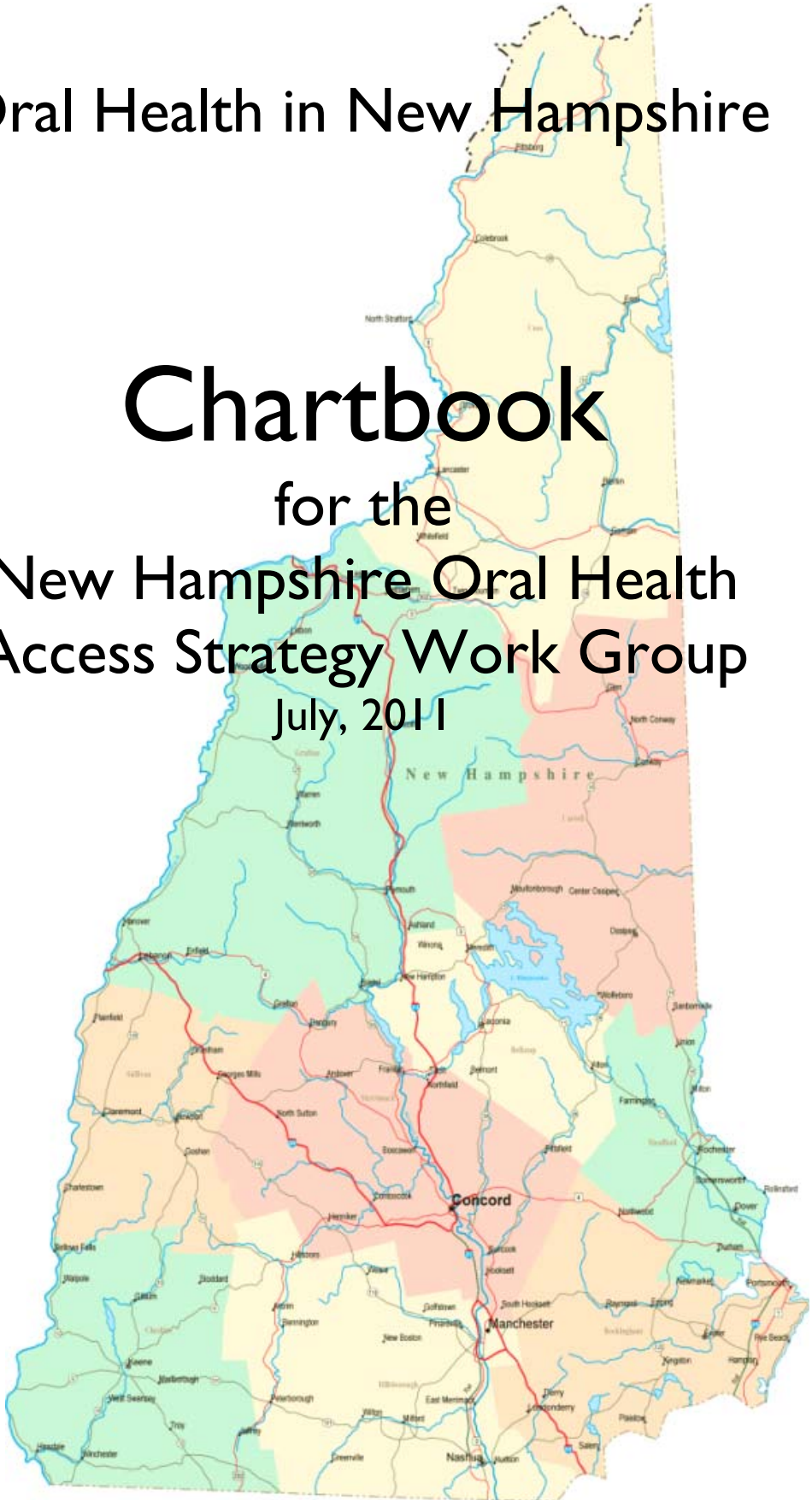
Oral Health in New Hampshire

Chartbook

for the
New Hampshire Oral Health Access Strategy Work Group

July, 2011



CHWS
The Center for Health Workforce Studies

Maps by Local Area and by Primary Care Service Area in NH

The following maps are constructed based on David Goodman's Primary Care Service Areas (PCSAs). PCSAs are based on established commuting patterns between zip codes for primary care services. They represent the smallest geographical area that can be considered a discrete service area for primary care. PCSAs are defined through utilization data and are geographic representations of primary care markets. Different zip codes, or groupings of zip codes, are associated with unique PCSAs.

