists	People Per LP
Barren River	37	8,380 ▲
Big Sandy	11	12,822 ▲
Bluegrass	233	3,559 ▼
Buffalo Trace	4	13,948 ▲
Cumberland Valley	11	20,937 ▲
FIVCO	15	8,997 ▲
Gateway	22	3,879 ▼
Green River	12	18,039 ▲
Kentucky River	15	7,134 ▲
KIPDA	315	3,240 ▼
Lake Cumberland	15	13,773 ▲
Lincoln Trail	30	9,310 ▲
Northern Kentucky	57	8,177 ▲
Pennyrile	22	9,746 ▲
Purchase	28	7,029 ▲
Kentucky	827	5,434 ▼

Notes: The counts of licensed psychologists classified as Out of State and Unknown by these analyses are 64 and 580, respectively. Values below national rate indicated by downward green arrow (▼) and above national rate by upward red arrow (▲).



Kentucky has 5,434 people per licensed psychologists, which is slightly better than the national rate of 5,715, though this trend does not hold across all ADDs. KIPDA, Bluegrass, and Gateway have a higher concentration of Licensed Psychologists compared to the rest of the commonwealth. The Green River and Cumberland Valley regions have the highest number of people per licensed psychologists. It should be noted that for a significant number of

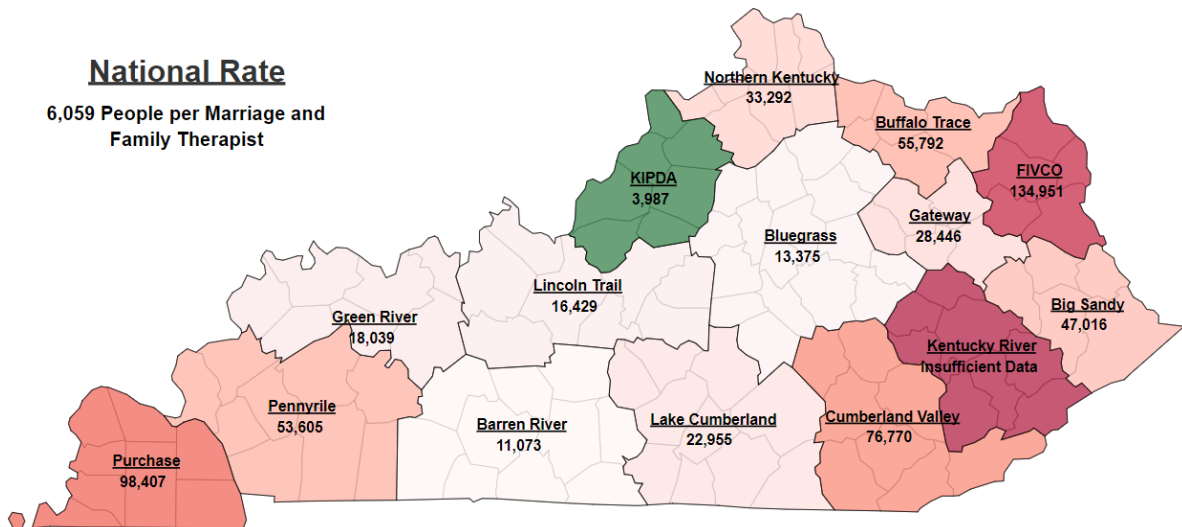
psychologists (580) licensed in Kentucky, a practice location could not be identified. As such, results should be interpreted with caution.

MARRIAGE & FAMILY THERAPISTS (MFT)

National Rate of People per Marriage & Family Therapist = 6,059

Area Development District	Marriage & Family Therapists	People per Marriage & Family Therapist
Barren River	28	11,073 ▲
Big Sandy	3	47,016 ▲
Bluegrass	62	13,375 ▲
Buffalo Trace	1	55,792 ▲
Cumberland Valley	3	76,770 ▲
FIVCO	1	134,951 ▲
Gateway	3	28,446 ▲
Green River	12	18,039 ▲
Kentucky River	0	---- ▲
KIPDA	256	3,987 ▼
Lake Cumberland	9	22,955 ▲
Lincoln Trail	17	16,429 ▲
Northern Kentucky	14	33,292 ▲
Pennyrile	4	53,605 ▲
Purchase	2	98,407 ▲
Kentucky	415	10,829 ▲

Notes: The counts of marriage & family therapists classified as Out of State and Unknown by these analyses are 26 and 338, respectively. Values below national rate indicated by downward green arrow (▼) and above national rate by upward red arrow (▲).



Kentucky has 10,829 people per MFT, which is worse than the national rate of 6,059 individuals per MFT. The KIPDA region, containing Jefferson County, is the only Kentucky ADD where the rate is better than the national average. Many regions in Kentucky have very low numbers of providers recorded. However, results should be interpreted with caution, as approximately 43%

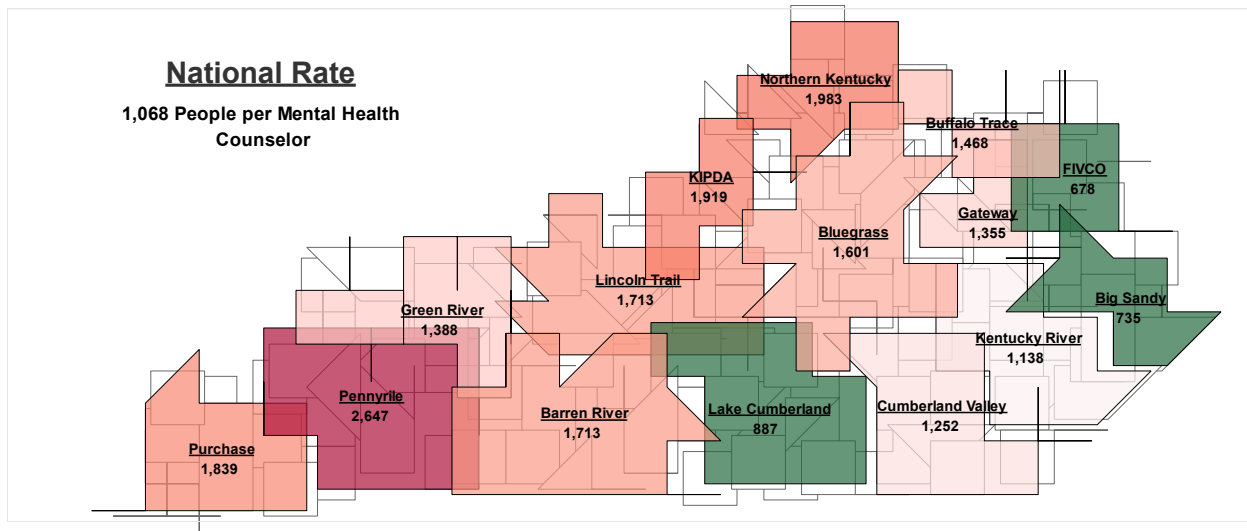
of the MFTs licensed in Kentucky have unknown location information, potentially altering the findings of this analysis.

MENTAL HEALTH COUNSELOR (MHC)

National Rate of People per Mental Health Counselors = 1068

Area Development District	MHC	People per MHC
Barren River	181	1,713 ▲
Big Sandy	192	735 ▼
Bluegrass	518	1,601 ▲
Buffalo Trace	38	1,468 ▲
Cumberland Valley	184	1,252 ▲
FIVCO	199	678 ▼
Gateway	63	1,355 ▲
Green River	156	1,388 ▲
Kentucky River	94	1,138 ▲
KIPDA	532	1,919 ▲
Lake Cumberland	233	887 ▼
Lincoln Trail	163	1,713 ▲
Northern Kentucky	235	1,983 ▲
Pennyrile	81	2,647 ▲
Purchase	107	1,839 ▲
Kentucky	2,976	1,510 ▲

Notes: The counts of mental health counselors classified as Out of State and Unknown by these analyses are 183 and 2,750, respectively. Values below national rate indicated by downward green arrow (▼) and above national rate by upward red arrow (▲).



MHC include Alcohol and Drug Counselors and Licensed Professional Counselors. Kentucky has a rate of 1,510 people per MHC. This is worse than the national rate of 1,068 people per MHC. While this trend is seen across the state, it is worst in the Pennyrile region, where the rate is over double that of the national average at 2,647. The only ADDs where the rate is better than

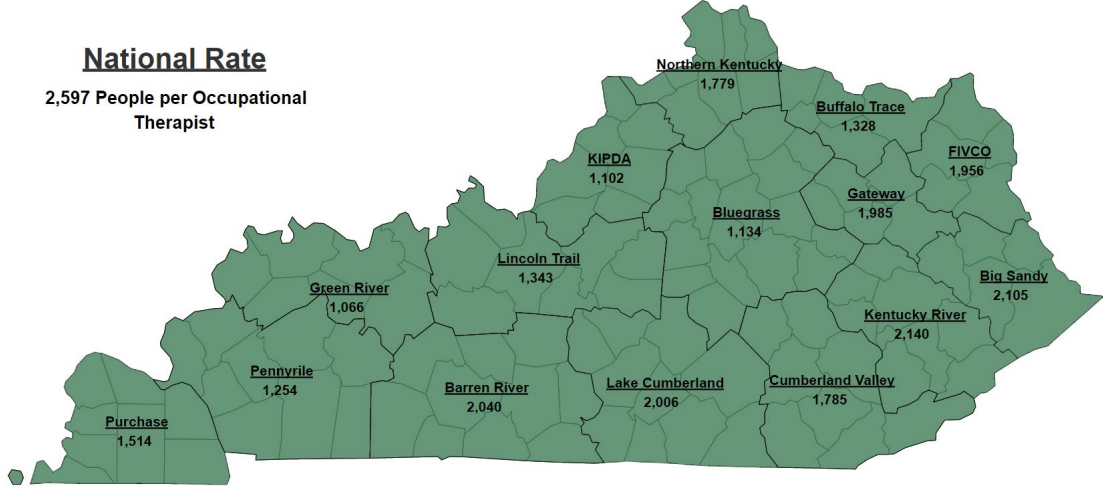
the national average are Lake Cumberland, FIVCO, and Big Sandy. It should be noted that for nearly half (2,750) of MHCs licensed in Kentucky a practice location could not be identified. As such, the extent to which an ADD has a shortage of providers should be interpreted with caution.

