Kentucky Dental Provider Workforce Analysis: 1998-2006

UNIVERSITY of LOUISVILLE
Health Sciences Center

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INTRODUCTION

Dynamic changes are underway in the dental workforce of the United States. In the mid-1980s, there was a national concern over the existing number of dentists graduating from dental schools, which in some parts of the United States was perceived as an "over-supply" of dentists. Between 1983 and 2001, six private dental schools closed, and the national number of dental graduates fell from 5,756 in 1983 to 3,778 by 1993, a decline of 34%. In recent years, three new dental schools have been established, but enrollments have only increased to approximately 4,300 dental students nationally. Compared to 25 years ago, US dental schools are graduating approximately 30% fewer dentists today.[1] With the aging of both the population and the dental workforce, investigation and analysis of recent workforce trends is appropriate to shape public policy. Kentucky is a state which has had two state supported dental schools for forty years. The University of Louisville (Louisville, KY) traces its founding to the late 1880's and became part of the state higher education system in the early 1970s. The University of Kentucky established a College of Dentistry (Lexington, KY) in the mid-1960s. The two dental education programs are 75 miles apart.

BACKGROUND

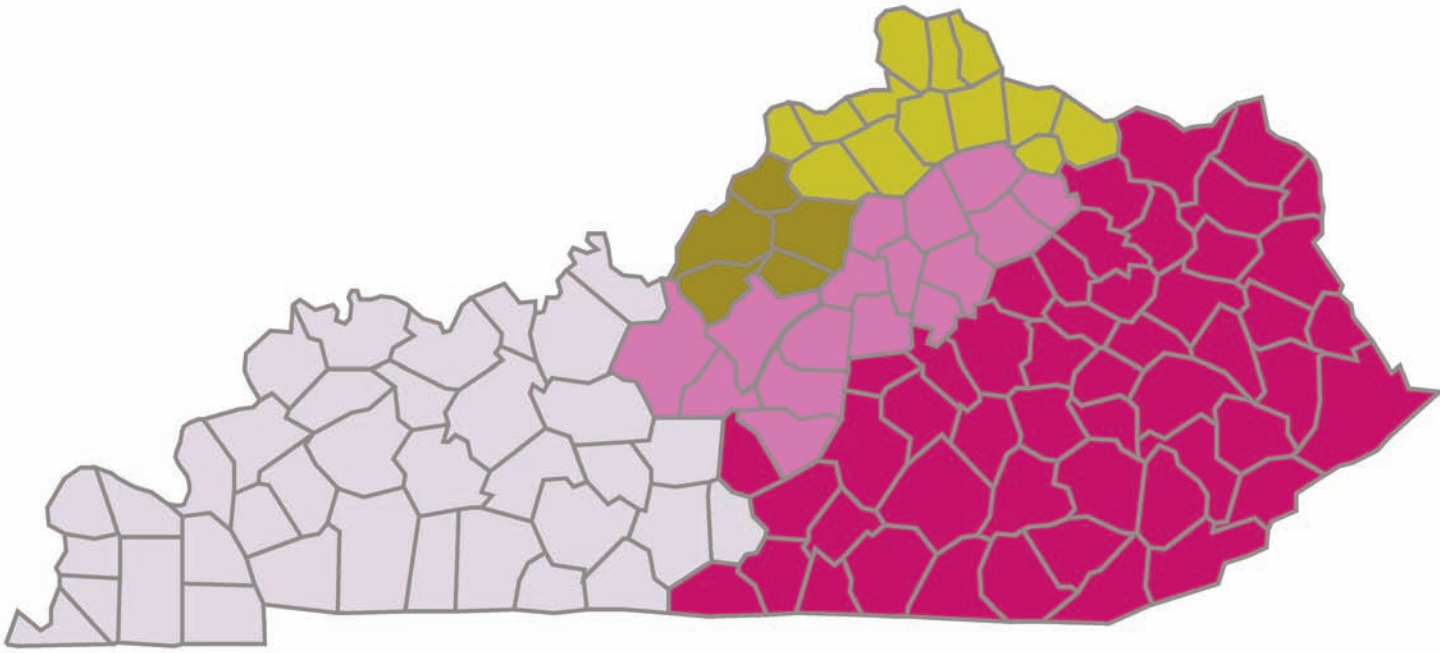
The dental workforce has been a focal point of discussion in Kentucky for over 20 years. For the state of Kentucky in the 1980s, concern was raised about a perceived oversupply of dentists being graduated by the state's two dental schools. While attempts to merge or close one school were unsuccessful, in-state enrollments and state funding were cut for both schools. The total in-state enrollment for both schools is limited to 80 dental students divided as follows: 44 for Louisville and 36 for Kentucky. There is no restriction on the number of out of state students to be enrolled at either school. The state applies a formula funding algorithm to establish in-state funding levels for each school which is supplemented by student tuition and fees.

Today, there is concern about having an adequate future supply of dentists to meet the population demand for dental care within the state. The American Dental Association (ADA) provides annual data regarding dental workforce issues through dissemination of its Dental Workforce Model.[2] This data is designed to help forecast dental workforce needs and to aid in policy decisions at a national level. The ADA annually surveys one-third of dentists in the United States (U.S.) in order to ascertain their number and occupational status. Estimates of the entire dentist workforce are made based upon survey results as well as age and gender. Workforce additions occur primarily as a result of new graduates and the influx of foreign trained dentists while losses primarily reflect death or retirement. This study was conducted to establish reasonably accurate Kentucky state specific dental workforce information upon which stakeholders can develop policy to meet the workforce needs of the future.

In 1987, as part of the dental education discussion, a Kentucky Oral Health Epidemiological Survey was conducted to acquire statewide data on the oral health status and oral health practices of the non-institutionalized population of the Commonwealth.

The study was designed using the five geographic stratified survey districts indicated in Figure 1. The five districts were stratified on the basis of geography and the presence of a household telephone. Among the many findings of the study were that more people in Appalachia sought dental care from public clinics and hospitals than the population in the remainder of the state.[3] Results of the study were used to direct policy development regarding the number of general dentists needed to meet expected future demand for dental services. Several years later the study was used, in part, to determine enrollment levels necessary at the two state dental schools for maintaining an adequate supply of dental graduates. The same geographic district mapping was used in this study as that used in 1987.[4]

FIGURE 1: 1987 STRATIFIED SURVEY DISTRICTS



- Western Kentucky
- Central Kentucky
- Northern Kentucky
- Appalachia
- Louisville Area

PURPOSE OF STUDY:

In order to prudently plan, it is essential that workforce data be assimilated at the state level. As a result, a number of states have conducted their own studies to quantify and forecast dental workforce needs at the state and local levels. Stakeholders such as state government, dental schools, public health officials, and practitioners can make more data-based decisions regarding issues such as dental school enrollment, workforce shortage areas where access to care is problematic, and oral health needs assessment. State specific data allows the opportunity for comparison with national ADA data.

METHODOLOGY:

This study was conducted in two parts spanning a period of three years. Part I involved an in-depth analysis of data files from the Kentucky Board of Dentistry using five data sets which spanned a period of 9 years (1998 – 2006). Part II consisted of asking licensed dentists to complete a questionnaire about various practice aspects which was mailed to all Kentucky licensed dentists in conjunction with the biannual mailing for Kentucky dental license renewal. The discussion for Part II begins on page 18.

PART 1: ANALYSIS OF DENTAL BOARD DATASETS

Part I involved an in-depth analysis of data files from the Kentucky Board of Dentistry using five data sets which spanned a period of 9 years (1998 – 2006). The last issue month for each data file is listed in Table 1. Each dataset consists of name, location of practice, year and school of graduation, specialty designation and other demographic information. Two distinctions are made for the following analyses in this report. First, all licensed dentists in Kentucky for a year of analysis are known as "all Kentucky Licensed Dentists" and consist of those dentists living or practicing within the state or outside the state of Kentucky but are currently licensed in Kentucky. These dentists make up the largest number which will be shown below. Second, "Kentucky Practicing Dentists" are those dentists who list their business address as Kentucky and make up a smaller number of the total number of licensed dentists in each file. There are limitations in the datasets in that the dates shown below do not always coincide with the same time interval each year.

TABLE 1 DATES: LAST DENTIST LICENSED IN EACH YEAR

File	End of Month for Last License Issued	Years to Last File	Months to Last File	Months to Next File
1998	03-31-1998	8.8	105.6	45.6
2001	12-31-2001	5.0	60.0	26.4
2004	03-31-2004	2.8	33.6	12.0
2005	03-31-2005	1.8	21.6	21.6
2006	12-31-2006	0.0	0.0	0

RESULTS: PART I

As of December 14, 2006, there were 3,027 dentists licensed in Kentucky and a state population of 4,204,022 for an average of 7.2 licensed dentists per 10,000 population. However, a more meaningful indicator of the Kentucky workforce is the ratio of dentists with Kentucky business addresses per 10,000 population (Figure 2 and Table 2). In 2006, there were 2,350 Kentucky dentists who reported business addresses, yielding 5.6 dentists per 10,000 population statewide. Of the 120 Kentucky counties, three reported no dentists with a business address (Hickman, Owsley, Robertson). Eleven counties reported one dentist in 1998 vs. thirteen counties in 2006. Twelve counties reported two dentists in both 1998 and 2006. All these counties were primarily rural. Jefferson County lists the most dentists at 670, followed by Fayette (342), Boone (73), Kenton (72), Warren (66), Hardin (61), Daviess (53), McCracken (52), Pike (37), and Campbell (36). Figure 3 indicates the number of 2006 Kentucky Practicing Dentists per 10,000 population in each of the five 1987 stratified survey districts.

