2018 Kentucky Dental Workforce Update

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Introduction

The perception that oral health is in some way less important than and separate from general health has been deeply ingrained in the American consciousness. Many Americans are unaware of ways to preserve oral health and may not recognize signs indicating they are in trouble.[1] Poor oral health can contribute to various diseases including endocarditis, cardiovascular disease, diabetes, HIV/AIDS, osteoporosis, and Alzheimer's disease.[2]

Kentuckians often fair worse on a multitude of health measures, especially rural Kentuckians. According to the 2019 County Health Rankings data, when compared to US averages, Kentuckians are more likely to smoke (18% vs 23%), be obese (32% vs 36%), be physically inactive (26% vs 31%), have diabetes (12% vs 14%), and report higher instances of poor or fair health (17% vs 22%). Rural Kentuckians experience these conditions at an even higher rate: physical inactivity (32%), diabetes (15%), and 23% report having poor or fair health. Life expectancy also decreases from the US average (77.4 years) to Kentucky's average (74.4 years) to rural Kentucky's average (73.8). In fact, the bottom ten counties with the lowest life expectancy are in rural Kentucky: (Owsley (67.8), Perry (69.0), Powell (69.8), Whitley (70.2), Breathitt (70.4), Floyd (70.6), Harlan (70.7), Lee (70.8), Gallatin (70.8), and Leslie (71.0)). Furthermore, Owsley County ranks eleventh in lowest life expectancy among all counties in the US.

Social factors can contribute to a patient's interest in or ability to seek oral health services which include: geography, socioeconomic conditions, oral health literacy, oral health preventive behaviors, and cultural preferences. Health behaviors including diet, smoking, and daily hygiene impact overall oral health. In addition, use of medications, abuse of substances, and genetic factors increase the likelihood of dental disease.[3] Compounding health disparity problems is the lack of adequate reimbursement for oral care services in both public and private programs.[4]

Health Provider Shortage Areas

As of 2018, in Kentucky, there were 124 federally designated dental health provider shortage areas (HPSA) with a total population of 617,809.[5] The Bureau of Health Workforce,

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[1] Office of the Surgeon General (US). National Call To Action To Promote Oral Health. Rockville (MD): National Institute of Dental and Craniofacial Research (US); 2003. The Actions. Available from: https://www.ncbi.nlm.nih.gov/books/NBK47478/

[2] Mayo Clinic- https://www.mayoclinic.org/healthy-lifestyle/adult-health/in-depth/dental/art-20047475.

[3] https://www.cdc.gov/oralhealth/oral_health_disparities/index.htm

[4] Office of the Surgeon General (US). National Call To Action To Promote Oral Health. Rockville (MD): National Institute of Dental and Craniofacial Research (US); 2003. The Actions. Available from: https://www.ncbi.nlm.nih.gov/books/NBK47478/

[5] Henry J. Kaiser Family Foundation (2019). Dental Care Health Professional Shortage Areas. Retrieve from https://www.kff.org/other/state-indicator/dental-care-health-professional-shortage-areas-

Health Resources and Services Administration (HRSA), U.S. Department of Health & Human Services, determines health provider shortage areas in three domains; primary care, dental health, and mental health. Shortage areas may be geographic, population, or facility based. In order for HRSA to designate a geographic area or population as having a shortage, the population to dental provider must be 5,000:1 or greater (HRSA). Facilities are designated a HPSA by serving a designated geographic area or population.