OCCUPATIONAL THERAPISTS

National Rate of People per Occupational Therapists = 2,597

Area Development District	Occupational Therapists	People Per Occupational Therapist
Barren River	152	2,040 ▼
Big Sandy	67	2,105 ▼
Bluegrass	731	1,134 ▼
Buffalo Trace	42	1,328 ▼
Cumberland Valley	129	1,785 ▼
FIVCO	69	1,956 ▼
Gateway	43	1,985 ▼
Green River	203	1,066 ▼
Kentucky River	50	2,140 ▼
KIPDA	926	1,102 ▼
Lake Cumberland	103	2,006 ▼
Lincoln Trail	208	1,343 ▼
Northern Kentucky	262	1,779 ▼
Pennyrile	171	1,254 ▼
Purchase	130	1,514 ▼
Kentucky	3,286	1,368 ▼

Notes: The counts of occupational therapists classified as Out of State and Unknown by these analyses are 659 and 170, respectively. Values below national rate indicated by downward green arrow (▼) and above national rate by upward red arrow (▲).



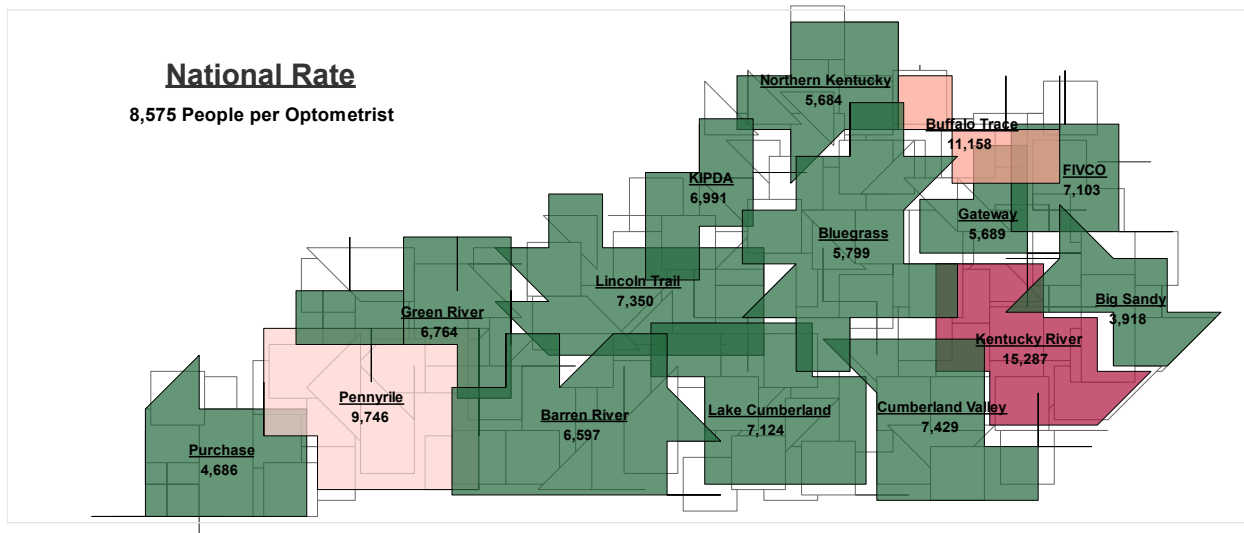
Kentucky has 1,368 people per occupational therapists, which is better than the national rate of 2,597 people per occupational therapist. Notably, all ADD regions report rates better than the national average. The Green River ADD has the greatest concentration of occupational therapists at a rate of 1,066 people per occupational therapist, while the Kentucky River has the lowest access at 2,140. These results suggest that, when compared to the rest of the nation, Kentucky has a better rate of people per occupational therapists.

OPTOMETRISTS

National Rate of People per Optometrist = 8,575

Area Development District	Optometrists	People Per Optometrist
Barren River	47	6,597 ▼
Big Sandy	36	3,918 ▼
Bluegrass	143	5,799 ▼
Buffalo Trace	5	11,158 ▲
Cumberland Valley	31	7,429 ▼
FIVCO	19	7,103 ▼
Gateway	15	5,689 ▼
Green River	32	6,764 ▼
Kentucky River	7	15,287 ▲
KIPDA	146	6,991 ▼
Lake Cumberland	29	7,124 ▼
Lincoln Trail	38	7,350 ▼
Northern Kentucky	82	5,684 ▼
Pennyrile	22	9,746 ▲
Purchase	42	4,686 ▼
Kentucky	694	6,476 ▼

Notes: The counts of Optometrists classified as Out of State and Unknown by these analyses are 170 and 9, respectively. Values below national rate indicated by downward green arrow (▼) and above national rate by upward red arrow (▲).



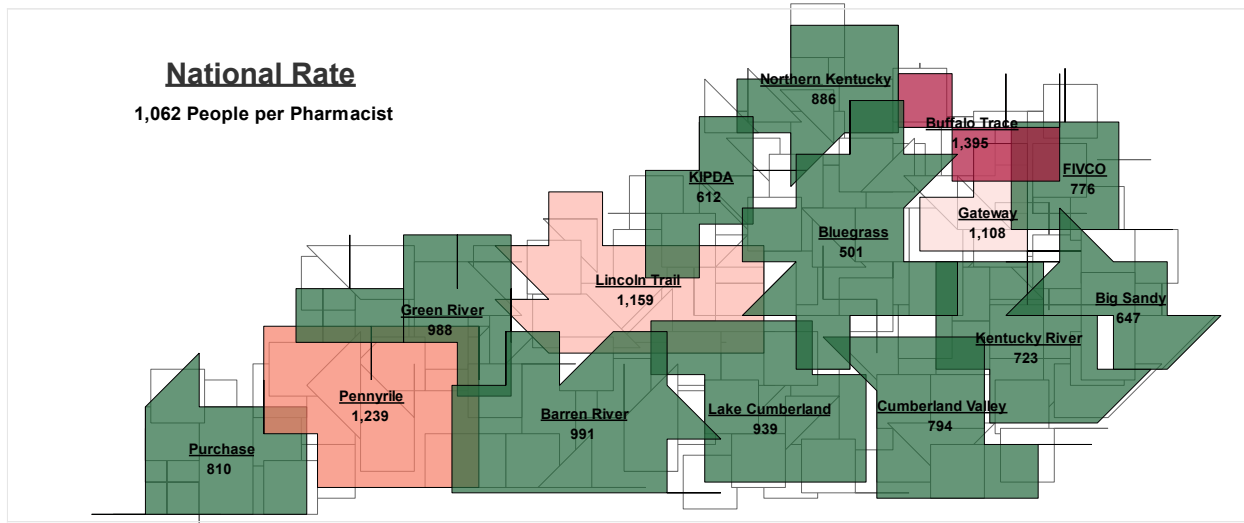
Kentucky has 6,476 people per optometrist, which is better than the national rate of 8,575 people per optometrist. Buffalo Trace, Pennyrile, and Kentucky River ADD regions have rates worse than the national average. Big Sandy stands out as the ADD with the best rate of people per optometrist.

PHARMACISTS

National Rate of People per Pharmacist = 1,062

Area Development District	Pharmacists	People Per Pharmacist
Barren River	313	991 ▼
Big Sandy	218	647 ▼
Bluegrass	1,655	501 ▼
Buffalo Trace	40	1,395 ▲
Cumberland Valley	290	794 ▼
FIVCO	174	776 ▼
Gateway	77	1,108 ▲
Green River	219	988 ▼
Kentucky River	148	723 ▼
KIPDA	1,668	612 ▼
Lake Cumberland	220	939 ▼
Lincoln Trail	241	1,159 ▲
Northern Kentucky	526	889 ▼
Pennyrile	173	1,239 ▼
Purchase	243	810 ▼
Kentucky	6,205	724 ▼

Notes: The counts of pharmacists classified as Out of State and Unknown by these analyses are 5,589 and 0, respectively. Values below national rate indicated by downward green arrow (▼) and above national rate by upward red arrow (▲).