FIGURE 2: KENTUCKY LICENSED AND PRACTICING DENTISTS BY LICENSURE YEAR

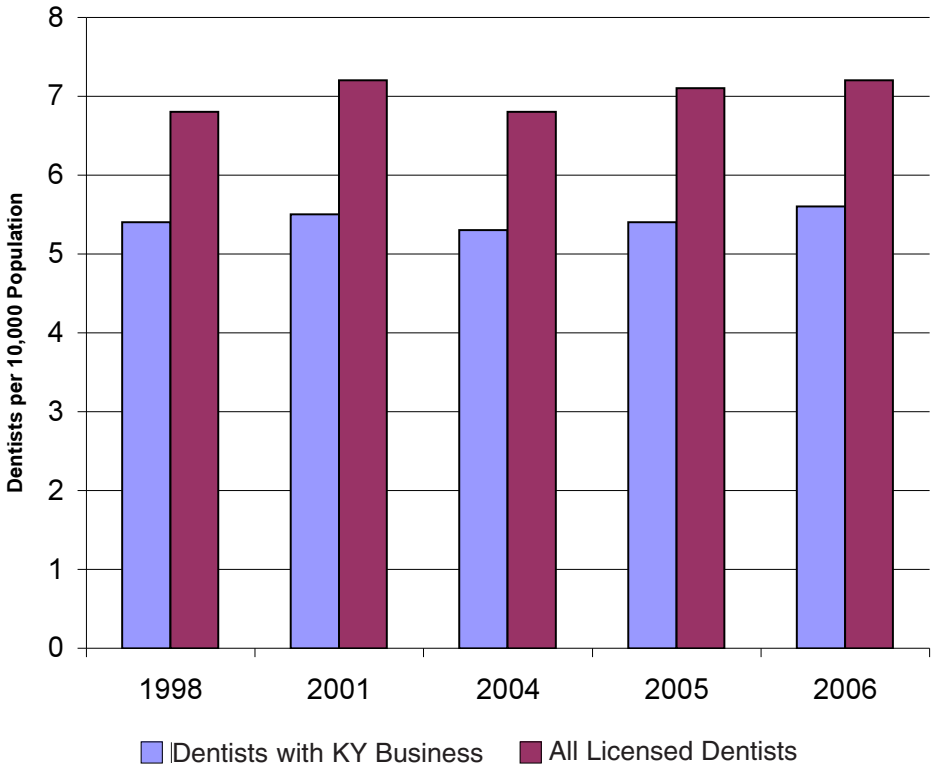
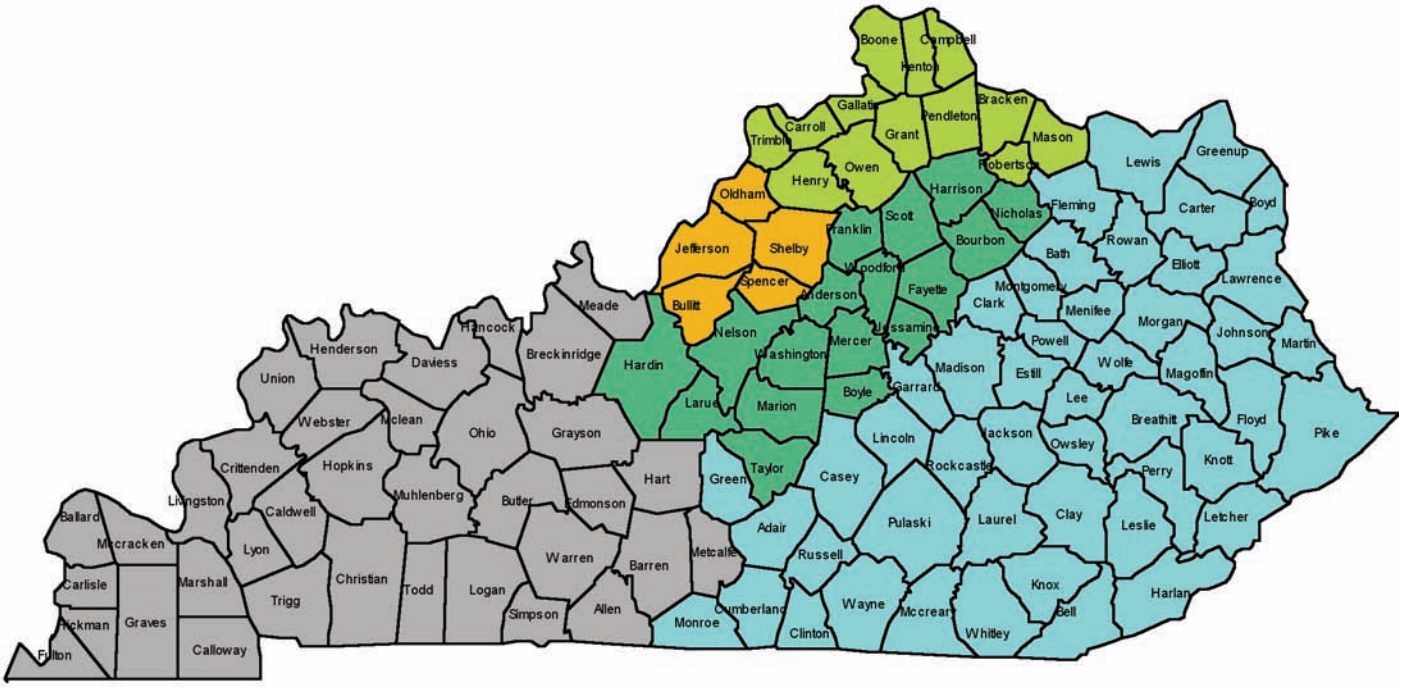


TABLE 2: KENTUCKY LICENSED AND PRACTICING DENTISTS BY LICENSUREYEAR

YEAR	Licensed Dentists Per 10,000	KY Business Dentists Per 10,000	KY Business Rate as a Percent of Total
1998	6.8	5.4	79%
2001	7.2	5.5	76%
2004	6.8	5.3	78%
2005	7.1	5.4	76%
2006	7.2	5.6	78%

FIGURE 3: KENTUCKY PRACTICING DENTISTS BY STRATIFIED SURVEY DISTRICT 2006



Western Kentucky– 4.1 Dentists/10,000

Louisville Area– 8.3 Dentists/10,000

Northern Kentucky – 4.6 Dentists/10,000

Central Kentucky - 7.6 Dentists/10,000

Appalachia– 3.8 Dentists/10,000

Comparisons to national data sources provide another means to measure Kentucky's dental workforce. Due to differences in data methodology between national Health Resources and Services Administration (HRSA), ADA, and state data sources, comparisons with specific yearly U.S. and Kentucky dentist to population ratios should be interpreted with caution. The ADA reported 6.0 professionally active dentists per 10,000 population in 2005 and 5.5 active private practitioners per 10,000 population. Nationally, the ADA designated professionally active dentists includes not only those in private practice, but also dental school faculty, those involved in the armed forces, federal, state or local government, hospital staff, graduate students, interns, residents and other dental organizations, thus explaining the 0.5 difference between professionally active vs. private dentists.[2] According to 1999 HRSA data, Kentucky ranked slightly above the midpoint of the fifty states at 5.6 dentists per 10,000 population as opposed to the surrounding states ratio per 10,000 population of Tennessee (5.3), Indiana (4.8), Illinois (6.7), West Virginia (4.6), Ohio (5.4), Missouri (4.9) and Virginia (5.8) dentists per 10,000 population.[5] Over the nine year period of this project it appears that both the U.S. and the Kentucky supply of dentists relative to population has grown. Although Kentucky's Practicing Dentists per 10,000 population ratio increased from 5.3 in 1998

FIGURE 4: COMPONENTS OF DENTAL WORKFORCE CHANGE 1998 - 2006 KENTUCKY PRACTICING DENTISTS

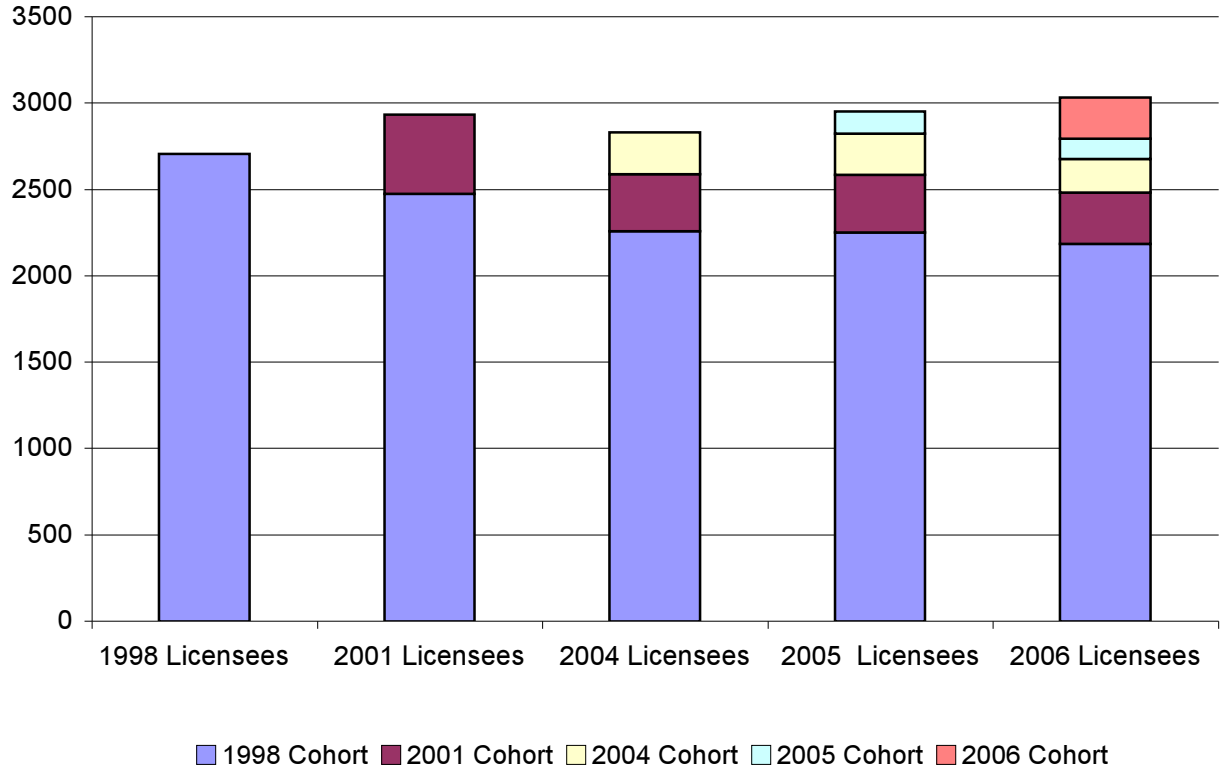
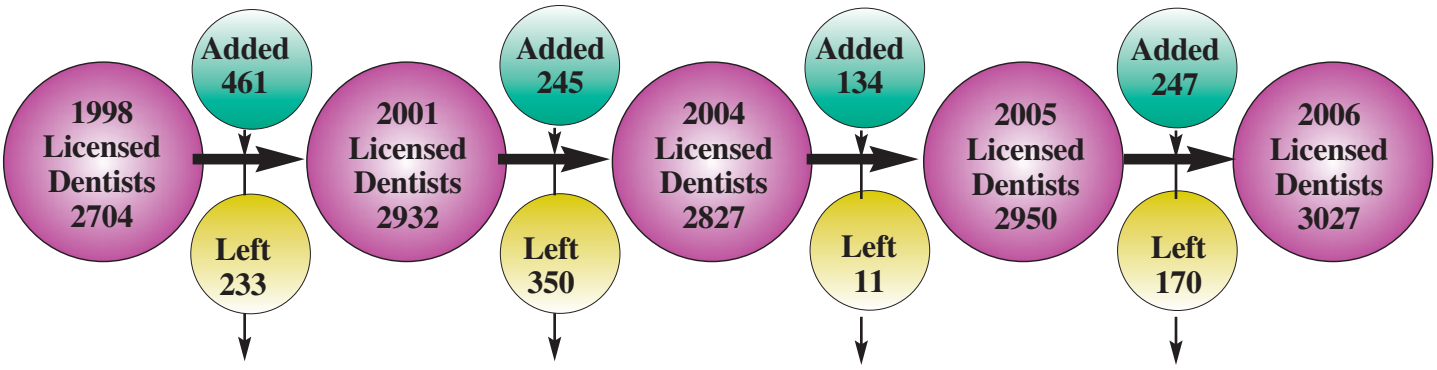


FIGURE 5: KENTUCKY LICENSED DENTISTS ENTRY AND EXIT 1998 - 2006



to 5.6 in 2006, it still remains below the national ADA figure, which increased from 5.9 in 2000 to 6.0 in 2005.[2]