The PCSA maps are constructed by aggregating data from the zip code level to each PCSA. Other sources of data for these maps include Claritas, the National Center for Education Statistics (NCES), and the New Hampshire licensure files for both dentists and dental hygienists located within New Hampshire. Claritas provides demographic data at the zip code level such as income, age, and total population. The National Center for Education Statistics provides data on the total student population, the total number of special education students (based on IEP), and all students eligible for a reduced or free school lunch. The New Hampshire licensure files provide zip code level information on licensed dentist and dental hygienist providers.

Data for the county maps are drawn from the Census 2010 county level population data and the Behavioral Risk Factor Surveillance System (BRFSS). BRFSS is a state-based system of health surveys that collects information on health conditions and behaviors. It is the world's largest, on-going telephone health survey system and is overseen by the Centers for Disease Control and Prevention. County level maps regarding special education students and students eligible for free/reduced lunches were constructed from the National Center for Education Statistics data and aggregated up to the county level.

The following websites provide more information on each of the data sources described:

Claritas: http://www.claritas.com/MyBestSegments/Default.jsp

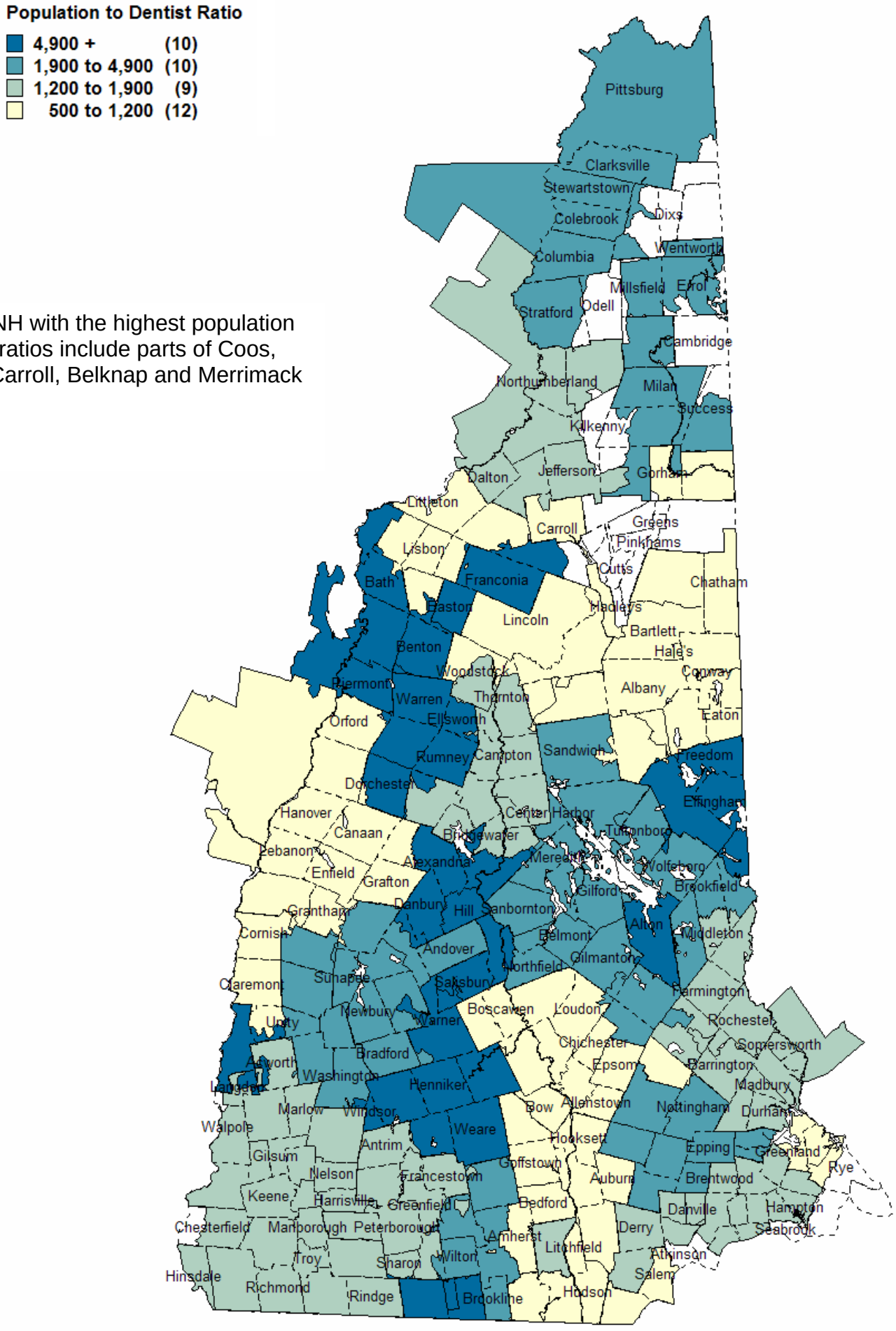
Behavioral Risk Factor Surveillance System: http://www.cdc.gov/BRFSS/