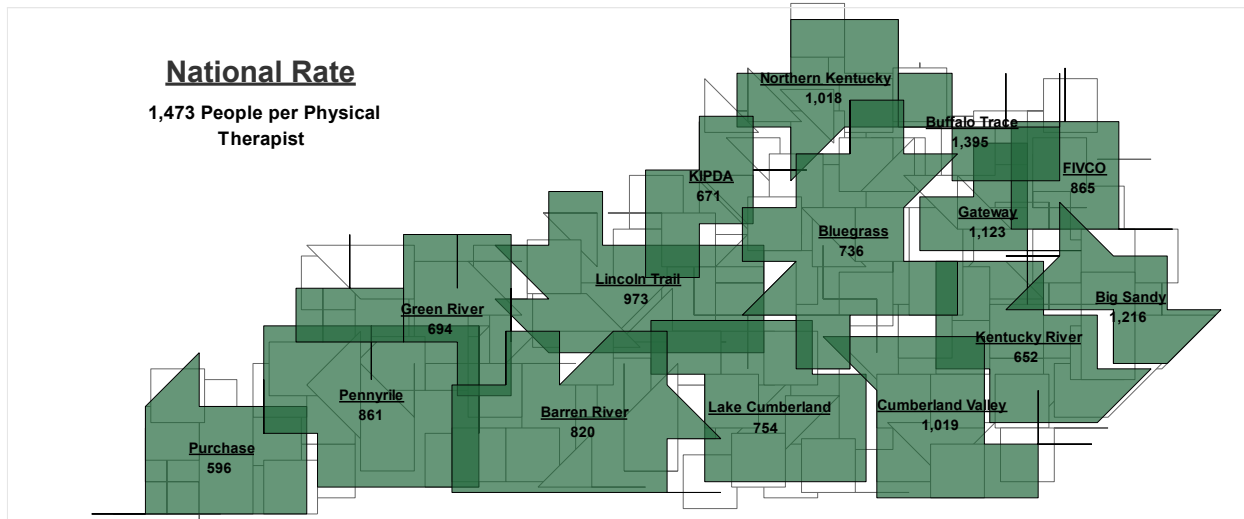
Kentucky has 724 people per pharmacist, which is better than the national rate of 1,062 people per pharmacist. Among the ADDs, four ADDs are worse than the national rate for pharmacists: Buffalo Trace, Gateway, Lincoln Trail, and Pennyrile. Among these, the most significant difference is seen in Buffalo Trace, with a rate 24% below the national rate. The Bluegrass is the best performing ADD for pharmacists, with 501 people per pharmacist, or a rate 212% better than the national rate.

PHYSICAL THERAPISTS

National Rate of People per Physical Therapists = 1,473

Area Development District	Physical Therapists	People Per Physical Therapists
Barren River	378	820 ▼
Big Sandy	116	1,216 ▼
Bluegrass	1,127	736 ▼
Buffalo Trace	40	1,395 ▼
Cumberland Valley	226	1,019 ▼
FIVCO	156	865 ▼
Gateway	76	1,123 ▼
Green River	312	694 ▼
Kentucky River	164	652 ▼
KIPDA	1,521	671 ▼
Lake Cumberland	274	754 ▼
Lincoln Trail	287	973 ▼
Northern Kentucky	458	1,018 ▼
Pennyrile	249	861 ▼
Purchase	330	596 ▼
Kentucky	5,714	787 ▼

Notes: The counts of Physical Therapists classified as Out of State and Unknown by these analyses are 1,068 and 4, respectively. Values below national rate indicated by downward green arrow (▼) and above national rate by upward red arrow (▲).



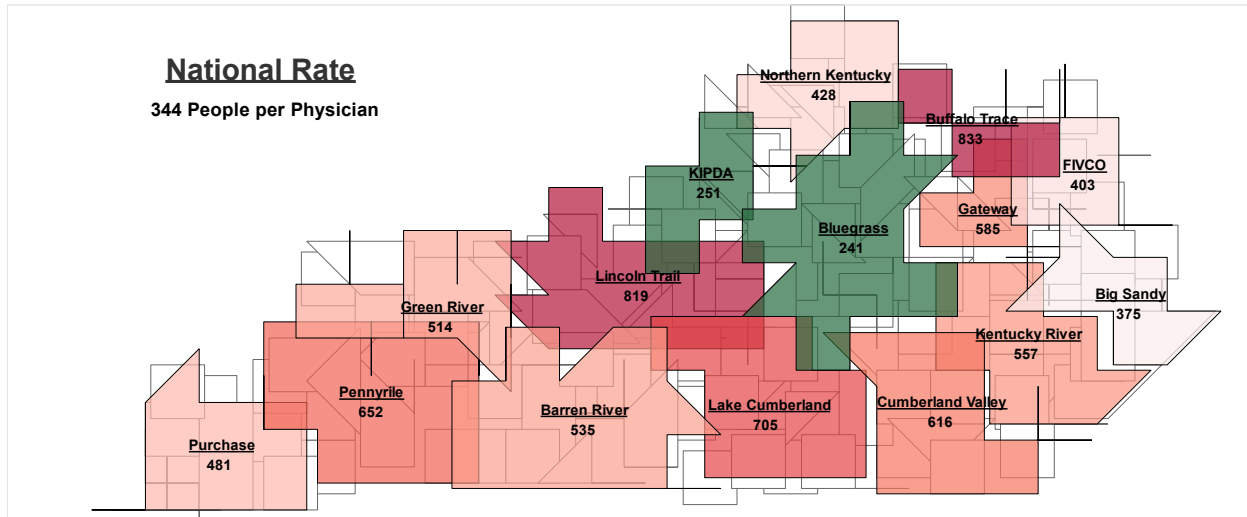
Kentucky has 787 people per physical therapist, which is better than the national rate of 1,473 people per physical therapist. The Purchase region has the most favorable rate of 596 people per provider. Buffalo Trace is closest to the national rate with 1,395. Eastern Kentucky tends to have better rates than western Kentucky, although this is not strictly the case. The quality of the physical therapist licensure data is high with only four unknown practice locations.

PHYSICIANS

National Rate of People per Physician = 344

Area Development District	Physicians	People per Physician
Barren River	580	535 ▲
Big Sandy	376	375 ▲
Bluegrass	3,446	241 ▼
Buffalo Trace	67	833 ▲
Cumberland Valley	374	616 ▲
FIVCO	335	403 ▲
Gateway	146	585 ▲
Green River	421	514 ▲
Kentucky River	192	557 ▲
KIPDA	4,071	251 ▼
Lake Cumberland	293	705 ▲
Lincoln Trail	341	819 ▲
Northern Kentucky	1,090	428 ▲
Pennyrile	329	652 ▲
Purchase	409	481 ▲
Kentucky	12,470	360 ▲

Notes: The counts of physicians classified as Out of State and Unknown by these analyses are 8,495 and 6, respectively. Values below national rate indicated by downward green arrow (▼) and above national rate by upward red arrow (▲).



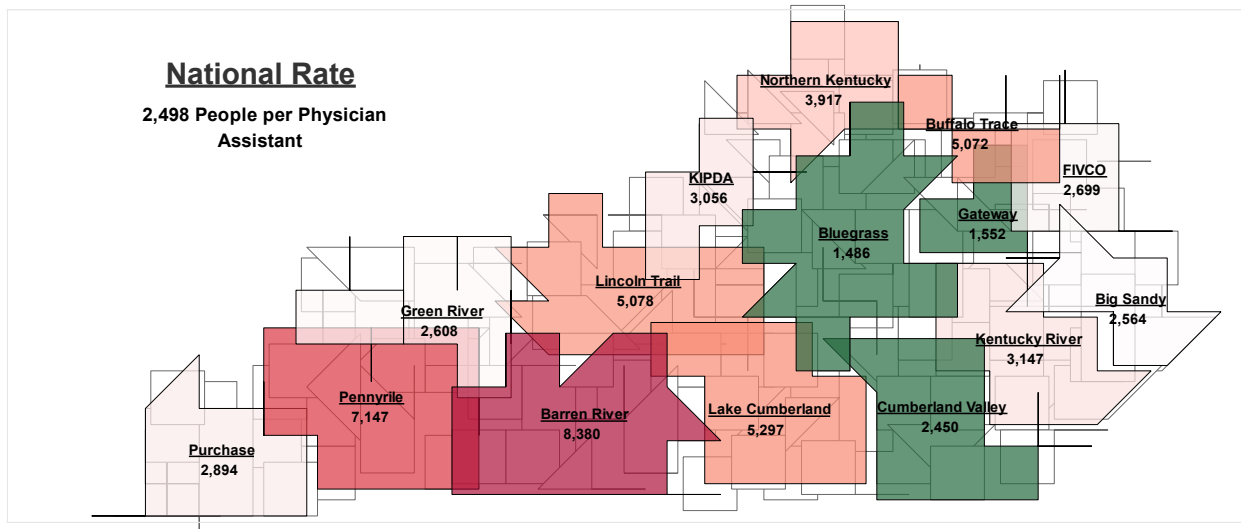
Kentucky has 360 people per physician, which is slightly worse than the national rate of 344 individuals per physician. The only ADD regions that are better than the national rate are Bluegrass and KIPDA, with a rate of 241 and 251 individuals per physician, respectively. Buffalo Trace and Lincoln Trail have the highest rate, servicing 833 and 819 individuals per physician, correspondingly.

PHYSICIAN ASSISTANTS

National Rate of People per Physician Assistant = 2,498

Area Development District	Physician Assistants	People Per Physician Assistant
Barren River	37	8,380 ▲
Big Sandy	55	2,564 ▲
Bluegrass	558	1,486 ▼
Buffalo Trace	11	5,072 ▲
Cumberland Valley	94	2,450 ▼
FIVCO	50	2,699 ▲
Gateway	55	1,552 ▼
Green River	83	2,608 ▲
Kentucky River	34	3,147 ▲
KIPDA	334	3,056 ▲
Lake Cumberland	39	5,297 ▲
Lincoln Trail	55	5,078 ▲
Northern Kentucky	119	3,917 ▲
Pennyrile	30	7,147 ▲
Purchase	68	2,894 ▲
Kentucky	1,622	2,771 ▲

Notes: The counts of physician assistants classified as Out of State and Unknown by these analyses are 241 and 2, respectively. Values below national rate indicated by downward green arrow (▼) and above national rate by upward red arrow (▲).