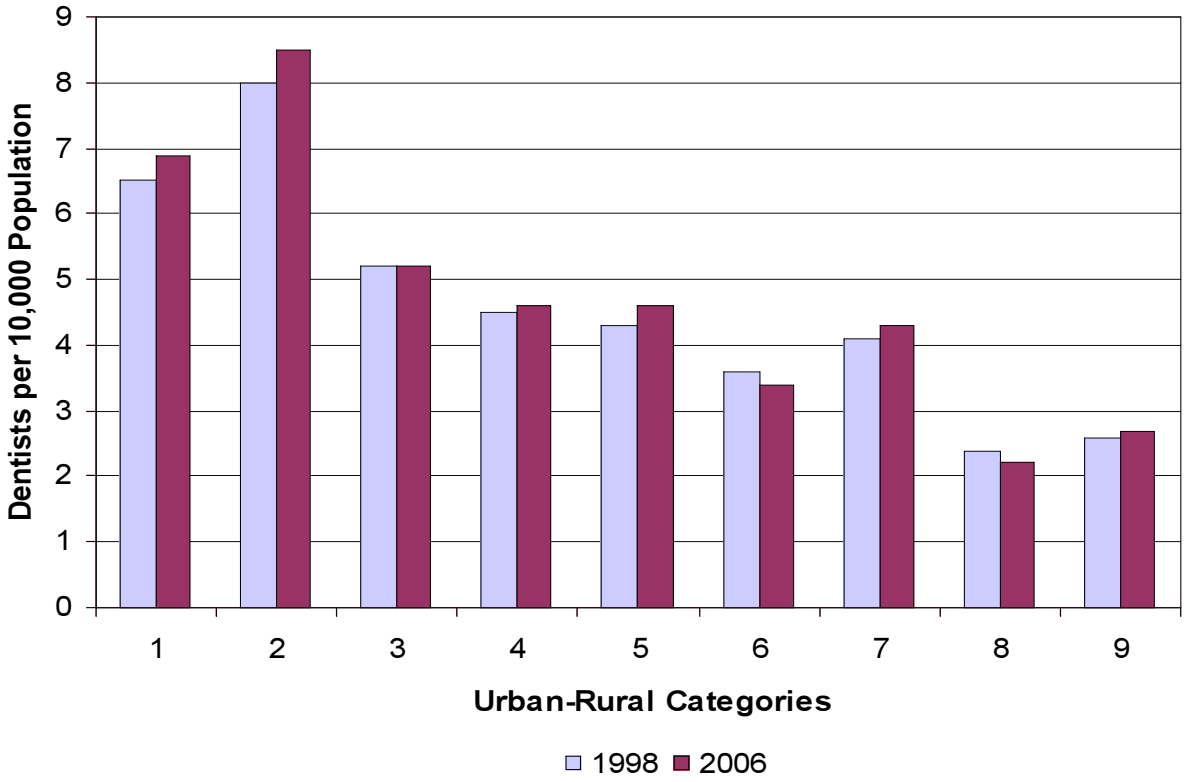
Data was obtained from the Kentucky Board of Dentistry containing practice information on all Kentucky Licensed Dentists for the years 1998, 2001, 2004, 2005, and 2006. Comparisons of these licensure files over this period of years provides insight into the flow of dentists into and out of active practice. Figure 4 demonstrates the annual profile for all licensed dentists for each year,

illustrating the gains and losses for each year. It can be seen from Figure 4 that approximately 500 dentists licensed in Kentucky in 1998 were no longer licensed in 2006.

Over the nine year period there was a net gain of 323 dentists to the file (Figure 5), with gains between each of the data points except the period from 2001-2004 with a loss of 105 dentists. The largest gain occurred between 1998 and 2001 with a net gain of 228 dentists.

DISTRIBUTION

There is an uneven distribution of dentists to population in Kentucky in that dentists are more heavily concentrated in the metropolitan areas. One tool to express the degree of rurality in a state is a methodology known as the Rural-Urban Continuum. The Rural-Urban Continuum Codes were used to determine dentists per 10,000 population in metro vs. nonmetro areas. Of the nine Rural-Urban Continuum Code categories in Figure 6, the first three are considered metro areas and the last six are nonmetro areas. This classification allows for additional analysis by determining the degree of rurality and metro proximity with respect to the location of dentists.[6] Figure 6 indicates there were more dentists per 10,000 population located in metro areas from the period 1998 - 2006. Figure 7 illustrates that dentists per 10,000 between 1998 and 2006 remained relatively constant in rural areas while



1.	Counties in metro areas of 1 million or more
2.	Counties in metro areas of 250,000 -1 million
3.	Counties in metro areas fewer than 250,000
4.	Urban pop of 20, 000 or more adjacent to metro areas
5.	Urban pop of 20,000 or more not adjacent to metro areas
6.	Urban pop of 2,500 or more adjacent to metro areas
7	Urban pop of 2,500 or more not adjacent to metro areas
8.	Completely rural or less than 2,500 urban pop adjacent to metro areas
9.	Completely rural or less than 2,500 urban pop not adjacent to metro areas

dentists per 10,000 increased in urban areas of Kentucky.

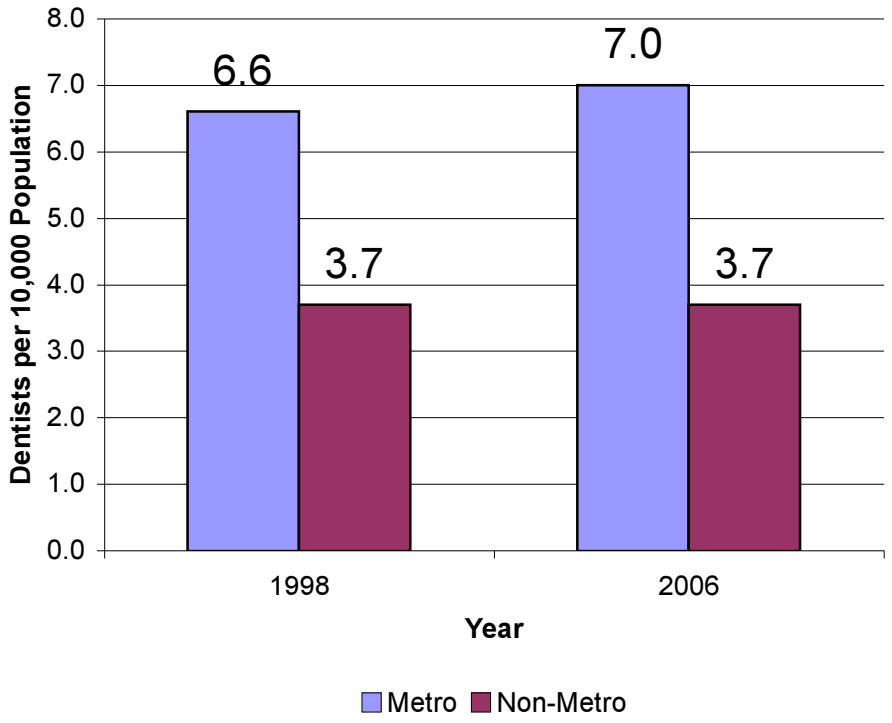


FIGURE 6: DENTISTS PER 10,000 POPULATION BY METROPOLITAN AND NON-METROPOLITAN COUNTIES 1998 – 2006

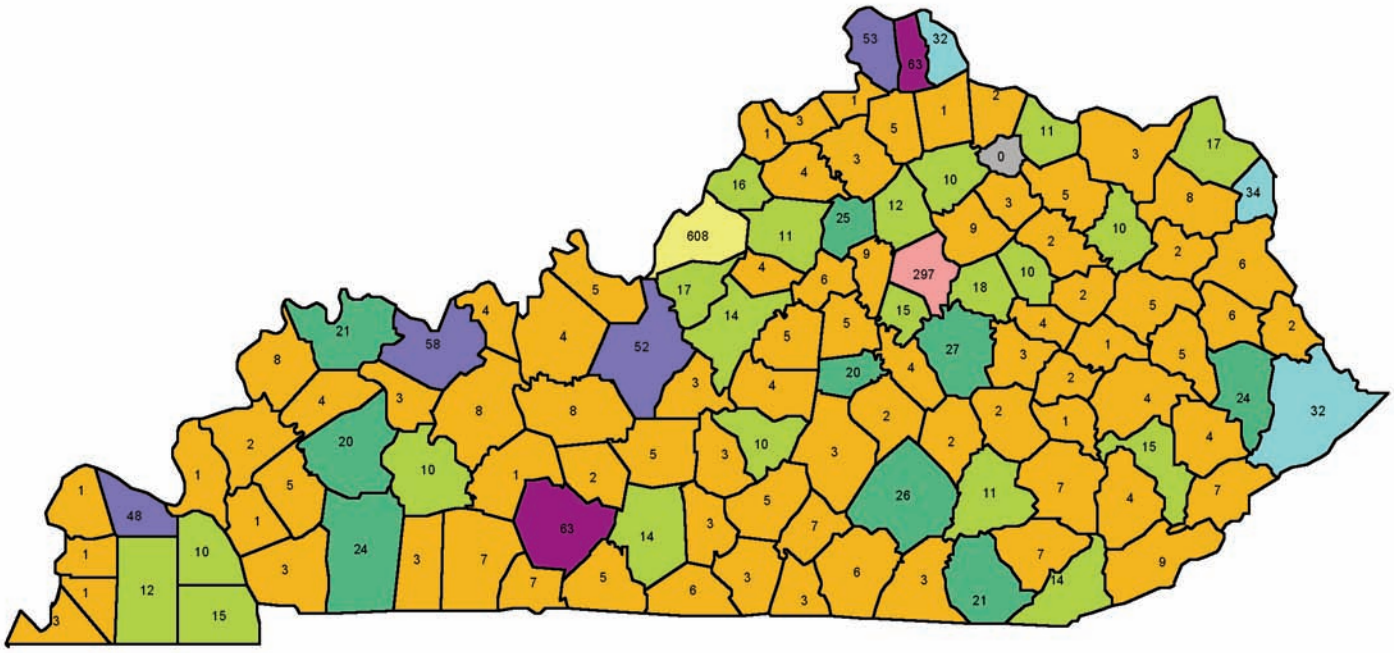
FIGURE 7: KENTUCKY PRACTICING DENTISTS IN METRO VS. NONMETRO AREAS 1998 AND 2006

Between 1998 and 2006 thirty-seven (37) Kentucky counties experienced a decline in the number of dentists, fifty-five counties (55) an increase, and twenty-eight (28) counties had no change in the number of dentists. Table 3 shows the gain and loss in dentists by stratified survey districts between 1998 and 2006. All except the Western District (-3) gained in the number of dentists. Figure 8 illustrates the number of Practicing Dentists per county in 1998. Figure 9 illustrates the number of Practicing Dentists per county in 2006. Figure 10 shows the net change in the number of Practicing Dentists per county between 1998 and 2006. Appendix B lists each county and the percentage change between 1998 and 2006.