A further examination of HPSAs in Kentucky revealed the majority of dental HPSAs are located within rural Kentucky. Seventy-two of Kentucky's 120 counties contain a dental HPSA (geographic, population, and/or facility based), 56 of the seventy-two counties with any shortage designation being rural counties (78%). Seventeen whole counties are designated HPSAs, all being rural except one county (94%). Thirty-four counties contain HPSA populations (25 rural, 74%) and 43 counties contain a facility HPSA (38 rural, 88%). Fourteen of the counties containing a facility HPSA contain multiple sites. Eleven counties contain both a population and facility HPSA and all are rural counties (see appendix A for detailed list of counties and HPSA designations).[6]

Although nearly 14% of individuals in Kentucky are living in a HPSA, it is estimated by the Henry J Kaiser Family Foundation 49.7% of Kentucky's dental health needs are being met, ranking eighth among the other states. According to the Henry J Kaiser Family Foundation, an additional 74 dental providers are needed to remove the HPSA designation. Kentucky ranks 24th out of the 50 states on number of dental providers per America's Health Rankings with 55.8 providers per 100,000 individuals.[7]

Oral Health Status

In 2016, the Center for Health Workforce Studies released an exhaustive report "Oral Health in Kentucky", summarizing major dental findings including analysis of data from national and state surveillance systems. Key conclusions from the report include:

- In 2015, 17 of the 120 Kentucky counties had no dentists or only one dentist,
- According to the 2012 Kentucky Behavioral Risk Factor Surveillance System (BRFSS) adults aged 65 years and older in Kentucky (51.5%) were more likely than those in the US (39.6%) to have had six or more permanent teeth extracted, placing Kentucky at fifth highest in the nation on this negative measure of oral health.
- Half (50.0%) of adults ages 18 and older residing in the Eastern Kentucky Region in Appalachia had not visited a dentist in the past year (2013).
- In 2012, Kentucky ranked first in the country in the percentage of people served by community water systems with fluoridated water (99.9%).
- The most noticeable increase over time was the percentage of Medicaid eligible children who received a preventative service each year. In 2000, just 14.7% of

hpsas/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D. Accessed on 2/1/2019.

[6] https://data.hrsa.gov/tools/shortage-area/hpsa-find

[7] https://www.americashealthrankings.org/explore/annual/measure/dentists/state/KY

eligible children had a preventative oral health services while in 2014, 38.1% received a preventative service.

- The percentage of eligible children who received a preventive oral health service almost tripled from 2000 to 2014 from 17.2% to 52.1% for ages 6 to 9, from 15.9% to 46.8% for ages 10 to 14, and from 13.1% to 36.1% for ages 15 to 18.

- There was geographic variation in oral health status. The percentages of children with caries (cavities) experience (60.5%), untreated tooth decay (32.6%), and a need for urgent dental care (7.7%) were the highest in eastern Kentucky. Oral health status of children also varied by age group. The percentages of children with caries experience (59.8%), and untreated tooth decay (34.6%) were the highest in the 3rd grade cohort of students in Kentucky.

The 2018 Kentucky Behavioral Risk Factor Surveillance System (BRFSS) annual report[8] identified those at risk in Kentucky based on responses to the question: How long has it been since you visited the dentist or dental clinic for any reason?" Adults who answered "more than 1 year ago" or "never" were considered at risk. Findings from this report included:

- About 38.2% of Kentucky adults reported that they did not have a dental visit in the past year. This was higher than the United States estimate of 33.6%.
- About 41.4% of adults aged 65 years or older did not have a dental visit in the past year; this was a significantly higher estimate compared to young adults aged 18-34 years.
- A significantly higher proportion of adults with less than a high school education did not have a dental visit in the past year compared to those with a college education (59.7% vs. 21.0%).
- The proportion of adults who did not have a dental visit in the past year decreased significantly with increasing levels of annual household income.

America's Health Rankings, an annual report by the United Health Foundation, is released and describes how healthy individual states are in comparison to every other state. Each state is provided a ranking out of 50 on a multitude of measures, 50 being the worst. It was reported in the 2018 version:

- Kentucky ranks 39th in dental visits, 61.8% adults visit the dentist annually.
- Kentucky ranks 48th in six or more dental extractions, 29.1% of adults aged 45-64.
- Kentucky ranks 1st and overall best in the percentage of population served with water fluoridation (99.9%).