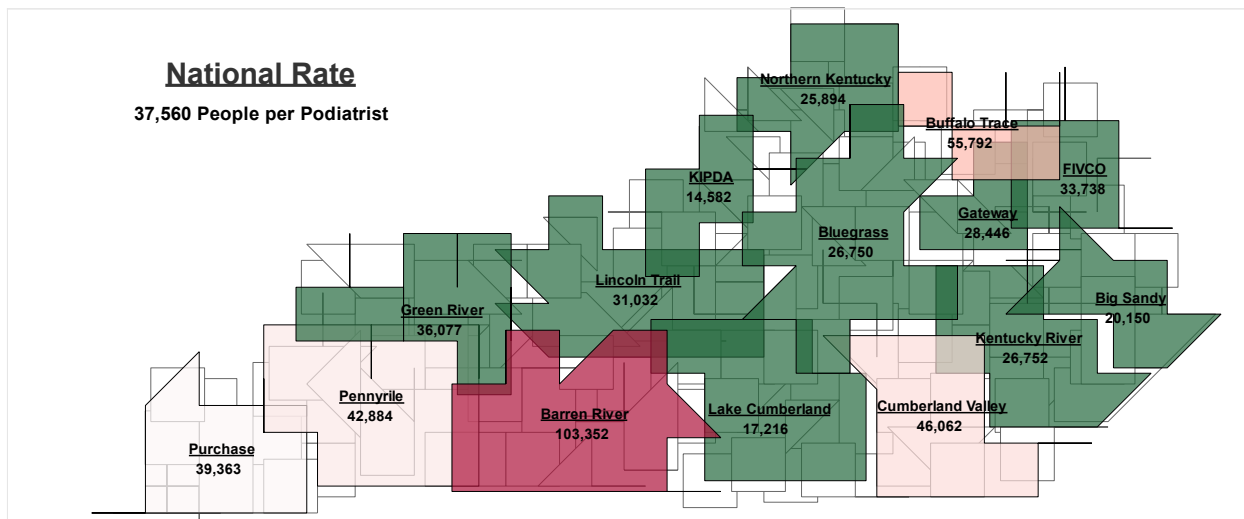
Kentucky has 2,771 people per physician assistant, marginally better than the national rate of 2,498 individuals per physician assistant. The only ADD regions that are better than the national rate are Bluegrass, Gateway, and Cumberland Valley, with rates of 1,486, 1,552, and 2,450 individuals per physician assistant, respectively. Barren River and Pennyrile have the greatest need for additional workforce, servicing 8,380 and 7,147 individuals per physician assistant, respectively.

PODIATRISTS

National Rate of People per Podiatrist = 37,560

Area Development District	Podiatrists	People Per Podiatrist
Barren River	3	103,352 ▲
Big Sandy	7	20,150 ▼
Bluegrass	31	26,750 ▼
Buffalo Trace	1	55,792 ▲
Cumberland Valley	5	46,062 ▲
FIVCO	4	33,738 ▼
Gateway	3	28,446 ▼
Green River	6	36,077 ▼
Kentucky River	4	26,752 ▼
KIPDA	70	14,582 ▼
Lake Cumberland	12	17,216 ▼
Lincoln Trail	9	31,032 ▼
Northern Kentucky	18	25,894 ▼
Pennyrile	5	42,884 ▲
Purchase	5	39,363 ▲
Kentucky	183	24,558 ▼

Notes: The counts of podiatrists classified as Out of State and Unknown by these analyses are 46 and 55, respectively. Values below national rate indicated by downward green arrow (▼) and above national rate by upward red arrow (▲).



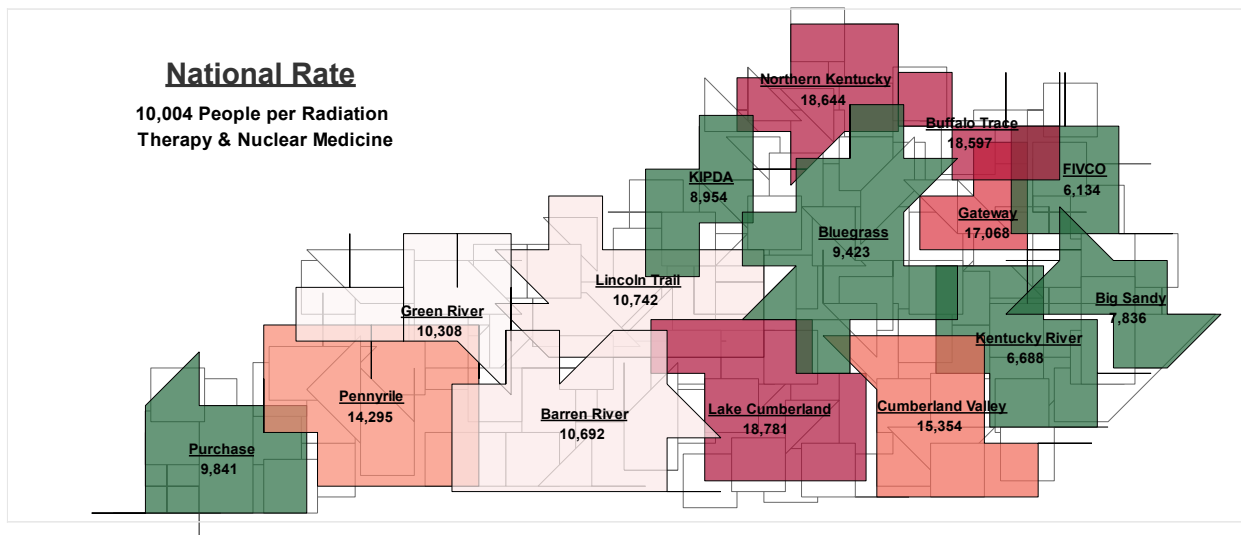
Kentucky has a rate of 24,558 people to podiatrist, which is better than the national rate of 37,560 individuals to podiatrist. Barren River is the one ADD significantly far from the national rate. It makes up part of western Kentucky, which is fairing worse on podiatrist-to-patient rates than central and eastern Kentucky. There is a large amount of missing and unknown data for podiatrists. Better data could alter the reported ADD podiatrist-to-patient rates and make more regions closer to or better than the national average.

RADIATION THERAPISTS & NUCLEAR MEDICINE TECHNOLOGISTS (RTNMT)

National Rate of People per RT or NMT = 10,004

Area Development District	RTNMT	People Per RTNMT
Barren River	29	10,692 ▲
Big Sandy	18	7,836 ▼
Bluegrass	88	9,423 ▼
Buffalo Trace	3	18,597 ▲
Cumberland Valley	15	15,354 ▲
FIVCO	22	6,134 ▼
Gateway	5	17,068 ▲
Green River	21	10,308 ▲
Kentucky River	16	6,688 ▼
KIPDA	114	8,954 ▼
Lake Cumberland	11	18,781 ▲
Lincoln Trail	26	10,742 ▲
Northern Kentucky	25	18,644 ▲
Pennyrile	15	14,295 ▲
Purchase	20	9,841 ▼
Kentucky	428	10,500 ▲

Notes: The counts of RTNMTs classified as Out of State and Unknown by these analyses are 62 and 19, respectively. Values below national rate indicated by downward green arrow (▼) and above national rate by upward red arrow (▲).



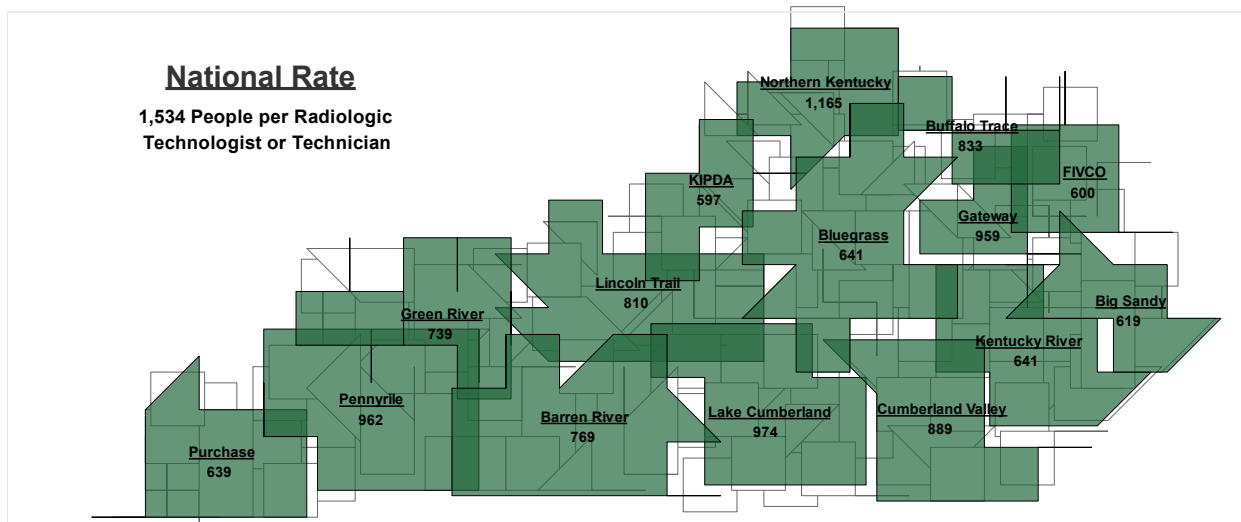
Kentucky has 10,500 people per RTNMT, slightly better than the national rate of 10,004 people per RTNMT. The ADD region with the best rate was FIVCO, with 6,134 individuals per RTNMT. Lake Cumberland, Northern Kentucky, and Buffalo Trace have the worst rates, servicing 18,781, 18,644, and 18,597 individuals per radiation therapist/nuclear medicine technologist, respectively.