TABLE 3: DENTIST GAIN/LOSS BY DISTRICT FOR KENTUCKY PRACTICING DENTISTS 1998 – 2006

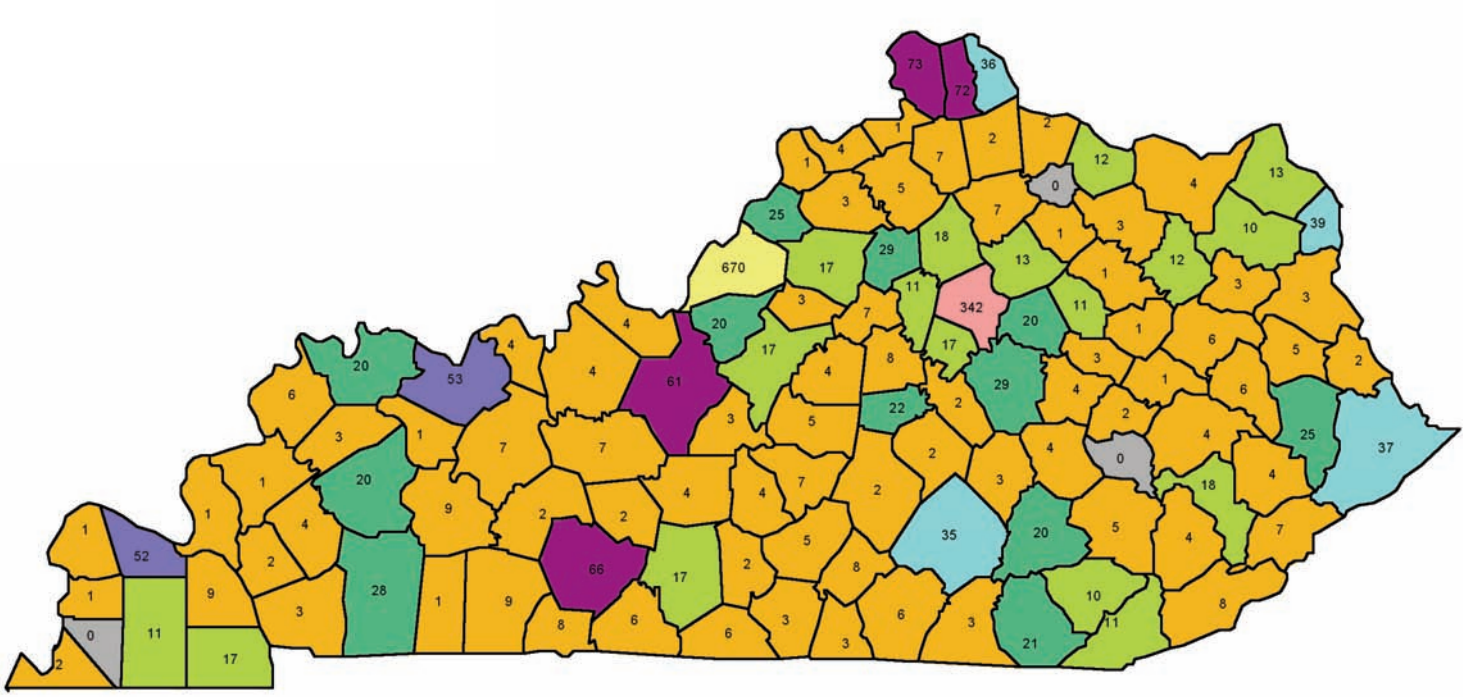
1998 – 2006	GAIN	LOSS	Net Effect
Louisville District	80	1	+79
Central District	82	9	+73

Northern District	20	1	+19



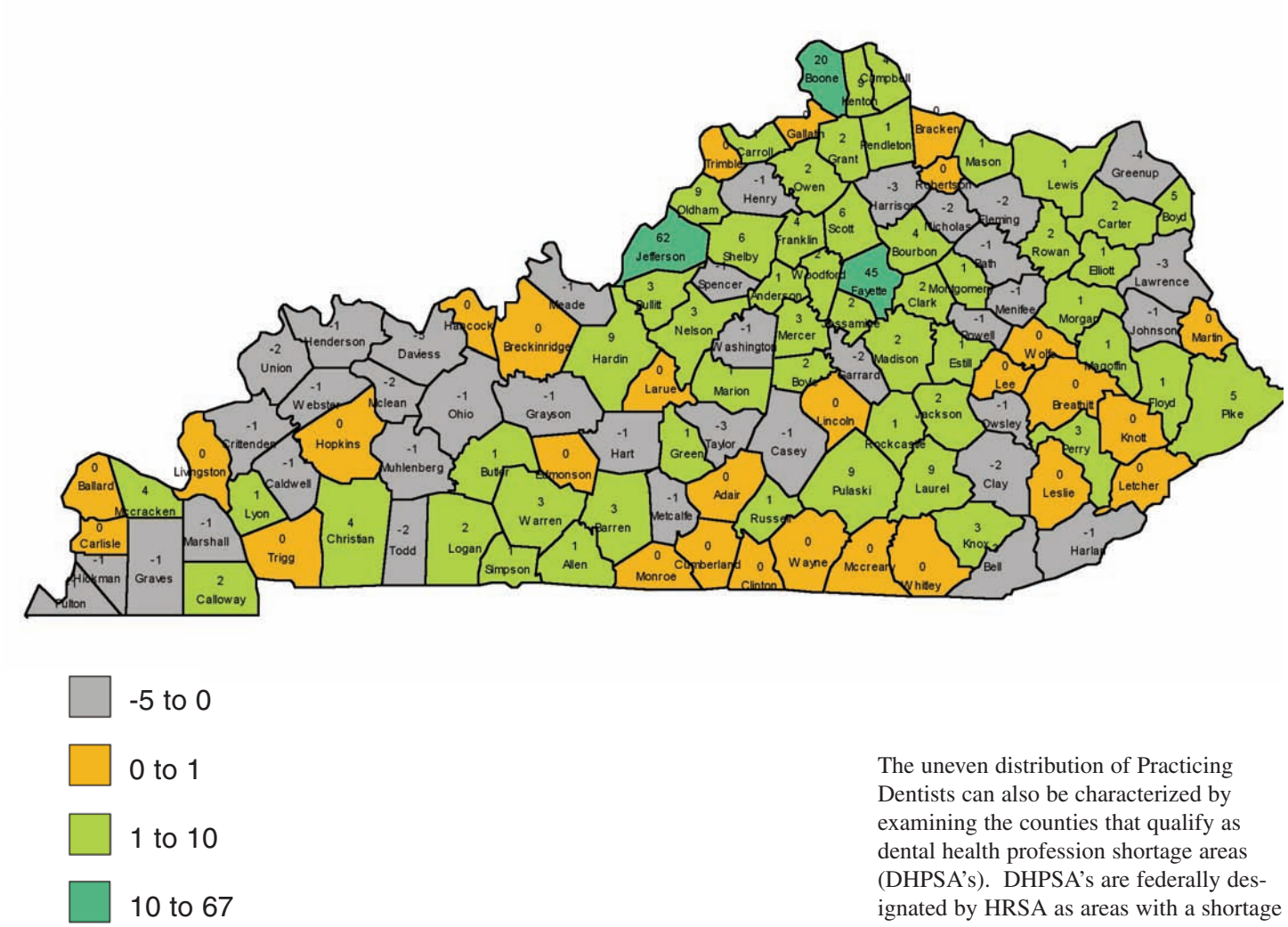
- 0 t0 1
- 1 t0 10
- 10 to 20
- 20 to 30
- 30 to 40
- 40 to 60
- 60 to 80
- 80 to 400
- 400 to 700

[illegible]	[illegible]	25	-3



- 0 t0 1
- 1 t0 10
- 10 to 20
- 20 to 30
- 30 to 40
- 40 to 60
- 60 to 80
- 80 to 400
- 400 to 700

FIGURE 8: # PRACTICING DENTISTS PER COUNTY 1998



-5 to 0

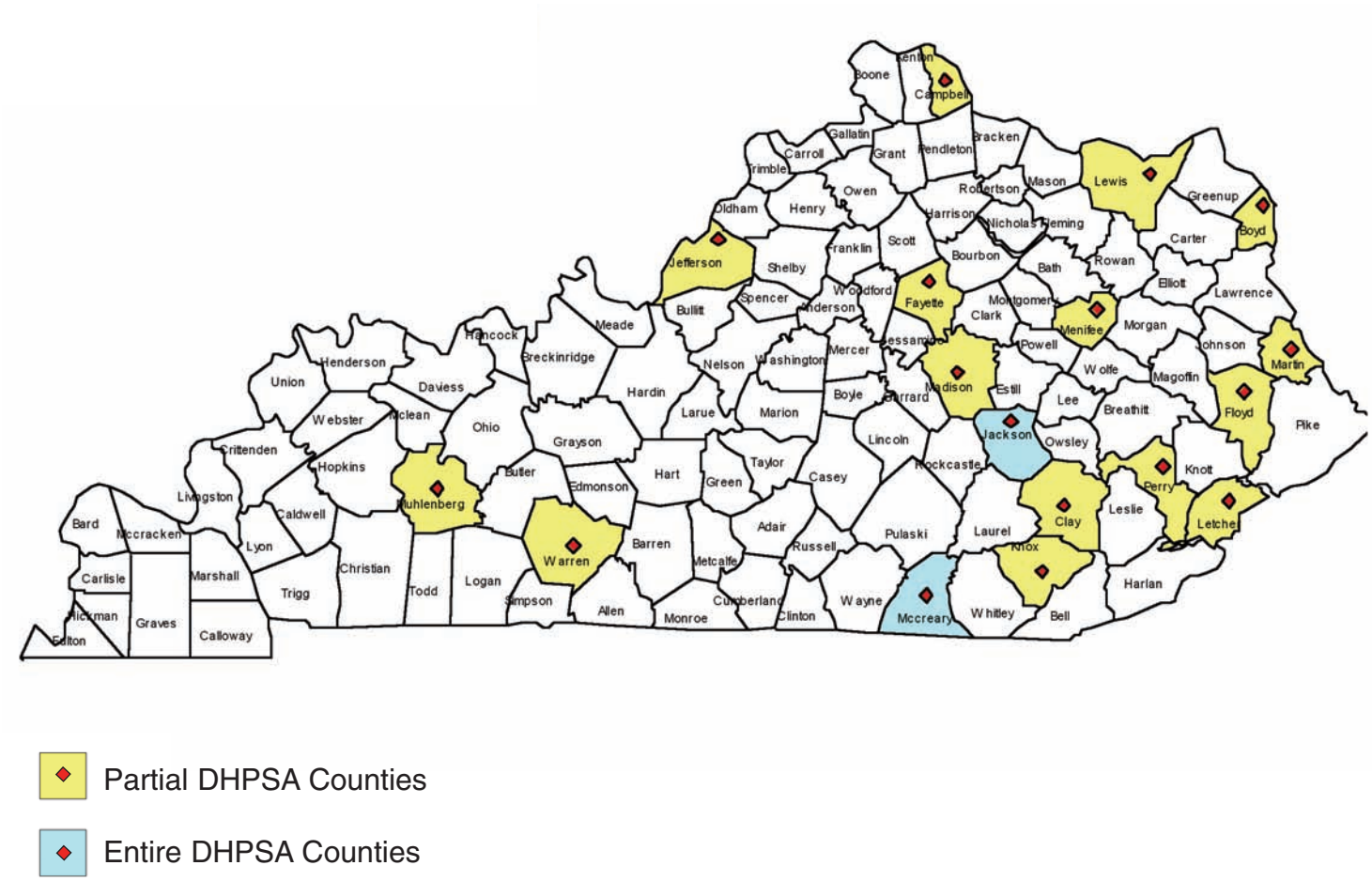
0 to 1

1 to 10

10 to 67

The uneven distribution of Practicing Dentists can also be characterized by examining the counties that qualify as dental health profession shortage areas (DHPSA's). DHPSA's are federally designated by HRSA as areas with a shortage of primary dental providers. The area may constitute an entire county or a service area, a demographic (e.g., low income) area, or institution (e.g., federally qualified health center or other public facility).[7] Two of the most heavily populated counties in Kentucky, Jefferson and Fayette, have a partial DHPSA designation due to the presence of federally qualified community health centers in both counties and a correctional institution in Fayette County. Basic requirements for DHPSA designation include being a rational area for the delivery of dental care, having a ratio of dentists to population that demonstrates a shortage, and having an "overutilized, excessively distant, or inaccessible supply of dental professionals" given the population under