Children's Dental Health

As reported by the Center for Health Workforce Studies in the "Oral Health in Kentucky" report, children are at the greatest risk for not having access to good dental care because they are dependent on others for seeking and obtaining care. At-risk children include those living in poverty, those with special healthcare needs, those living out of home, and those who live in

[8]https://chfs.ky.gov/agencies/dph/dpqi/cdpb/Kentucky%20BRFSS%20Data%20Reports/2018%20KyBRFS%20Annual%20Report.pdf

families without dental insurance. In 2016, Delta Dental, along with Making Smiles Happen and Kentucky Youth Advocates, distributed a statewide surveillance survey to 60 schools across five regions.[9] The mouths of third and sixth graders were observed and a parental survey collected. Key findings included: fewer than half of the children covered by Medicaid or CHIP are utilizing dental services and thus oral health outcomes remain poor; sixty-three percent are experiencing cavities; forty-one percent with untreated tooth decay; fifty-seven percent lack dental sealants; and one in five, third and sixth graders in the Eastern region, around 5,400 children needed urgent dental care.

Kentucky Dental Workforce

The US population is growing and aging. The census reports the US population grows between 0.7% and 0.9% a year and projects the population to exceed 400 million people on 2051.[10] It is estimated that by 2030 all baby boomers will be older than age 65, 1 in 5 individuals will be retirement age, and older people are projected to outnumber children.[11] As the population ages, so does the dental workforce. It is expected that in Kentucky 82 dentists will retire each year and only 55 dentists will be added back to the workforce.[12] Such a small number of graduates each year could be attributed to there being only two dental schools in Kentucky. Individuals gaining insurance or accessing dental care more regularly also puts a strain on the already deficient workforce numbers.

The "Oral Health in KY" report by the Center of Health Workforce Studies reports the following dental workforce profile for previous years (Table 1):

Oral Health Professionals	1998		2006		2015	
	n	%	n	%	n	%
General Dentist	1,794	84	1,950	83	2,097	81
Orthodontist	116	5	130	6	137	5
Oral Surgeon	81	4	101	4	114	4
Pediatric Dentist	59	3	74	3	107	4
Periodontist	45	2	46	2	56	2
Endodontist	22	1	28	1	40	2
Prosthodontist	10	0	16	1	14	1
Oral Pathologist	2	<1	4	<1	8	<1
Oral Radiologist			2	<1	1	<1
Total	2,129	100	2,351	100	2,574	100

Table 1. Workforce change by specialty.

[9] http://www.kentuckyoralhealth.com/wp-content/uploads/2016/10/Making_Smiles_Happen_2016.pdf
[10] http://worldpopulationreview.com/countries/united-states-population/
[11] https://www.census.gov/newsroom/press-releases/2018/cb18-41-population-projections.html
[12] Saman DM, Johnson AO, Arevalo O, Odoi A. Geospatially illustrating regional-based oral health disparities in Kentucky. Public Health Rep. 2011:612–618.

Over the past 21 years, there has been a steady increase in dentists entering the Kentucky workforce, however, the rate of additional dentist joining the workforce does not seem to meet the 55 dentists needed a year. If retirement is held constant at 82 dentists retiring and 55 dentists joined the workforce per year, the total should be 2,466 dentists in 2019.

Analysis

In order to calculate the current Kentucky dental workforce, the data was accessed from the Kentucky Board of Dentistry on February 11th, 2019. For the purposes of the analysis, those dentists with an out-of-state practice were excluded from the data. Duplicate cases were also excluded from the analysis.

Results

Oral Health Professionals	2019	
	n	%
General Dentist	1,928	79.9
Orthodontist	131	5.4
Oral Surgeon	119	4.9
Pediatric Dentist	108	4.5
Periodontist	56	2.3
Endodontist	42	1.7
Prosthodontist	12	.5
Oral Pathologist	8	.3
Oral Radiologist	2	.1
Missing specialty	13	.5
Total	2,419	100

Table 2. Dental workforce by specialty.