RADIOLOGIC TECHNOLOGISTS AND TECHNICIANS

National Rate of People per Radiologic Technologists and Technicians = 1,534

Area Development District	Radiologic Technologists and Technicians	People Per Radiologic Technologists and Technicians
Barren River	403	769 ▼
Big Sandy	228	619 ▼
Bluegrass	1,294	641 ▼
Buffalo Trace	67	833 ▼
Cumberland Valley	259	889 ▼
FIVCO	225	600 ▼
Gateway	89	959 ▼
Green River	293	739 ▼
Kentucky River	167	641 ▼
KIPDA	1,711	597 ▼
Lake Cumberland	212	974 ▼
Lincoln Trail	345	810 ▼
Northern Kentucky	400	1,165 ▼
Pennyrile	223	962 ▼
Purchase	308	639 ▼
Kentucky	6,224	722 ▼

Notes: The counts of classified as radiological technologists and technicians Out of State and Unknown by these analyses are 959 and 115, respectively. Values below national rate indicated by downward green arrow (▼) and above national rate by upward red arrow (▲).



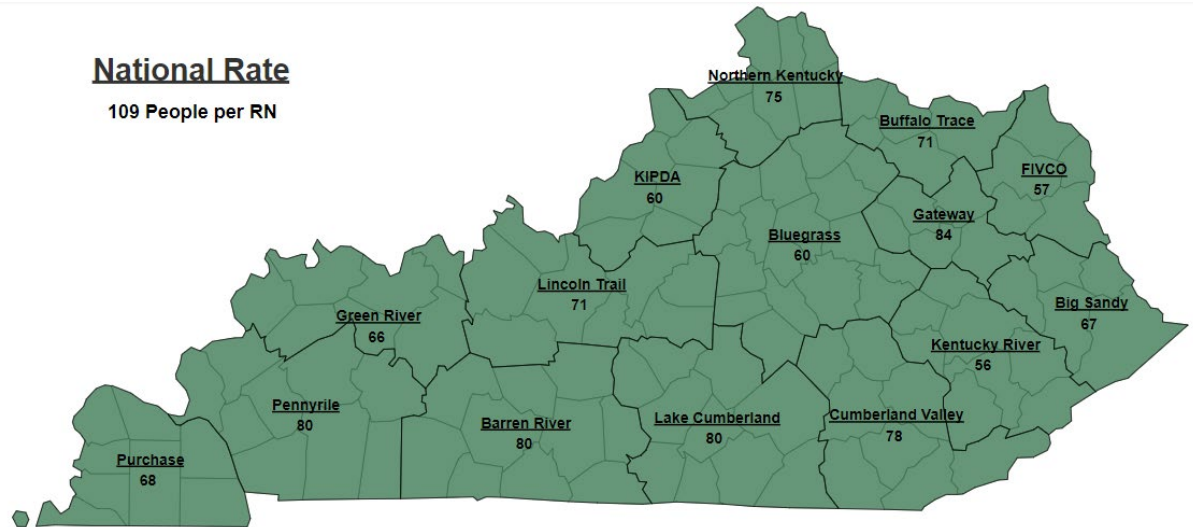
Kentucky has 722 people per radiologic technologist, which is significantly better than the national rate of 1,534 individuals per technologist. For all ADD regions, the number of people per radiological technologist and technician is lower than the national rate.

REGISTERED NURSES (RN)

National Rate of People per Registered Nurses = 109

Area Development District	Registered Nurses	People per Registered Nurse
Barren River	3,859	80 ▼
Big Sandy	2,116	67 ▼
Bluegrass	13,833	60 ▼
Buffalo Trace	788	71 ▼
Cumberland Valley	2,956	78 ▼
FIVCO	2,372	57 ▼
Gateway	1,017	84 ▼
Green River	3,264	66 ▼
Kentucky River	1,897	56 ▼
KIPDA	17,019	60 ▼
Lake Cumberland	2,598	80 ▼
Lincoln Trail	3,947	71 ▼
Northern Kentucky	6,206	75 ▼
Pennyrile	2,689	80 ▼
Purchase	2,906	68 ▼
Kentucky	67,467	67 ▼

Notes: The counts of registered nurses classified as Out of State and Unknown by these analyses were 0. Values below national rate indicated by downward green arrow (▼) and above national rate by upward red arrow (▲).



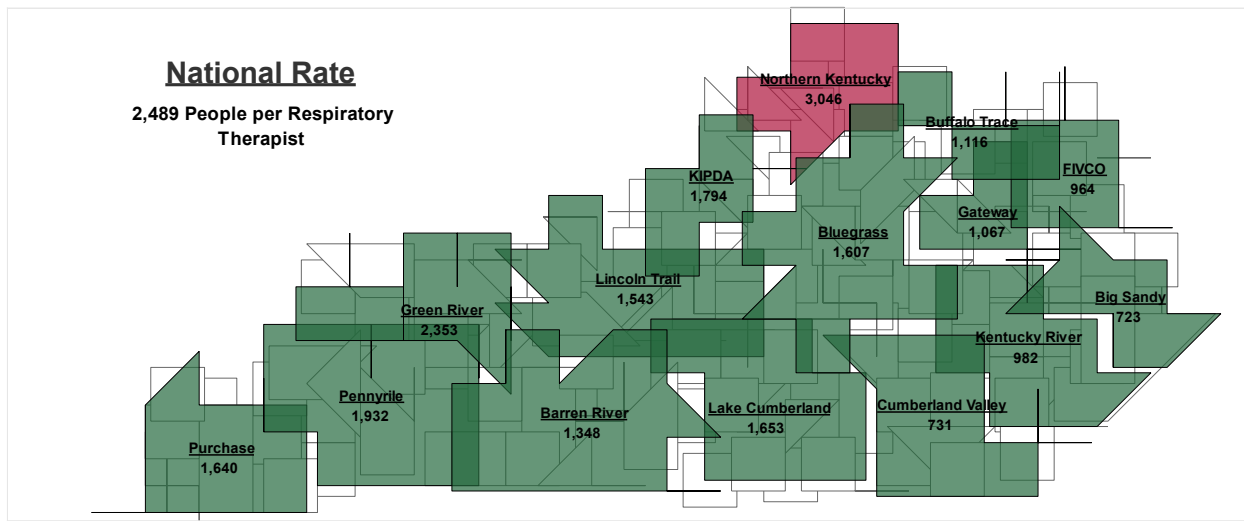
Kentucky has a rate of 67 people per RN, which is better than the national rate of 109 people per RN. Each ADD performs relatively similarly within Kentucky; however, Kentucky River has the best rate at 56 people per nurse, followed closely by FIVCO at 57 people per nurse.

RESPIRATORY THERAPISTS

National Rate of People per Respiratory Therapist = 2,489

Area Development District	Respiratory Therapists	People per Respiratory Therapist
Barren River	230	1,348 ▼
Big Sandy	195	723 ▼
Bluegrass	516	1,607 ▼
Buffalo Trace	50	1,116 ▼
Cumberland Valley	315	731 ▼
FIVCO	140	964 ▼
Gateway	80	1,067 ▼
Green River	92	2,353 ▼
Kentucky River	109	982 ▼
KIPDA	569	1,794 ▼
Lake Cumberland	125	1,653 ▼
Lincoln Trail	181	1,543 ▼
Northern Kentucky	153	3,046 ▲
Pennyrile	111	1,932 ▼
Purchase	120	1,640 ▼
Kentucky	2,986	1,505 ▼

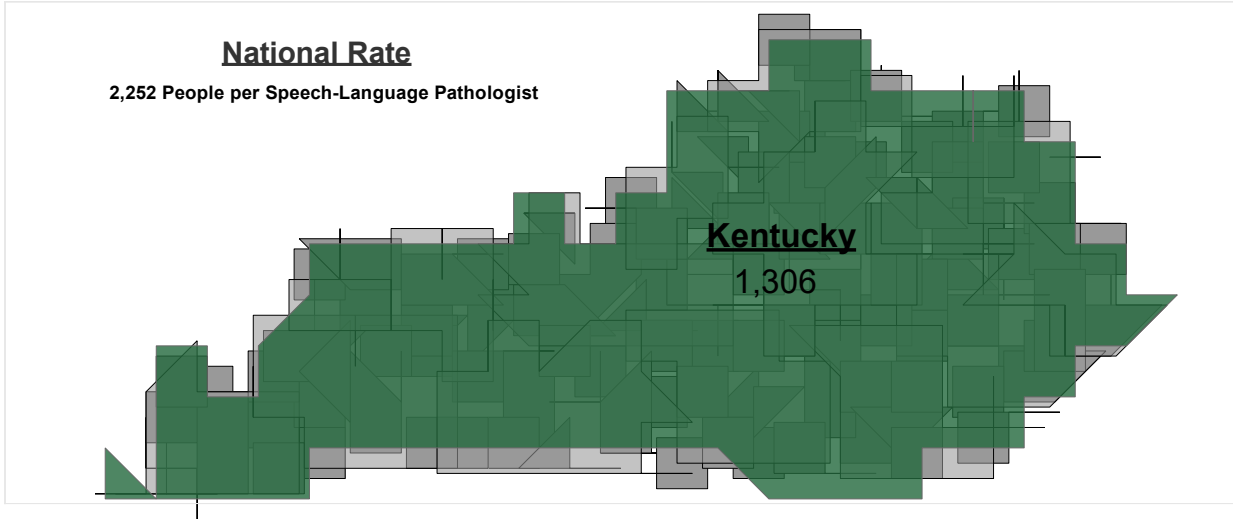
Notes: The counts of respiratory therapists classified as Out of State and Unknown by these analyses are 1,304 and 0, respectively. Values below national rate indicated by downward green arrow (▼) and above national rate by upward red arrow (▲).