FIGURE 11: KENTUCKY DHPSA'S BY COUNTY (DECEMBER, 2006)



Partial DHPSA Counties

Entire DHPSA Counties

consideration.[8] As of December, 2006 there were 17 DHPSA's in Kentucky (Figure 11), 15 of which are designated as partial DHPSA's within counties, and 2 of which encompass the entire counties of Jackson and McCreary. The remaining 15 DHPSA's are located in Boyd, Campbell, Clay, Fayette, Floyd, Jefferson, Knox, Letcher, Lewis, Madison, Martin, Menifee, Muhlenberg, Perry and Warren counties. The location of the DHPSA's with respect to the 5 stratified survey districts is as follows:

Western: 2

Louisville: 1

Northern: 1

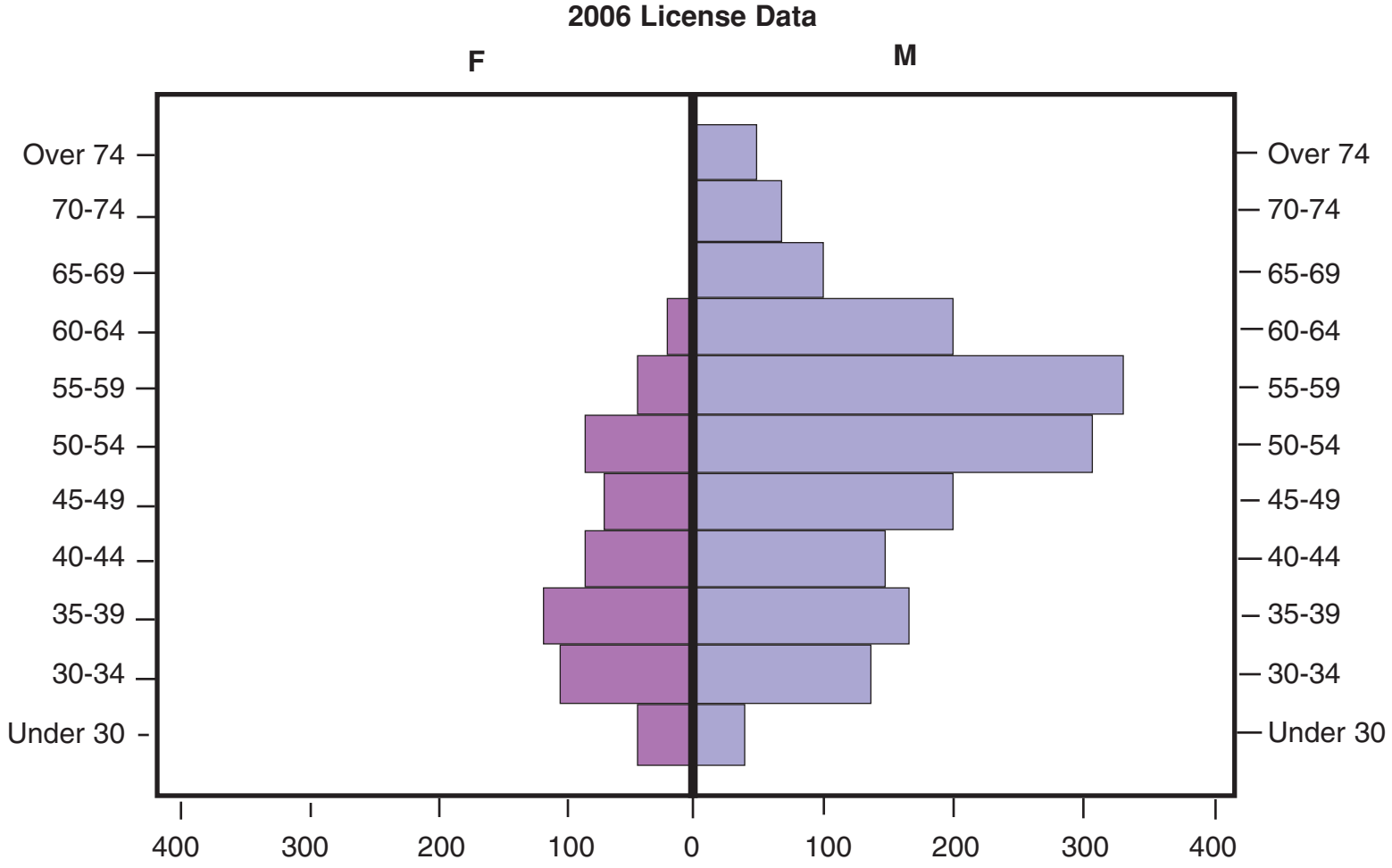
Central: 1

Appalachia: 12 (Jackson and McCreary/Entire Counties)

The Appalachian District has by far the most DHPSA's (including 2 entire counties).

WORKFORCE DEMOGRAPHICS

Women represent a growing number of dentists nationally in the workforce, and Kentucky is no exception. In 2006, approximately 1 in 4 Kentucky dentists was female; these women are on average about 9 years younger than their male counterparts. Since 1998 the percentage of female dentists in Kentucky has grown from 17.5% to 25%. Figure 12 shows the gender breakdown of Kentucky den-



tists by age and sex in 2006. With respect to the 5 stratified survey districts, in 2006 more female dentists practiced in the metro areas of Louisville (19.6%) and Central (30.4%) districts, with the fewest number of females practicing in the Western District (19.6%). Since females comprise a growing number of dentists in the workforce, this phenomenon has the potential to exacerbate the existing uneven distribution of dentists within metropolitan and non-metropolitan counties. The weighted average age of all male and female Practicing Dentists in Kentucky was 46.2 in 1998 and 49.7 in 2006. The largest age cohort of dentists is between 50 and 59

Primary Specialty	1998 Number of Dentists	1998 Percent of Dentists	2006 Number of Dentists	2006 Percent of Dentists	1998 – 2006 Percent Change
General Practice	1794	84%	1950	84%	+8%
Endodontics	22	<1%	28	1%	+27%
Oral/Maxillofacial Radiology		Not Listed	2	<1%	
Oral Pathology	2	<1%	4	<1%	+100%
Oral Surgery	81	4%	101	4%	+25%
Orthodontics	116	5%	130	5%	+12%
Pedodontics	59	3%	74	3%	+25%
Periodontics	45	2%	46	2%	+2%
Prosthodontics	10	<1%	16	<1%	+60%
TOTAL	**2131**		**2351**		**10%**
KY Population	**3,934,310**		**4,024,022**		**+2%**

years of age. As these baby boomers, representing a large cohort, reach retirement age, there may be a period of greater attrition of the workforce than has been experienced in recent years.

FIGURE 12: AGE GENDER PYRAMID: PRACTICING DENTISTS KENTUCKY, 2006

TABLE 5: 2006 KENTUCKY PRACTICING DENTISTS GRADUATING AFTER 1997

Year	U of K (36.78 %)	U of L (42.77 %)	Other Dental Schools (20.45 %)
1998	18	19	10
1999	20	23	4
2000	19	24	10
2001	19	21	9
2002	17	23	10
2003	21	28	15
2004	25	26	20
2005	30	32	12
2006	9	11	9
TOTAL	**178**	**207**	**99**

TABLE 4: WORKFORCE PRACTICE CHARACTERISTICS AND TRAINING: KENTUCKY PRACTICING DENTISTS 1998 – 2006

The majority of Kentucky dentists indicate a primary practice type of general dentist (Table 4). Between 1998 and 2006 the ratio of general dentists (84%) and specialists (16%) remained stable although the absolute numbers of dentists increased in all categories with an overall 2% population increase between 1998 and 2006. When one considers that Kentucky has two dental schools it is interesting to note the breakdown of graduates, by school, within the state. On average, between 1998 and 2006, 43% of Kentucky Practicing Dentists graduated from the University of Louisville, 37% from the University of Kentucky, and 20% from other dental schools (Table 5).

Graduating Year	TOTAL # Graduates				Retention of All Grads With KY Business Address		Retention of KY Grads With KY Business Address		# Total Retention of Grads With KY Business Address	
	UK		ULSD							
	Resident	Non-Resident	Resident	Non-Resident	UK	ULSD	UK	ULSD	UK	ULSD
2002	39	10	53	21	35%	31%	44%	43%	17	23
2003	43	9	55	24	40%	35%	49%	51%	21	28
2004	44	6	44	29	50%	37%	57%	59%	25	26
2005	51	1	47	30	52%	42%	59%	68%	30	32
2006	45	4	44	34	49%	14%	20%	25%	9	11
Average Retention Rate					**45%**	**32%**	**46%**	**49%**		

Source: UK College of Dentistry and UL School of Dentistry Academic Affairs

SUMMARY OF FINDINGS: PART I

Table 6 indicates that each of the two Kentucky dental schools averaged an overall graduate retention rate (i.e., remaining in Kentucky) of less than 50% from 2002-2006. The average retention rate of Kentucky residents for the state from the graduating classes of both schools for the period 2002-2006 was higher but still less than 50%. These numbers may be slightly low because more recent graduates (i.e., 2006) may not yet have established business addresses at the time they acquired their licenses.

TABLE 6: 2002 – 2006 GRADUATE RETENTION RATES OF UK & ULSD GRADUATES KENTUCKY PRACTICING DENTISTS

1. Kentucky has 5.6 practicing dentists per 10,000 population, which is below the ADA's national projection of 6.0 professionally active dentists per 10,000 population.
2. Statewide, the number of dentists per 10,000 population from 1998-2006 increased from 5.3 to 5.6.
3. Ranking by the five 1987 stratified survey districts used for the Kentucky Oral Health Survey, the Louisville District has the most dentists per 10,000 population at 8.3, followed by Central Kentucky (7.6 per 10,000), Northern Kentucky (4.6 per 10,000), Western Kentucky (4.1 per 10,000) and Appalachia (3.8 per 10,000).
4. Using the Urban-Rural Continuum Codes, the increase in the number of dentists per 10,000 population from 1998-2006 has occurred in the metro areas (6.6 to 7.0) and