Most dentists were practicing as general dentists, accounting for almost 80% of the workforce (Table 2). The other nine specialty categories accounted for just under 20% and around .5% of dentists had no specialty listed. The majority of dentists in Kentucky are practicing in Jefferson (673) and Fayette (377) counties (43%), consistent with the literature which suggests dentist are more likely to practice in areas with higher income.[13]

Almost three-fourths of dentist practice in urban Kentucky (n=1734, 71.7%) compared to rural Kentucky (n=685, 28.3%) as illustrated in Figure 1. Fifty-seven of the 120 Kentucky counties (48%) have five or fewer dentists, 45 of the 57 counties are rural (79%). There are seven Kentucky counties without dentists and five are rural Kentucky counties.

[13] Rephann, Terance J. & Wanchek, Tanya N., 2016. "Filling the Gaps: Explanations for Disparities in the Distribution of Dentists among U.S. Counties," Journal of Regional Analysis and Policy, Mid-Continent Regional Science Association, vol. 46(1).

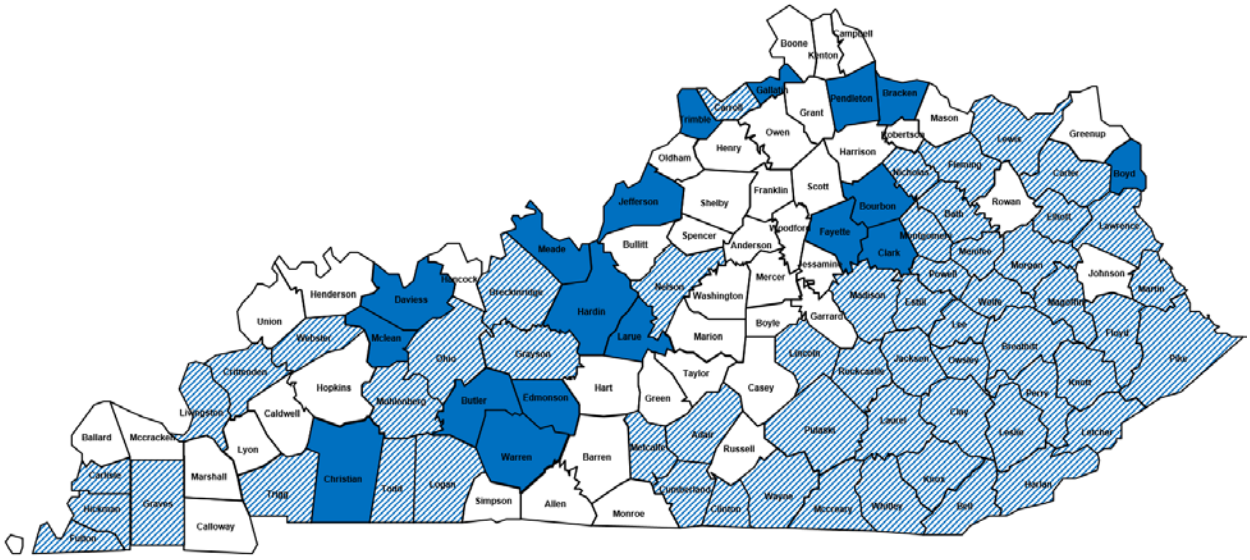

Figure 1. Blue counties represent those with either a geographical, population, or facility HPSA. Counties with pattern contain a HPSA and are designated as rural.

According to the 2019 County Health Rankings, the US provider to patient ratio is 1:1,461, much lower than that of Kentucky's provider to patient ratio, 1:1,841. An additional 629 dentists would need to be added to Kentucky's dental workforce in order to achieve the recommended national provider to patient ratio.