Kentucky has a statewide workforce rate of 1,505 people per respiratory therapist, which is better than the national rate of 2,489. Every ADD region outperforms the national rate, except for the Northern Kentucky region. This region has 3,046 people per respiratory therapist, which is about 22% higher when compared to the national rate. Big Sandy is the best performing ADD among all regions, only having 723 people per respiratory therapist.

SPEECH-LANGUAGE PATHOLOGISTS

National Rate of People per Speech-Language Pathologists = 2,252



Notes: The counts of speech-language pathologists classified as Out of State and Unknown by these analyses are 1,926 and 73, respectively. Despite using the linking method to NPES data, greater than 50% of geographic data for licensed speech-language pathologists was missing. For this reason, only the statewide value (which includes providers with missing data), and rate is reported. Values below national rate indicated by downward green arrow (▼) and above national rate by upward red arrow (▲).

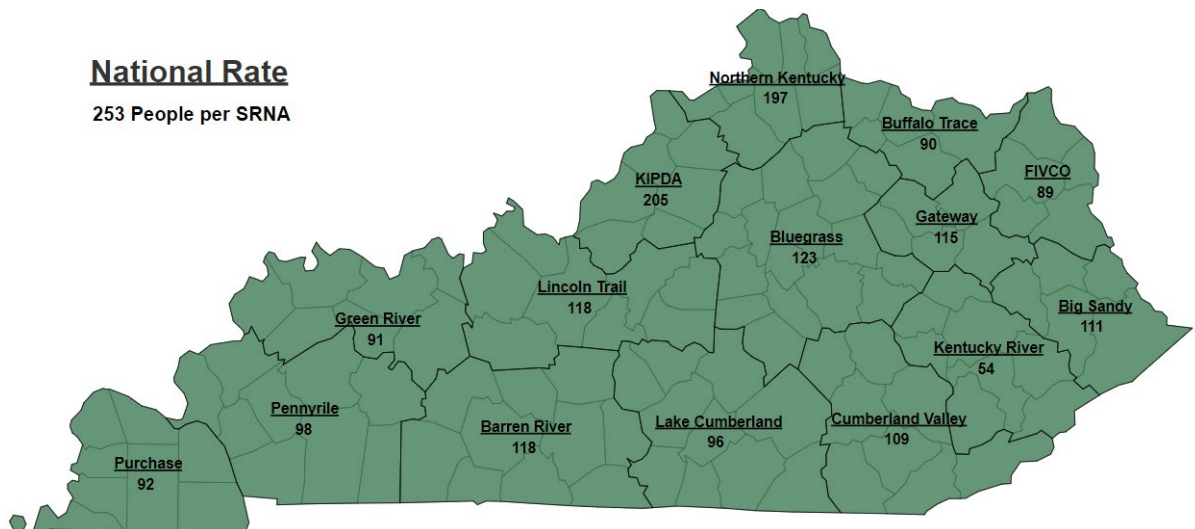
Kentucky has 1,306 people per speech-language pathologist, which is better than the national rate. The high level of missing data in the licensure dataset for speech-language pathologists prohibits analysis of regional variation within Kentucky. It is important to note that the rate described here rests on the assumption that all the providers with unknown addresses are providers who mostly practice in Kentucky, and the degree to which those providers maintain an active Kentucky license but mostly practice in another state could significantly alter the conclusions presented here. Results should be interpreted with caution.

STATE REGISTERED NURSE AIDES (SRNAs)

National Rate of People per SRNAs = 253

Area Development District	SRNAs	People per SRNA
Barren River	2,621	118 ▼
Big Sandy	1,267	111 ▼
Bluegrass	6,732	123 ▼
Buffalo Trace	621	90 ▼
Cumberland Valley	2,120	109 ▼
FIVCO	1,520	89 ▼
Gateway	743	115 ▼
Green River	2,367	91 ▼
Kentucky River	1,985	54 ▼
KIPDA	4,990	205 ▼
Lake Cumberland	2,150	96 ▼
Lincoln Trail	2,373	118 ▼
Northern Kentucky	2,368	197 ▼
Pennyrile	2,189	98 ▼
Purchase	2,146	92 ▼
Kentucky	36,192	124 ▼

Notes: The counts of state registered nurse aides classified as Out of State and Unknown by these analyses were 0. Values below national rate indicated by downward green arrow (▼) and above national rate by upward red arrow (▲).



Kentucky has a rate of 124 people per SRNA, which is better than the national rate of 253 individuals per aides. While all ADDs demonstrate an adequate number of SRNAs, the best people per nurse rate is seen in Kentucky River, at 54 people per SRNA. This makes the rate of SRNAs to people in Kentucky River 4.7 times better than the national average.

VII. KENTUCKY MEDICAL GRADUATE RETENTION

Figure VII-1. Total Graduates from M.D. and D.O Granting Institutions in Kentucky Annually from 2010 through 2022

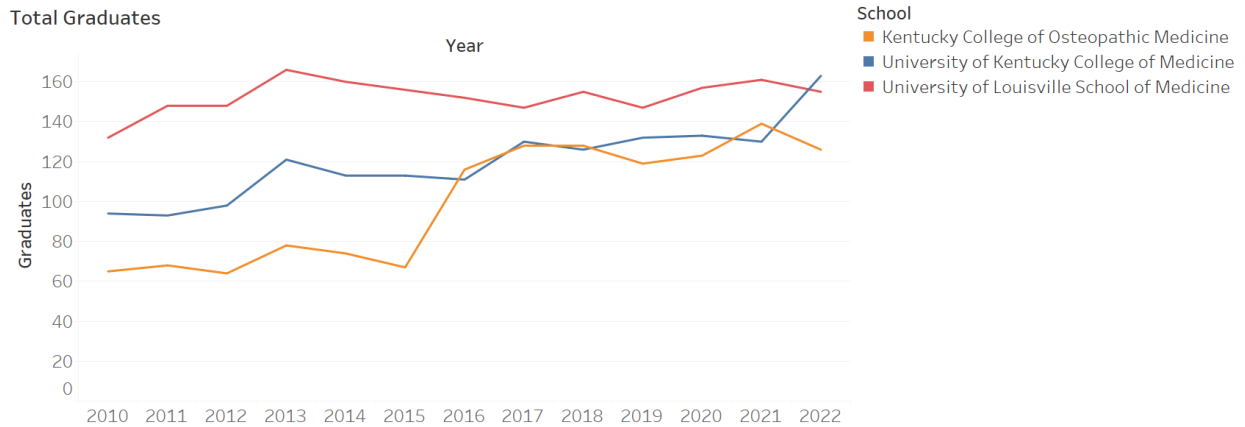


Figure VII-2. Graduates from M.D. and D.O Granting Institutions in Kentucky that are Licensed to Practice in Kentucky, Grouped by Graduation Year from 2010 through 2018.

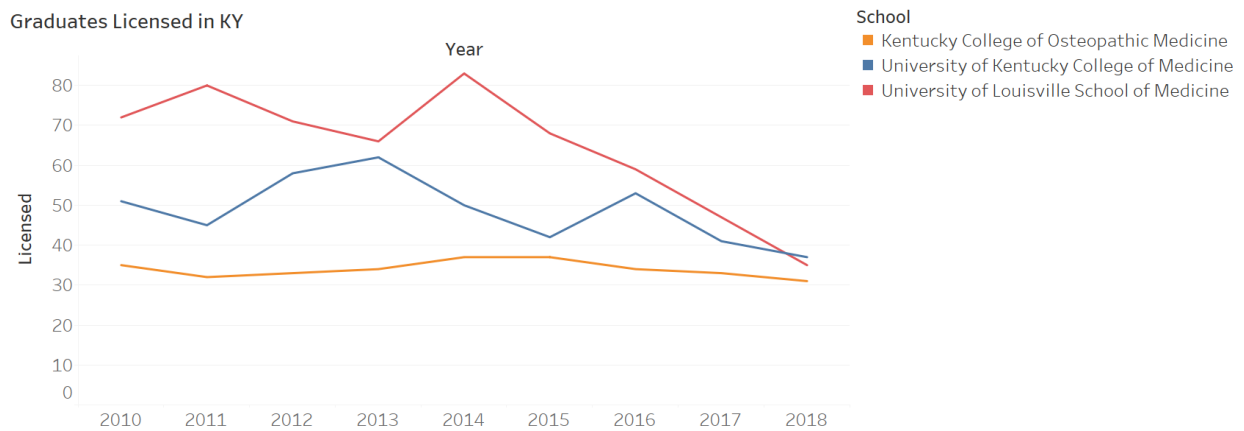
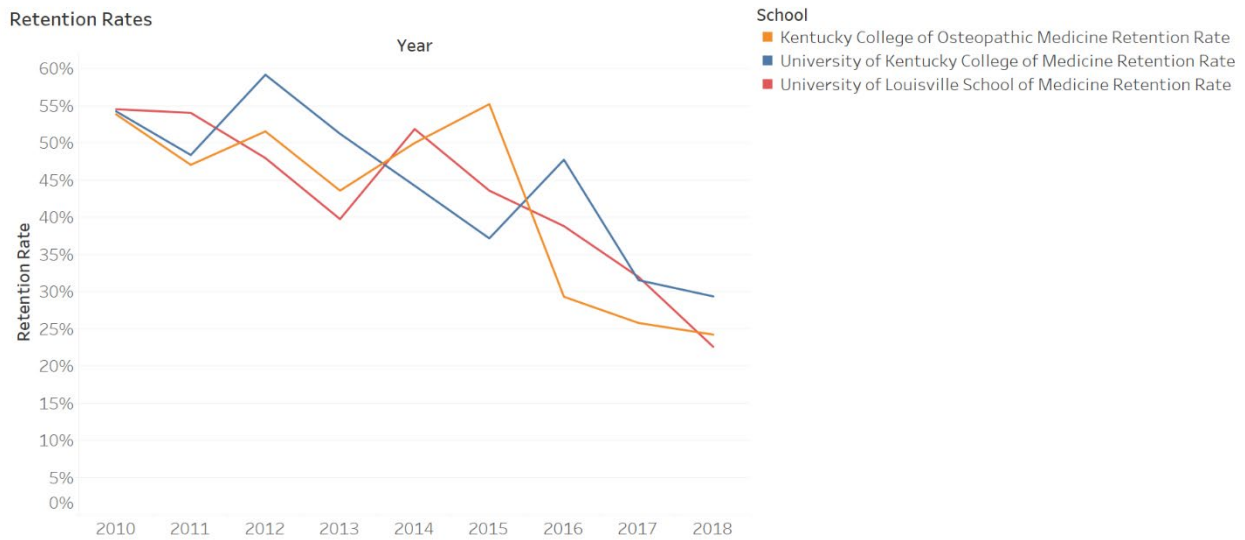