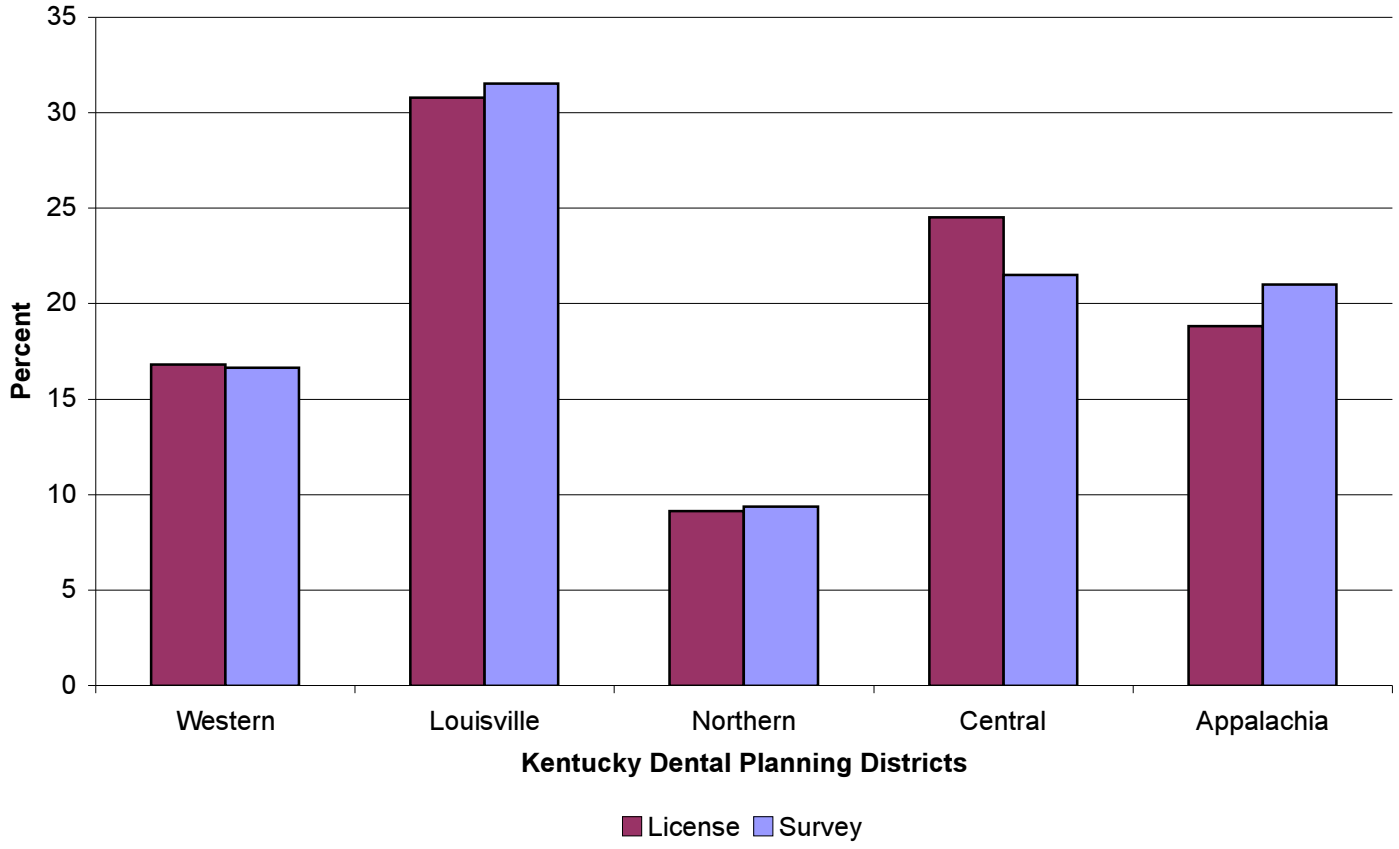
PART II: 2005 KENTUCKY LICENSED DENTIST WORKFORCE SURVEY

remained unchanged in the nonmetro areas at 3.7 dentists per 10,000 population.

5. As of December, 2006 there were 17 Dental Health Profession Shortage Areas in Kentucky, 12 of which are located in the Appalachian District.
6. The average age of Kentucky dentists is currently 49.7, with the largest cohort between the ages of 50 and 59.
7. One fourth of Kentucky dentists are female and they are, on average, 9 years younger than their male counterparts.
8. More females are located in metro areas (Louisville and Central Districts), with fewer located in Western Kentucky.
9. The ratio of general dentists and specialists from 1998 to 2006 has remained stable despite an overall increase in absolute numbers of practicing dentists.
10. On average each of the two Kentucky dental schools retained less than 50% of all their graduates from 2002-2006.
11. On average each of the two Kentucky dental schools retained approximately 50% of their Kentucky resident graduates from 2002-2006.

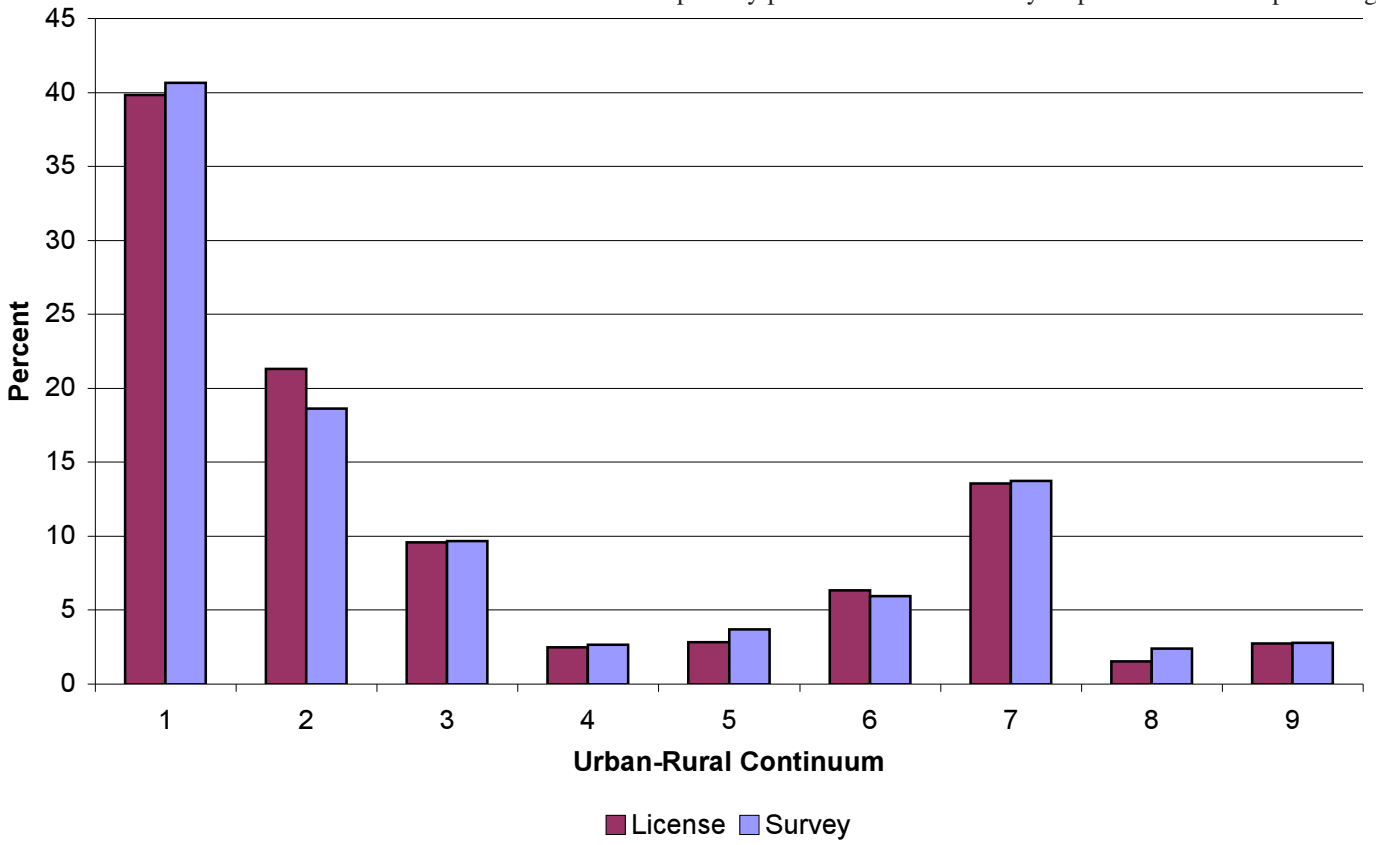
Methods

During the second year of the study a voluntary 20 question survey (Appendix A) was developed by the authors and the State Director of Oral Health. With the cooperation of the Kentucky Board of Dentistry, this survey was mailed to 3061 licensed dentists of record in conjunction with the biannual mailing for license renewal. Questions asked related to such issues as practice location, use of auxiliary personnel, retirement plans, practice migration, and participation in Medicaid and charitable dental service projects. A stamped, self-addressed envelope was provided and respondents were asked to return the survey directly to the principal investigator. A follow-up postcard was sent to each dentist and a



brief item in the Board's newsletter were used as reminders.

There was a 32% survey return rate with 994 surveys returned and processed. Figures 12 and 13 compare the geographic distribution of the business location recorded in the dental license file and the primary practice site of the survey respondents who are practicing in



1. Counties in metro areas of 1 million or more
2. Counties in metro areas of 250,000 -1 million
3. Counties in metro areas fewer than 250,000
4. Urban pop of 20, 000 or more adjacent to metro areas
5. Urban pop of 20,000 or more not adjacent to metro areas
6. Urban pop of 2,500 or more adjacent to metro areas
7. Urban pop of 2,500 or more not adjacent to metro area
8. Completely rural or less than 2,500 urban pop adjacent to metro areas
9. Completely rural or less than 2,500 urban pop not adjacent to metro areass

Kentucky. There is no significant difference between the locations (p > .05)) indicating that the proportion of responding dentists is comparable from each of the five stratified survey districts and from the metropolitan vs. non-metropolitan areas within the state.

FIGURE 12: KENTUCKY STRATIFIED SURVEY DISTRICTS: GEOGRAPHIC LOCATION OF KENTUCKY PRACTICING DENTISTS VS. SURVEY RESPONDENTS

The business address in the license file and the primary business site in the survey were compared using the 2003

FIGURE 13 LICENSE VS SURVEY - URBAN RURAL

Urban-Rural Continuum Codes of U.S. Counties (Figure 13). There was no significant difference between the two. (p>.05).

How many Dental Hygienists	Percent
None	29%
One	31%
Two	25%
Three or More	15%

Eighty percent (80%) of the respondents reported they were currently practicing or teaching in Kentucky. Of those practicing in Kentucky, 85% reported they were practicing at one site, 10% at two sites, and 5% at three or more sites. They described their primary practice setting as follows:

- Individual proprietor of an unincorporated dental practice (34%)

Hours per Week at Total of Primary and Secondary Sites	Female Dentists	Male Dentists
0 – 16	5%	5%
17 – 31	21%	15%
32 – 50	72%	77%

- Individual proprietor of an incorporated dental practice (33%)

Do you use your Hygienist for:	Percent Yes
Patient Care (Prophylaxis, etc.)	89%
Patient education/counseling	89%
Developing patient education programs	57%
Community education	47%
Case management	29%
General supervision	28%
Delegated administration of local anesthesia	26%

- Government setting (6%)
- Other setting such as group practice, shareholder (27%)

Of the responding Kentucky Practicing Dentists, 71% reported using one or more dental hygienists. Slightly less than one third (29%) reported using no dental hygienist(Table 7). Approximately 12% of the respondents reported a full or part-time dental hygiene vacancy.

TABLE 7: KENTUCKY – RESPONDENTS WITH HYGIENISTS

A slightly higher percentage of female dentists work 17 – 31 hours per week (Table 8) vs. male dentists (21% vs. 15%, respectively)

Question	Percent Yes
Currently accept new patients	96%
Serve KY Medicaid or KCHIP patients	45%
Accept new KY Medicaid and /or KCHIP patients	39%

while a slightly higher percentage of male dentists work 32 – 50 hours per week (77% vs. 72%, respectively). 28% of respondents indicated using general supervision and 26% reported using dental hygenists for the administration of local anesthesia (Table 9).