Urban Kentucky fairs far better when examining provider to patient ratios. For every one urban dental provider, there are 1,504 individuals. In rural Kentucky, for every one provider there are 2,693 individuals. In order for rural to reach the same provider to patient ratio as urban, there would need to be 542 more dentists practicing within rural counties.

Discussion

Although some sources report dental health improving in Kentucky, adequate workforce remains a concern. As of 2019, there were 2,419 dentists practicing in Kentucky. The total number of dentists in 2019 is around 47 dentists short of the projected 2,466 by the Center of Health Workforce Studies, which was an already conservative estimation of how many dentists would be added to the workforce each year. Couple the slow flow of dentists into the workforce with the aging population, retiring dentists, and individuals gaining dental insurance, the Kentucky shortage is sure to worsen, especially in rural Kentucky.

Rural Kentucky has long been plagued by poor health, including dental health, and the maldistribution of dental providers only exacerbates the problem. Even though 41% of individuals live within rural Kentucky, only 28.3% of dentists are practicing in rural. Furthermore, two counties (Jefferson and Fayette) in Kentucky possess almost half of the dentists (43%), leaving 57% of the remaining dentists to cover the remaining 118 counties.

One other alarming finding is that currently Kentucky has less dentists in the workforce than was reported in 2015. There has been evidence to suggest dentists are waiting longer to retire (average age of dentist retiring in 2001 was 65.4 vs 2017 average age of 69.7)[14] however, even with dentists waiting longer to retire, and the aforementioned retiring estimate being liberal, dentists are not being replaced fast enough within the workforce.

It is important to note, while the data used to analyze the historical workforce was obtained from the same source, there could be discrepancies in the way it is cleaned. Improvements could be made to standardize the way licensure data is captured in order to obtain a more clean and accurate snapshot of the current workforce.

County	Rural /Urban*	HPSA**	Provider to Patient Ratio
Adair	Rural	Yes	1:9743
Allen	Urban	No	1:5233
Anderson	Rural	No	1:3757
Ballard	Rural	No	0:8039
Barren	Rural	No	1:3369
Bath	Rural	Yes	1:12378
Bell	Rural	Yes	1:1921
Boone	Urban	No	1:1614
Bourbon	Urban	Yes	1:2504
Boyd	Urban	Yes	1:1599
Boyle	Rural	No	1:1108
Bracken	Urban	Yes	1:4134
Breathitt	Rural	Yes	1:6473
Breckinridge	Rural	Yes	1:4022
Bullitt	Urban	No	1:4022
Butler	Urban	Yes	0:12831
Caldwell	Rural	No	1:4213
Calloway	Rural	No	1:2780
Campbell	Urban	No	1:1968
Carlisle	Rural	Yes	1:4846
Carroll	Rural	Yes	1:5357
Carter	Rural	Yes	1:3878
Casey	Rural	No	1:15750
Christian	Urban	Yes	1:2608
Clark	Urban	Yes	1:2253
Clay	Rural	Yes	1:5092
Clinton	Rural	Yes	1:3425
Crittenden	Rural	Yes	1:4542
Cumberland	Rural	Yes	1:2235
Daviess	Urban	Yes	1:1761

[14] Munson, B. & Vujicic, M.; American Dental Association (2018). Supply of Full-Time Equivalent Dentists in the U.S. Expected to Increase Steadily. Retrieved from http://www.ada.org/~/media/ADA/Science%20and%20Research/HPI/Files/HPIBrief_0718_1.pdf. Accessed on 2/1/2019.