Figure VII-3. Retention Rates of Graduates from Kentucky M.D. and D.O. Granting Institutions that Remained and/or Returned after Residency, Grouped by Graduation Year from 2010 through 2018.



Figures VII-1, VII-2, and VII-3 describe the Kentucky medical school graduate numbers and in-state retention rate. Figure VII-2 and Figure VII-3 stop reporting information in 2018, as that is the latest that someone could have graduated from medical school and completed the shortest residency. Figure VII-3 rates represent the percentage of people from each graduating year who subsequently became licensed to practice in Kentucky. For example, if a doctor graduated in 2011, completed residency, and became licensed in Kentucky in 2017, they would be counted in the 2011 group of retention rates. Likewise, in Figure VII-2, this doctor would be counted in the 2011 year of graduates licensed in Kentucky.

From 2011 through 2022, there was an overall increasing trend in graduates from the state’s medical schools. More applications and more admissions may have driven this change. Nationally, students applying for medical school increased by 18% for the 2021-22 school year, according to the Association of American Medical Colleges (AAMC).²³ Potentially, the COVID-19 public health emergency motivated additional applications as it highlighted importance of healthcare professionals -- nicknamed the “Dr. Fauci effect”. Furthermore, the pandemic may have limited and altered some career prospects, encouraging more people to consider medical school.^{24,25} To alleviate this, medical schools have expanded campus locations. The University of Kentucky Medical School has even taken steps to expand its admitted class size by adding partnership locations where clinical rotations can occur outside the main Lexington campus.²⁶

A given year’s graduate numbers and retention percentage may overrepresent the number of physicians who will eventually become licensed to practice in Kentucky. Upon graduation, doctors may match with and complete a residency. Often, new doctors match with an out-of-state residency program. Residency can be a critical time for a new doctor’s family formation. Planting roots in a community during residency may increase the likelihood that a new doctor will stay out of state if they do not match into a Kentucky residency program. Given the rise in graduates in Kentucky, increasing residency program capacity could be an avenue to achieve higher retention of physicians.

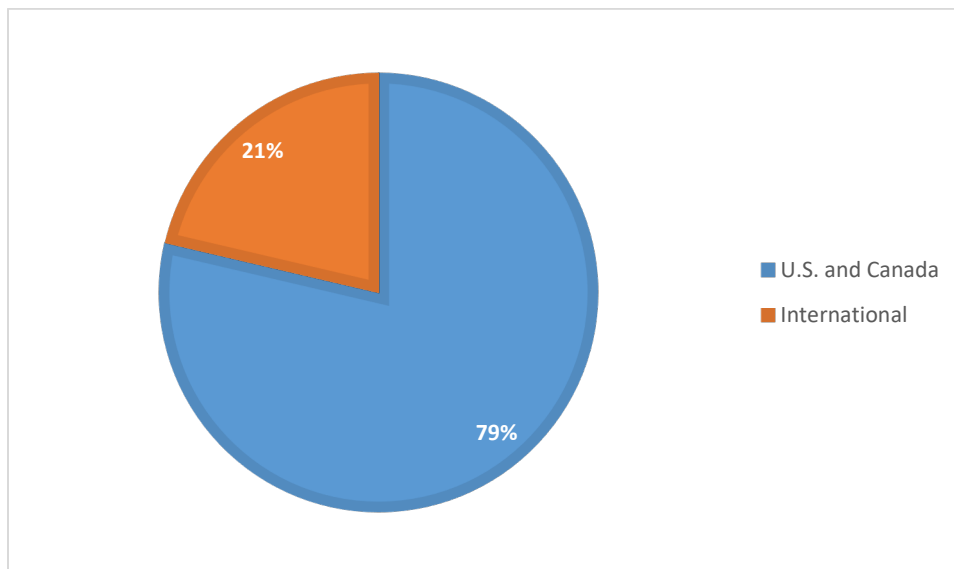
²⁷Recent graduates who return to Kentucky following completion of an out-of-state residency or fellowship may retroactively increase the retention rates for 2018; however, these retroactive increases are not anticipated to significantly alter the overall decline in retention depicted in Graph VII-3 or alter the fact that fewer Kentucky graduates are becoming licensed to practice in Kentucky despite increases in graduating class size. The decrease in retention rates presented in Graph VII-3 is not solely attributable to increases in graduating class size.

VIII. DISPERSION OF IMGs ACROSS THE COMMONWEALTH

IMGs are integral to the healthcare workforce in Kentucky. Most IMGs are foreign-born non-American citizens that graduated from medical schools outside the United States. Although Americans who choose to attend international medical schools are also considered to be IMGs, this section largely focuses on those physicians that are non-citizens and trained outside the United States. Compared to physicians trained in American medical schools, foreign-trained physicians are more likely to practice in lower-income and disadvantaged communities.²⁸

Likely, visa programs help incentivize IMGs to address the needs of rural Kentuckians. Approximately 50% of IMGs receive J-1 visa waivers in exchange for their service to more isolated rural areas. This is a boon for underserved communities as the J-1 visa waiver program is tied to health provider shortage areas (HPSAs).²⁹ The waivers allow IMGs to stay in the country instead of having to leave the U.S. for at least two years following the completion of their residency before being eligible to return.³⁰

Figure VIII-1 *Country of Medical School for Doctors Licensed in Kentucky in 2022.*



Note: The one entry with an unknown medical school was removed from the sample. U.S. and Canada are grouped together as they have a joint accreditation agreement conferred upon a medical school student's graduation licensing

a practitioner in both countries. International would include both Americans that graduated from IMGs and foreign-born individuals that graduated from IMGs.

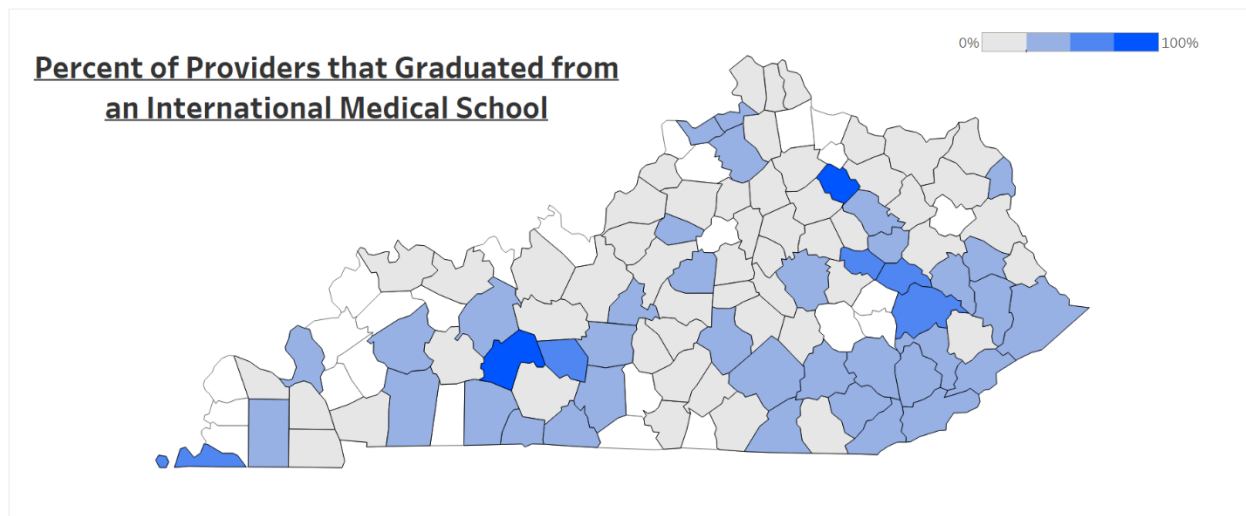
Using the KBLM licensing board data, slightly more than 1 in 5 licensed doctors in Kentucky are from international locations. This illustrates that IMGs are vital to the supply of Kentucky doctors. Kentucky’s percentage of IMGs is slightly less than the national rate of IMG practitioners.³⁰

Table VIII-1. *Top Ten Colleges that IMGs Licensed in KY Graduated from.*

School Name	Location	Count of Graduates Licensed in KY
St. George’s University	Grenada	394
Dow Medical College, University of Karachi	Pakistan	234
University of Santo Tomas	Philippines	207
University of Damascus	Syria	194
American University of the Caribbean School of Medicine	Sint Maarten	186
King Edward Medical University	Pakistan	139
Osmania Medical College, Osmania University	India	121
Universidad Autonoma De Guadalajara, Jalisco	Mexico	105
University of the Philippines Manila	Philippines	103
American University of Beirut	Lebanon	101

This table describes the ten international colleges from which IMGs licensed in Kentucky have graduated. Grenada, Pakistan, the Philippines, Syria, Sint Maarten, India, Mexico, and Lebanon are countries that have a substantial number of graduates in Kentucky. Identifying that these countries produce the most IMGs for the Commonwealth could be a starting place for recruiting more heavily from these regions.