TABLE 8: MALE/FEMALE DENTIST WORK WEEK

TABLE 9: DENTAL HYGIENIST FUNCTIONS AT PRIMARY

PRACTICE SITE

Survey respondents reported that they are accepting new patients (96%) while far fewer are accepting Kentucky Medicaid of Kentucky Childrens Health Insurance Program (KCHIP) patients (Table 10). Slightly less than half of the respondents reported serving Kentucky Medicaid or KCHIP patients. When viewed by the five stratified survey districts, the Appalachian district has the highest number of dentists participating in Medicaid.

TABLE 10: KENTUCKY – ACCEPT NEW PATIENTS

The survey findings in Table 11 approximate those published in a report by Kentucky Youth Advocates in 2004. The report stated that 41% of Kentucky business dentists submitted Medicaid claims that year.[9] The 2004 report indicated that of the 120 counties, less than 50% of the dentists in 33 counties submitted Medicaid claims, at least 50% of the dentists in 61 counties submitted claims, and all the dentists in 26 counties submitted claims. The highest percentage of the county population under the age of 21.[9]

	Western	Louisville	Northern	Central	Appalachian
Accept New Patients	94%	97%	94%	96%	99%
Serve Medicaid/KCHIP	51%	26%	38%	43%	74%
Accept New Medicaid/KCHIP	37%	23%	36%	41%	61%

TABLE 12: KENTUCKY – PARTICIPATE IN SERVICE ACTIVITIES

Program	Percent Yes
Participate in ADA's "Give Kids a Smile" program during February 2005	19%
Participate in KYDA's "Sealants for Kentucky's Children/Healthy Smiles 2010 at the State Fair Program during August 2005	9%

TABLE 11: STRATIFIED SURVEY DISTRICTS – ACCEPT NEW PATIENTS

Table 12 illustrates the overall participation of respondents in the "Give Kids a Smile" and "Sealants for Kentucky's Children" programs. More respondents in the Louisville and Central Districts participated in these service activities while more respondents in the Central and Appalachian Districts indicated the routine provision of free care to both children and adults (Table 13). More respondents in the Central and Appalachian Districts indicated serving migrant farm workers.

Survey respondents were 97% Caucasian, with the Central District being the most diverse. Of note, more respondents in the Central District offered language interpretation services (30%), followed by the Louisville (20%) and Northern (20%) Districts. Only 9% and 6% of the respondents in the Western and Appalachian Districts, respectively, offered language interpretation services.

TABLE 13: STRATIFIED SURVEY DISTRICTS – SERVICE ACTIVITIES, FREE CARE, SLIDING SCALE,

	Western	Louisville	Northern	Central	Appalachian
KY State Fair Sealant Program	5%	14%	1%	10%	4%
ADA Give Kids A Smile	10%	26%	9%	19%	17%
Offer Free Care/Children & Adults	29%	26%	29%	35%	36%
Offer Sliding Fee Scale	11%	15%	19%	24%	19%
Serve Migrant Farm Workers	27%	12%	20%	35%	36%

MIGRANT FARM WORKERS

Table 14 indicates that 12% of survey respondents planned to retire in 2 to 5 years and 27% planned to retire in 6 to 10 years.

Question	Percent Yes
In the next 12 months do you plan to retire?	2%
Have plans to retire or leave your practice in Kentucky in the next ……	
…… two to five years?	12%
…… six to ten years?	27%

TABLE 14: PLANS FOR RETIREMENT

According to the survey, Table 15 illustrates that the Western, Louisville and Northern districts will lose approximately 10% of their dentist workforce in 2-5 years due to retirement while the Central District will lose 20% and the Appalachian District 6%. All the districts will lose approximately one quarter of their dentist workforce in 6-10 years due to retirement.

TABLE 15: RETIREMENT/RELOCATION PLANS BY STRATIFIED SURVEY DISTRICTS

Plans to Retire in:	Western	Louisville	Northern	Central	Appalachian
12 Months	3%	1%	1%	2%	-0-
2-5 Years	11%	10%	11%	20%	6%
6-10 Years	28%	25%	28%	28%	26%
Move within KY	2%	2%	6%	3%	3%
Move out of KY	<1%	<1%	1%	2%	-0-

There appears to be minimal attrition secondary to leaving the State.

SUMMARY OF FINDINGS: PART II

1. Approximately two-thirds of survey respondents are individual proprietors.
2. 29% of respondents reported having no hygienist.
3. 26% of respondents allow their hygienists to administer local anesthesia.
4. 28% of respondents provide general supervision for their hygienists.
5. 45% of respondents accept Medicaid/KCHIP and 39% are accepting new Medicaid/KCHIP patients.
6. More respondents in the Appalachian District serve and accept new Medicaid/KCHIP patients, followed by the Western, Central, Northern, and Louisville Districts, respectively.
7. More respondents in the Appalachian and Central Districts serve migrant farm workers and routinely offer free care to children and adults.
8. 2% of dentists plan to retire in one year, 12% in 2-5 years, and 27% in 6-10 years.

CONCLUSIONS

1. There is an uneven distribution of dentists in Kentucky with the Louisville and Central Districts exceeding the ADA national average, and the remaining three districts remaining below the ADA national average.
2. The workforce increase is occurring in the metro areas while the nonmetro areas remain flat.
3. Assuming the 2006 number of practicing dentists (2350), the attrition rate indicated by the survey, the current average age of Kentucky dentists, an influx of 121 graduates from dental schools outside Kentucky over the next 10 years, the additions and retirements to the workforce, and that UK and UL combined provide 50 graduates per year to the Kentucky workforce, it is estimated there will be approximately 2064 dentists in 2016, a loss of 286 dentists from the current time. If the current trend continues, the question will be whether the existing uneven distribution of the workforce will be exacerbated such that the metro areas continue to populate with dentists while the nonmetro areas begin to lose dentists.
4. Kentucky is exporting over 50% of its combined dental graduates to other states.

LIMITATIONS IN THE STUDY

1. It was not possible to accurately compare the Kentucky Board of Dentistry workforce data with that used by the ADA and HRSA due to the manner in which data is collected for licensure.
2. A full time equivalent (FTE) for dentists was not calculated, only the number of dentists.
3. While the responses from the Part II survey were geographically representative, it is unknown in detail about gender and age characteristics compared to the entire set of licensed dentists.

RECOMMENDATIONS

1. In order to monitor changes in the workforce it is recommended that the Kentucky Board of Dentistry make available its licensure data following the biennial renewal period for dentists and dental hygienists.
2. It is recommended that the Kentucky Board of Dentistry consider expanding the relicensure application to record hours worked per week and weeks worked per year to enable the development of a more accurate profile of a full time equivalent dentist.

ACKNOWLEDGMENTS

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REFERENCES

1. Valachovic RW, Weaver R, Sinkford J, Haden NK. Trends in Dental Education and Dentistry. J Dent Educ 2001;65(6):539-561.

2. American Dental Association, Health Policy Resources Center. *2005 American Dental Association Dental Workforce Model: 2003-2025*. Chicago: American Dental Association, Health Policy Resources Center; 2005.

3. The Kentucky Cabinet for Human Resources. The Kentucky Oral Health Survey, 1987, Frankfort, KY: Cabinet for Human Resources, July 1989.

4. Kentucky Dental Manpower/Dental Education Report: A Staff Report to the Kentucky Council on Higher Education, November 9, 1992.

5. Retrieved from http://bhpr.hrsa.gov/healthworkforce/reports/factbook02/FB302.htm, March 22, 2007

6. Retrieved from http://www.ers.usda.gov/Briefing/Rurality/RuralUrbCon/, March 22, 2007.

7. Retrieved from http://hpsafind.hrsa.gov/hpsasearch.aspx, December 15, 2006.

8. Retrieved from http://bhpr.hrsa.gov/shortage/hpsaguidepc.htm, May 1, 2007

9. Kentucky Youth Advocates. Kentucky's Cavity. Louisville: Kentucky Youth Advocates, 2004.

APPENDIX A

2005 Kentucky Licensed Dentist Workforce Survey

Please type or print legibly. Please return survey in the pre-stamped return envelope and not with your renewal materials.

Shade circles like this: ●
Not like this: ⊠ ✓

DEMOGRAPHIC INFORMATION
Last Name
First

License Number

Are you Spanish/Hispanic/Latino?
O Yes
O No

What is your race?
O White
O Black, African American, or Negro
O Asian
O Other

DENTAL EDUCATION INFORMATION

1. Type of dental degree **(choose one)**
   O DDS
   O DMD
   O Other (specify such as BDS)
   Year Granted

2. Granting institution **(choose school below. If your school is not listed, provide the name and location of the school)**
   O University of Louisville
   O University of Kentucky
   O University of Tennessee
   O Indiana University
   O Ohio State University
   O Virginia Commonwealth University
   O West Virginia University
   Other (Name)
   Location (state or country)

PRACTICE INFORMATION

3. Are you currently practicing or teaching dentistry in Kentucky? O Yes O No
   If **YES**, skip to question 4. If **NO**, choose all of the following categories that apply.
   O Retired or permanently disabled
   O Practicing only outside of Kentucky
   O Working in another field
   O Seeking work or temporarily inactive
   O Other, (describe)
   Description

If you answered **No** to question 3, your survey is complete. Please fold and mail this survey in the attached postage paid envelope. Thank you.

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2005 KENTUCKY DENTIST WORKFORCE SURVEY
Page 3

PLANS

7. In the next 12 months do you plan to: Retire? O Yes O No
   Move your practice to another geographic location in Kentucky? O Yes O No
   Move out of Kentucky? O Yes O No
   Change patient hours? O Yes O No
   If you answered yes to any item in question 7, estimate the average hours per week you anticipate practicing in Kentucky: [ ][ ] Weeks per year [ ][ ]

8. Do you have plans to retire or leave your practice in Kentucky
   a) Within the next two to five years (2007 - 2010)? O Yes O No
   b) Within six to 10 years (2011 - 2015)? O Yes O No

DENTAL HYGIENIST INFORMATION

9. Do you have a dental hygienist vacancy at this time?
   O Yes - full-time O Yes - part-time O No O Not Applicable

10. Do you use your hygienist(s) for:
   Patient Care (prophylaxis, etc.)? O Yes O No
   Patient education/counseling? O Yes O No
   Developing patient education programs? O Yes O No
   Delegated administration of local anesthesia? O Yes O No
   Case management? O Yes O No
   Community education? O Yes O No
   General Supervision O Yes O No

11. For each hygienist:	Hygienist 1	Hygienist 2	Hygienist 3	Hygienist 4	Hygienist 5
Avg. hours/week with your patients	[ ][ ]	[ ][ ]	[ ][ ]	[ ][ ]	[ ][ ]
Year licensed	[ ][ ][ ][ ]	[ ][ ][ ][ ]	[ ][ ][ ][ ]	[ ][ ][ ][ ]	[ ][ ][ ][ ]
Approximately how many years practicing as a hygienist?	[ ][ ]	[ ][ ]	[ ][ ]	[ ][ ]	[ ][ ]
Certified to administer local anesthesia?	O Yes O No	O Yes O No	O Yes O No	O Yes O No	O Yes O No
Certified in general supervision?	O Yes O No	O Yes O No	O Yes O No	O Yes O No	O Yes O No
Retiring within 5 years?	O Yes O No	O Yes O No	O Yes O No	O Yes O No	O Yes O No

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2005 KENTUCKY DENTIST WORKFORCE SURVEY
Page 4

PATIENT

12. Do you currently accept new patients? O Yes O No

Do you serve Kentucky Medical Assistance (KY Medicaid) or KCHIP patients? O Yes O No

If YES, estimate the number age 21 or older that you served in 2004: [ ][ ][ ][ ]

If YES, estimate the number under age 21 that you served in 2004: [ ][ ][ ][ ]

If YES, estimate the percent of your practice covered by Medicaid or KCHIP: [ ][ ][ ]

14. Do you accept new Kentucky Medical Assistance (KY Medicaid) and/or KCHIP patients? O Yes O No

15. Do you routinely provide any free care? O Yes - children O Yes - adults O No

16. Do you provide services to migrant farmworkers? O Yes O No

If YES, estimate the percent of your practice committed to migrant farm workers: [ ][ ][ ]

Do you offer a sliding fee scale for patients based on income or ability to pay? O Yes O No

If YES, estimate the percent of your practice covered with a sliding fee scale: [ ][ ][ ]

18. Do you or others on staff offer language interpretation? O Yes O No

Which language(s)?