County	Rural/ Urban*	HPSA**	Provider to Patient Ratio
Edmonson	Urban	Yes	1:12226
Elliott	Rural	Yes	1:2508
Estill	Rural	Yes	1:2380
Fayette	Urban	Yes	1:854
Fleming	Rural	Yes	1:4815
Floyd	Rural	Yes	1:1577
Franklin	Rural	No	1:1174
Fulton	Rural	Yes	0:6192
Gallatin	Urban	Yes	1:8776
Garrard	Rural	No	1:4381
Grant	Urban	No	1:3123
Graves	Rural	Yes	1:3712
Grayson	Rural	Yes	1:3295
Green	Rural	No	1:2766
Greenup	Urban	No	1:3552
Hancock	Urban	No	1:1760
Hardin	Urban	Yes	1:1637
Harlan	Rural	Yes	1:3339
Harrison	Rural	No	1:1565
Hart	Rural	No	1:3751
Henderson	Urban	No	1:2296
Henry	Urban	No	1:3201
Hickman	Rural	Yes	1:4520
Hopkins	Rural	No	1:2530
Jackson	Rural	Yes	0:13431
Jefferson	Urban	Yes	1:1146
Jessamine	Urban	No	1:3336
Johnson	Rural	No	1:4519
Kenton	Urban	No	1:2469
Knott	Rural	Yes	1:5097
Knox	Rural	Yes	1:2839
Larue	Urban	Yes	1:7103
Laurel	Rural	Yes	1:1770
Lawrence	Rural	Yes	1:5240
Lee	Rural	Yes	1:3285
Leslie	Rural	Yes	1:5167
Letcher	Rural	Yes	1:7446
Lewis	Rural	Yes	1:3335
Lincoln	Rural	Yes	1:12228
Livingston	Rural	Yes	1:9269
Logan	Rural	Yes	1:4510
Lyon	Rural	No	1:8082
McCracken	Rural	No	1:1189
McCreary	Rural	Yes	1:8733
McLean	Urban	Yes	1:9201
Madison	Rural	Yes	1:2851
Magoffin	Rural	Yes	1:2508

County	Rural/ Urban*	HPSA**	Provider to Patient Ratio
Marion	Rural	No	1:3879
Marshall	Rural	No	1:3487
Martin	Rural	Yes	1:5726
Mason	Rural	No	1:1908
Meade	Urban	Yes	1:7039
Menifee	Rural	Yes	1:6455
Mercer	Rural	No	1:3074
Metcalfe	Rural	Yes	1:5054
Monroe	Rural	No	1:1777
Montgomery	Rural	Yes	1:1995
Morgan	Rural	Yes	1:6594
Muhlenberg	Rural	Yes	1:2801
Nelson	Rural	Yes	1:2402
Nicholas	Rural	Yes	1:7130
Ohio	Rural	Yes	1:3023
Oldham	Urban	No	1:1748
Owen	Rural	No	1:2691
Owsley	Rural	Yes	1:4435
Pendleton	Urban	Yes	1:7287
Perry	Rural	Yes	1:2043
Pike	Rural	Yes	1:1784
Powell	Rural	Yes	0:12374
Pulaski	Rural	Yes	1:2387
Robertson	Rural	No	0:2134
Rockcastle	Rural	Yes	1:2385
Rowan	Rural	No	1:1751
Russell	Rural	No	1:4444
Scott	Urban	No	1:2032
Shelby	Urban	No	1:3161
Simpson	Rural	No	1:2587
Spencer	Urban	No	1:4627
Taylor	Rural	No	1:2123
Todd	Rural	Yes	1:12243
Trigg	Rural	Yes	1:4815
Trimble	Urban	Yes	0:8561
Union	Rural	No	1:2445
Warren	Urban	Yes	1:1481
Washington	Rural	No	1:4042
Wayne	Rural	Yes	1:4143
Webster	Rural	Yes	1:6509
Whitley	Rural	Yes	1:2263
Wolfe	Rural	Yes	1:3632
Woodford	Urban	No	1:2637

*Trigg County is eligible for rural designation even though it is designated as a Metropolitan County. All census tracts within the county qualify as rural and therefore has been included in the analysis as rural.

**All counties containing a Health Provider Shortage Area, whether it be geographic, population, or facility designation, were included in the analysis.