Figure VIII-2. *Percent of Providers that Graduated from an IMG.*



Note: This is a map of Kentucky where each county is colored based on the percentage of providers that graduated from an international medical school. The colors are binned by percentages, where white shaded regions indicate that 0% of providers are IMGs, grey shaded is 1 to >25%, light blue shaded is 25% to >50%, medium shaded blue 50% to >75%, and the deepest blue shaded is 75% to 100%.

IMGs provide substantial care to the more rural areas of Kentucky, particularly in the southeastern region, a more rural region of the state; and in western Kentucky, particularly the area around Bowling Green (Warren County). Notably, both Nicholas County and Butler County have the largest percentage of IMGs, with 75% or more of the providers in their counties being IMGs.

IX. CONCLUSION

The healthcare workforce is a vital component of Kentucky's infrastructure, ensuring the health and wellbeing of its citizens. With approximately 184,000 active healthcare professionals registered in the state, these individuals provide a significant service to the Commonwealth. Their work ensures that the other realms of life within Kentucky can flourish, and thus having an adequate workforce is an important component towards a bright, healthy future for the Commonwealth.

This report found a disparity in the number of physicians practicing and licensed in Kentucky in every ADD except Bluegrass and KIPDA when compared to the national rate. Diabetes educators applied behavioral analysts, audiologists, MFTs, mental health counselors, physician assistants, and RTNMTs are also practicing or licensed in Kentucky at a rate worse than the national average. Significant shortages exist within the Buffalo Trace, Kentucky River, Cumberland Valley, Purchase, Pennyrile, and Green River ADDs. For many of these regions, larger metropolitan areas are a greater distance to travel for care, suggesting that residents may face significant health disparities due to a lack of easily accessible providers.

While data indicates that the number of healthcare physicians will likely continue to grow, rapidly growing older population may dramatically increase the need for these individuals beyond the supply. Therefore, the healthcare workforce shortages observed within this report represent an urgent area of concern for Kentucky. By further focusing efforts on growing a vital component to the wellbeing of Kentucky, we create a better community for Kentuckians to live in and thus ensure that Kentucky continues thriving for years to come.

X. BIBLIOGRAPHY

1. Staff Shortages Choking U.S. Health Care System | Healthiest Communities Health News | U.S. News. Accessed February 9, 2023. <https://www.usnews.com/news/health-news/articles/2022-07-28/staff-shortages-choking-u-s-health-care-system>
2. Dentzer S. Susan Dentzer: How to design a national strategy to end the healthcare workforce crisis. HFMA. Published January 24, 2023. Accessed February 6, 2023. <https://www.hfma.org/operations-management/susan-dentzer-how-to-design-a-national-strategy-to-end-the-healthcare-workforce-crisis/>
3. Landrum M, Schutze M. KHA Workforce Survey Report. Published online 2022.
4. United Health Foundation. America's Health Rankings. Published 2022. Accessed February 9, 2023. <https://assets.americashealthrankings.org/app/uploads/allstatesummaries-ahr22.pdf>
5. Health Insurance Coverage of the Total Population. KFF. Published October 28, 2022. Accessed June 14, 2023. <https://www.kff.org/other/state-indicator/total-population/>
6. Acquisto A. Beshear: COVID-19 surge means KY will 'be out of hospital capacity very, very soon.' Lexington Herald Leader. Published August 19, 2021. Accessed February 6, 2023. <https://www.kentucky.com/news/coronavirus/article253602358.html>
7. Boyer C. Kentucky hospitals have been overflowing with COVID patients for almost 2 months. *NPR*. <https://www.npr.org/2021/10/04/1043145270/kentucky-hospitals-are-have-been-overflowing-with-covid-patients-almost-2-months>. Published October 4, 2021. Accessed February 6, 2023.
8. Godsey J. COVID-19 Survey of Kentucky Nurses. *Ky Nurses Assoc*. Published online October 21, 2021.
9. Data Dissemination | CMS. Accessed May 16, 2023. <https://www.cms.gov/Regulations-and-Guidance/Administrative-Simplification/NationalProvIdentStand/DataDissemination>
10. Doctor shortages are here—and they'll get worse if we don't act fast | American Medical Association. Accessed June 14, 2023. <https://www.ama-assn.org/practice-management/sustainability/doctor-shortages-are-here-and-they-ll-get-worse-if-we-don-t-act>
11. Healthcare Occupations : Occupational Outlook Handbook: : U.S. Bureau of Labor Statistics. Accessed June 14, 2023. <https://www.bls.gov/ooh/healthcare/home.htm>
12. The State of the Nation's Nursing Shortage. *US News & World Report*. Accessed June 14, 2023. <https://www.usnews.com/news/health-news/articles/2022-11-01/the-state-of-the-nations-nursing-shortage>

13. Kentucky Profile, 2012. ACL. Accessed June 14, 2023. <https://acl.gov/sites/default/files/programs/2016-11/Kentucky%20Epi%20Profile%20Final.pdf>
14. Kentucky's Growing Mental Health Crisis. Kentucky Hospital Association Data Center. Accessed June 14, 2023. <https://www.kyha.com/assets/docs/DataDocs/KentuckysGrowingMentalHealthCrisisReport.pdf>
15. Table C6. Physician Retention in State of Residency Training, by State. AAMC. Accessed June 14, 2023. <https://www.aamc.org/data-reports/students-residents/data/report-residents/2022/table-c6-physician-retention-state-residency-training-state>
16. Immigration information for international medical graduates | American Medical Association. Accessed June 14, 2023. <https://www.ama-assn.org/education/international-medical-education/immigration-information-international-medical-graduates>
17. 23 RS HB 200. Kentucky Legislature. Accessed June 14, 2023. <https://apps.legislature.ky.gov/law/acts/23RS/documents/0065.pdf>
18. Kentucky Healthcare Workforce Collaborative - Ky. Council on Postsecondary Education. Accessed February 1, 2023. <http://cpe.ky.gov/ourwork/kyhwc.html>
19. Medical Student Education | Bowling Green Campus | University of Kentucky College of Medicine. Accessed June 14, 2023. <https://medicine.uky.edu/sites/meded/bowling-green-campus>
20. About ADDs. Kentucky Council of Area Development Districts. Accessed May 2, 2023. <http://www.kcadd.org/overview>
21. Fields BE, Bigbee JL, Bell JF. Associations of Provider-to-Population Ratios and Population Health by County-Level Rurality. *J Rural Health*. 2016;32(3):235-244. doi:10.1111/jrh.12143
22. US Department of Health and Human Services. Physician supply and demand: Projections to 2020. *HRSA Bur Health Prof*. Published online 2006. <https://bhwh.hrsa.gov/sites/default/files/bureau-health-workforce/data-research/physician-2020-projections.pdf>
23. Medical school applicants and enrollments hit record highs; underrepresented minorities lead the surge. AAMC. Accessed May 26, 2023. <https://www.aamc.org/news/medical-school-applicants-and-enrollments-hit-record-highs-underrepresented-minorities-lead-surge>
24. Nietzel MT. What's Behind The Soaring Applications To Medical School? Forbes. Published December 9, 2021. Accessed March 13, 2023. <https://www.forbes.com/sites/michaelnietzel/2021/12/09/whats-behind-the-soaring-applications-to-medical-school/>

25. Marcus J. “Fauci Effect” Drives Record Number Of Medical School Applications. *NPR*. <https://www.npr.org/2020/12/07/942170588/fauci-effect-drives-record-number-of-medical-school-applications>. Published December 7, 2020. Accessed March 13, 2023.
26. Addressing Kentucky’s Physician Shortage While Securing a Ne... : Academic Medicine. Accessed May 26, 2023. https://journals-lww-com.ezproxy.uky.edu/academicmedicine/Fulltext/2021/03000/Addressing_Kentucky_s_Physician_Shortage_While.25.aspx
27. Types of Licenses - Kentucky Board of Medical Licensure. Accessed May 26, 2023. <https://kbml.ky.gov/physician/Pages/Types-of-Licenses.aspx>
28. Foreign-Trained Doctors are Critical to Serving Many U.S. Communities. American Immigration Council. Published January 17, 2018. Accessed June 5, 2023. <https://www.americanimmigrationcouncil.org/research/foreign-trained-doctors-are-critical-serving-many-us-communities>
29. Rural J-1 Visa Waiver Overview - Rural Health Information Hub. Accessed November 23, 2022. <https://www.ruralhealthinfo.org/topics/j-1-visa-waiver>
30. How IMGs have changed the face of American medicine | American Medical Association. Accessed June 5, 2023. <https://www.ama-assn.org/education/international-medical-education/how-imgs-have-changed-face-american-medicine>

XI. REPORT AUTHORS

Cameron Bushling

Kailyn Conner

Ryan LaZur

Jacob Mackie

Patrick Perry

Angela Taylor

Darby Todd

Matthew Walton