19. Did you participate in the ADA's "Give Kids A Smile" program during February 2005? O Yes O No

20. Did you participate in the KYDA's "Sealants for Kentucky's Children/Health Smiles 2010" at the State Fair program during August 2005? ? O Yes O No

Please fold and mail this survey in the attached postage paid envelope.
Thank you.

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APPENDIX B

Kentucky County	Dentists 1998	Dentists 2006	Population 1998	Population 2006	1998 Dentist/ 10,000	2006 Dentist/ 10,000	Diff. 1998-2006	Percent change 1998-2006	DHPSA
Adair	5	5	16972	17643	2.9	2.8	0	0.0%	
Allen	5	6	17116	18963	2.9	3.2	1	20.0%	
Anderson	6	7	18343	20657	3.3	3.4	1	16.7%	
Ballard	1	1	8193	8270	1.2	1.2	0	0.0%	
Barren	14	17	37185	40378	3.8	4.2	3	21.4%	
Bath	2	1	10726	11752	1.9	0.9	-1	-50.0%	
Bell	14	11	30404	29663	4.6	3.7	-3	-21.4%	
Boone	53	73	79601	109401	6.7	6.7	20	37.7%	
Bourbon	9	13	19287	19909	4.7	6.5	4	44.4%	
Boyd	34	39	50187	49515	6.8	7.9	5	14.7%	*
Boyle	20	22	27326	28465	7.3	7.7	2	10.0%	
Bracken	2	2	8195	8716	2.4	2.3	0	0.0%	
Breathitt	4	4	15940	15985	2.5	2.5	0	0.0%	
Breckinridge	4	4	17958	19526	2.2	2.0	0	0.0%	
Bullitt	17	20	58943	69342	2.9	2.9	3	17.6%	
Butler	1	2	12660	13503	0.8	1.5	1	100.0%	
Caldwell	5	4	13092	12900	3.8	3.1	-1	-20.0%	
Calloway	15	17	33595	35296	4.5	4.8	2	13.3%	
Campbell	32	36	88266	88027	3.6	4.1	4	12.5%	*
Carlisle	1	1	5345	5356	1.9	1.9	0	0.0%	
Carroll	3	4	10017	10489	3.0	3.8	1	33.3%	
Carter	8	10	26468	27504	3.0	3.6	2	25.0%	
Casey	3	2	15139	16460	2.0	1.2	-1	-33.3%	
Christian	24	28	72327	72025	3.3	3.9	4	16.7%	
Clark	18	20	32292	35111	5.6	5.7	2	11.1%	
Clay	7	5	24172	24201	2.9	2.1	-2	-28.6%	*
Clinton	3	3	9522	9584	3.2	3.1	0	0.0%	
Crittenden	2	1	9332	9001	2.1	1.1	-1	-50.0%	
Cumberland	3	3	7108	7187	4.2	4.2	0	0.0%	
Daviess	58	53	91110	93361	6.4	5.7	-5	-8.6%	
Edmonson	2	2	11314	12104	1.8	1.7	0	0.0%	
Elliott	2	3	6700	6953	3.0	4.3	1	50.0%	
Estill	3	4	15319	15108	2.0	2.6	1	33.3%	
Fayette	297	342	254539	270787	11.7	12.6	45	15.2%	*
Fleming	5	3	13474	14797	3.7	2.0	-2	-40.0%	
Floyd	24	25	42888	42214	5.6	5.9	1	4.2%	*
Franklin	25	29	47098	48374	5.3	6.0	4	16.0%	
Fulton	3	2	7696	7192	3.9	2.8	-1	-33.3%	
Gallatin	1	1	7275	8338	1.4	1.2	0	0.0%	
Garrard	4	2	14100	16913	2.8	1.2	-2	-50.0%	
Grant	5	7	21105	25321	2.4	2.8	2	40.0%	
Graves	12	11	36372	37819	3.3	2.9	-1	-8.3%	
Grayson	8	7	23522	25439	3.4	2.8	-1	-12.5%	
Green	3	4	11272	11729	2.7	3.4	1	33.3%	

Kentucky County	Dentists 1998	Dentists 2006	Population 1998	Population 2006	1998 Dentist/ 10,000	2006 Dentist/ 10,000	Diff. 1998-2006	Percent change 1998-2006	DHPSA
Greenup	17	13	37016	37152	4.6	3.5	-4	-23.5%	
Hancock	4	4	8302	8591	4.8	4.7	0	0.0%	
Hardin	52	61	93112	98127	5.6	6.2	9	17.3%	
Harlan	9	8	34184	31473	2.6	2.5	-1	-11.1%	
Harrison	10	7	17571	18627	5.7	3.8	-3	-30.0%	
Hart	5	4	16985	18465	2.9	2.2	-1	-20.0%	
Henderson	21	20	44691	45617	4.7	4.4	-1	-4.8%	
Henry	4	3	14712	16043	2.7	1.9	-1	-25.0%	
Hickman	1	0	5304	5048	1.9	0.0	-1	-100.0%	
Hopkins	20	20	46633	46826	4.3	4.3	0	0.0%	
Jackson	2	4	13263	13730	1.5	2.9	2	100.0%	*
Jefferson	608	670	689020	701886	8.8	9.5	62	10.2%	*
Jessamine	15	17	37403	44236	4.0	3.8	2	13.3%	
Johnson	6	5	23619	24047	2.5	2.1	-1	-16.7%	
Kenton	63	72	149761	153846	4.2	4.7	9	14.3%	
Knott	4	4	17872	17603	2.2	2.3	0	0.0%	
Knox	7	10	31493	32089	2.2	3.1	3	42.9%	*
Larue	3	3	13091	13695	2.3	2.2	0	0.0%	
Laurel	11	20	50822	57349	2.2	3.5	9	81.8%	
Lawrence	6	3	15391	16260	3.9	1.8	-3	-50.0%	
Lee	2	2	7890	7783	2.5	2.6	0	0.0%	
Leslie	4	4	12628	11942	3.2	3.3	0	0.0%	
Letcher	7	7	25728	24365	2.7	2.9	0	0.0%	*
Lewis	3	4	13896	13813	2.2	2.9	1	33.3%	*
Lincoln	2	2	22711	25411	0.9	0.8	0	0.0%	
Livingston	1	1	9674	9762	1.0	1.0	0	0.0%	
Logan	7	9	26234	27242	2.7	3.3	2	28.6%	
Lyon	1	2	7920	8207	1.3	2.4	1	100.0%	
Madison	27	29	68086	78971	4.0	3.7	2	7.4%	*
Magoffin	5	6	13325	13472	3.8	4.5	1	20.0%	
Marion	4	5	17840	19082	2.2	2.6	1	25.0%	
Marshall	10	9	29721	31113	3.4	2.9	-1	-10.0%	
Martin	2	2	12799	12515	1.6	1.6	0	0.0%	*
Mason	11	12	16904	17135	6.5	7.0	1	9.1%	
McCracken	48	52	65401	64404	7.3	8.1	4	8.3%	
McCreary	3	3	16937	17311	1.8	1.7	0	0.0%	*
McLean	3	1	9806	9919	3.1	1.0	-2	-66.7%	
Meade	5	4	25903	28664	1.9	1.4	-1	-20.0%	
Menifee	2	1	6196	6901	3.2	1.4	-1	-50.0%	*
Mercer	5	8	20514	21798	2.4	3.7	3	60.0%	
Metcalfe	3	2	9845	10253	3.0	2.0	-1	-33.3%	
Monroe	6	6	11796	11707	5.1	5.1	0	0.0%	
Montgomery	10	11	21812	24540	4.6	4.5	1	10.0%	
Morgan	5	6	13767	14428	3.6	4.2	1	20.0%	
Muhlenberg	10	9	31727	31630	3.2	2.8	-1	-10.0%	*
Nelson	14	17	35835	41870	3.9	4.1	3	21.4%	

Kentucky County	Dentists 1998	Dentists 2006	Population 1998	Population 2006	1998 Dentist/ 10,000	2006 Dentist/ 10,000	Diff. 1998-2006	Percent change 1998-2006	DHPSA
Nicholas	3	1	6826	7055	4.4	1.4	-2	-66.7%	
Ohio	8	7	22484	23791	3.6	2.9	-1	-12.5%	
Oldham	16	25	43951	54451	3.6	4.6	9	56.3%	
Owen	3	5	10183	11532	2.9	4.3	2	66.7%	
Owsley	1	0	4954	4759	2.0	0.0	-1	-100.0%	
Pendleton	1	2	14015	15373	0.7	1.3	1	100.0%	
Perry	15	18	29893	29526	5.0	6.1	3	20.0%	*
Pike	32	37	70180	66644	4.6	5.6	5	15.6%	
Powell	4	3	12780	13806	3.1	2.2	-1	-25.0%	
Pulaski	26	35	55216	59543	4.7	5.9	9	34.6%	
Robertson	0	0	2246	2328	0.0	0.0	0	#N/A	
Rockcastle	2	3	16215	16791	1.2	1.8	1	50.0%	
Rowan	10	12	21804	22324	4.6	5.4	2	20.0%	
Russell	7	8	16190	17025	4.3	4.7	1	14.3%	
Scott	12	18	30890	40368	3.9	4.5	6	50.0%	
Shelby	11	17	31461	38853	3.5	4.4	6	54.5%	
Simpson	7	8	16188	17071	4.3	4.7	1	14.3%	
Spencer	4	3	10431	16398	3.8	1.8	-1	-25.0%	
Taylor	10	7	22802	23856	4.4	2.9	-3	-30.0%	
Todd	3	1	11773	11999	2.5	0.8	-2	-66.7%	
Trigg	3	3	12100	13482	2.5	2.2	0	0.0%	
Trimble	1	1	7679	9282	1.3	1.1	0	0.0%	
Union	8	6	15800	15644	5.1	3.8	-2	-25.0%	
Warren	63	66	90034	99899	7.0	6.6	3	4.8%	*
Washington	5	4	10779	11483	4.6	3.5	-1	-20.0%	
Wayne	6	6	19412	20594	3.1	2.9	0	0.0%	
Webster	4	3	14015	14129	2.9	2.1	-1	-25.0%	
Whitley	21	21	35468	38425	5.9	5.5	0	0.0%	
Wolfe	1	1	7003	7044	1.4	1.4	0	0.0%	
Woodford	9	11	22622	24318	4.0	4.5	2	22.2%	

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