National Center for Education Statistics:
http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2010350

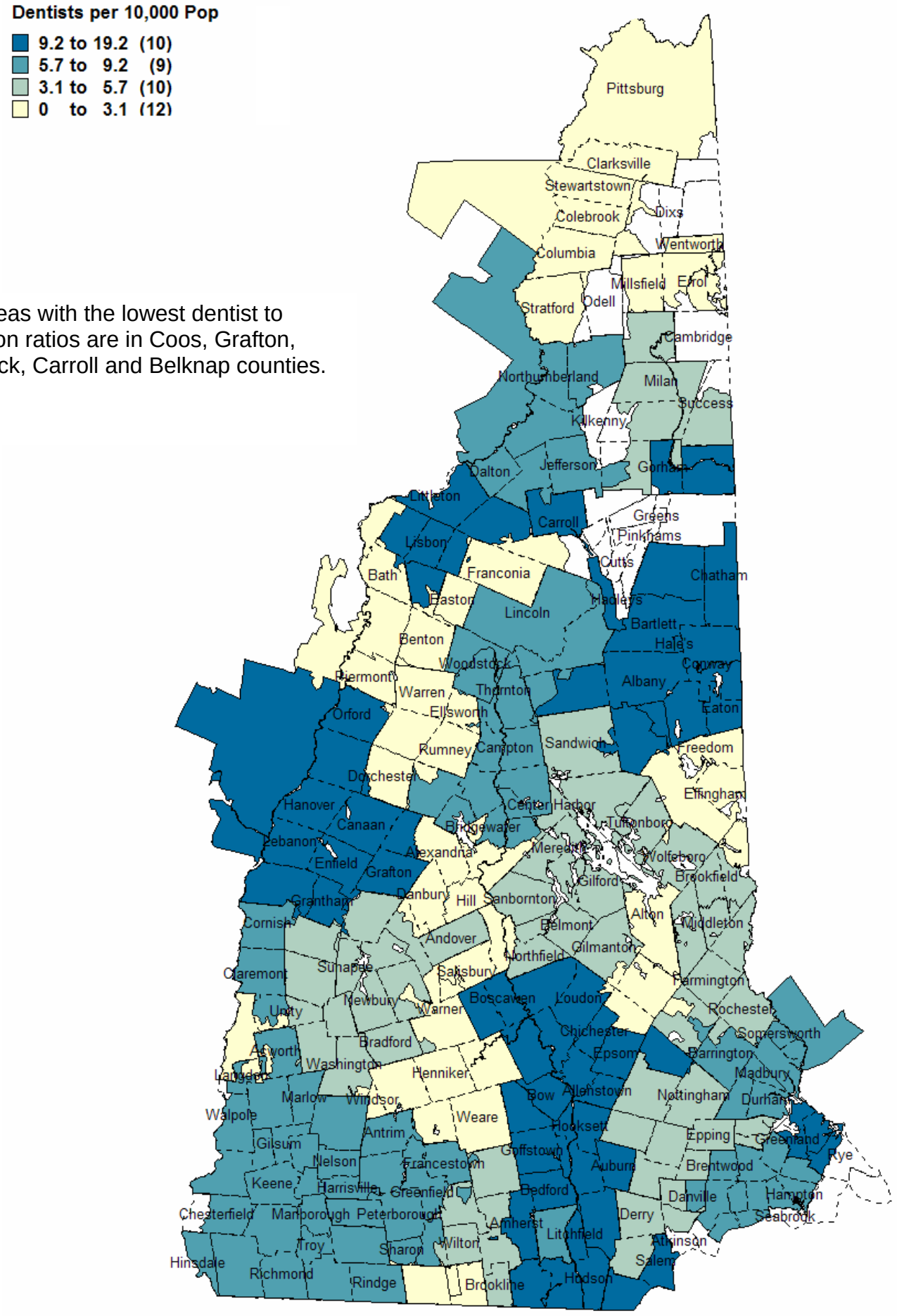
U.S. Bureau of the Census:
http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml

David Goodman's PCSAs: http://www.ncbi.nlm.nih.gov/pubmed/12650392

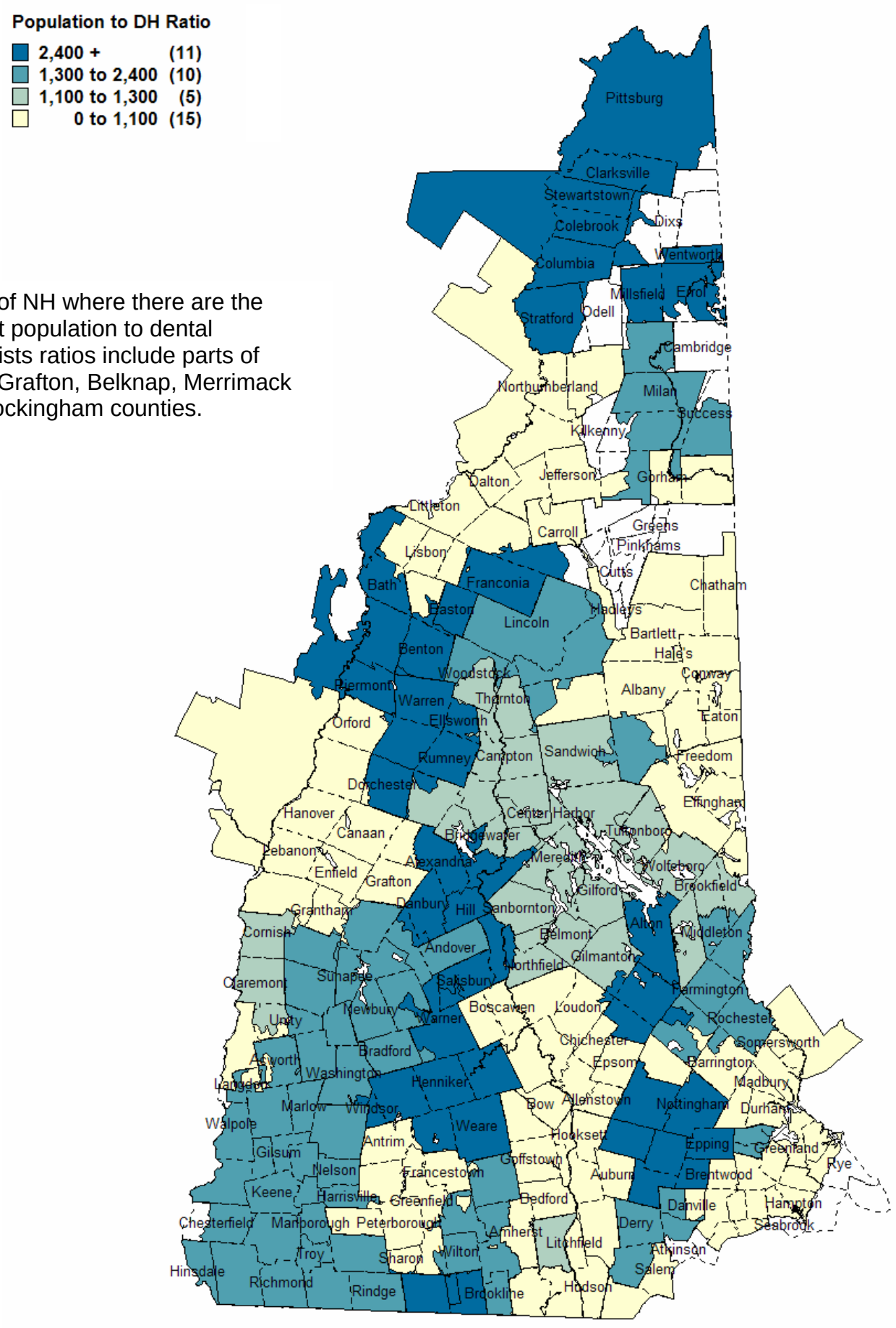
http://www.hrsa.gov/advisorycommittees/shortage/Meetings/20110118/MeetingMaterials/primarycare.pdf



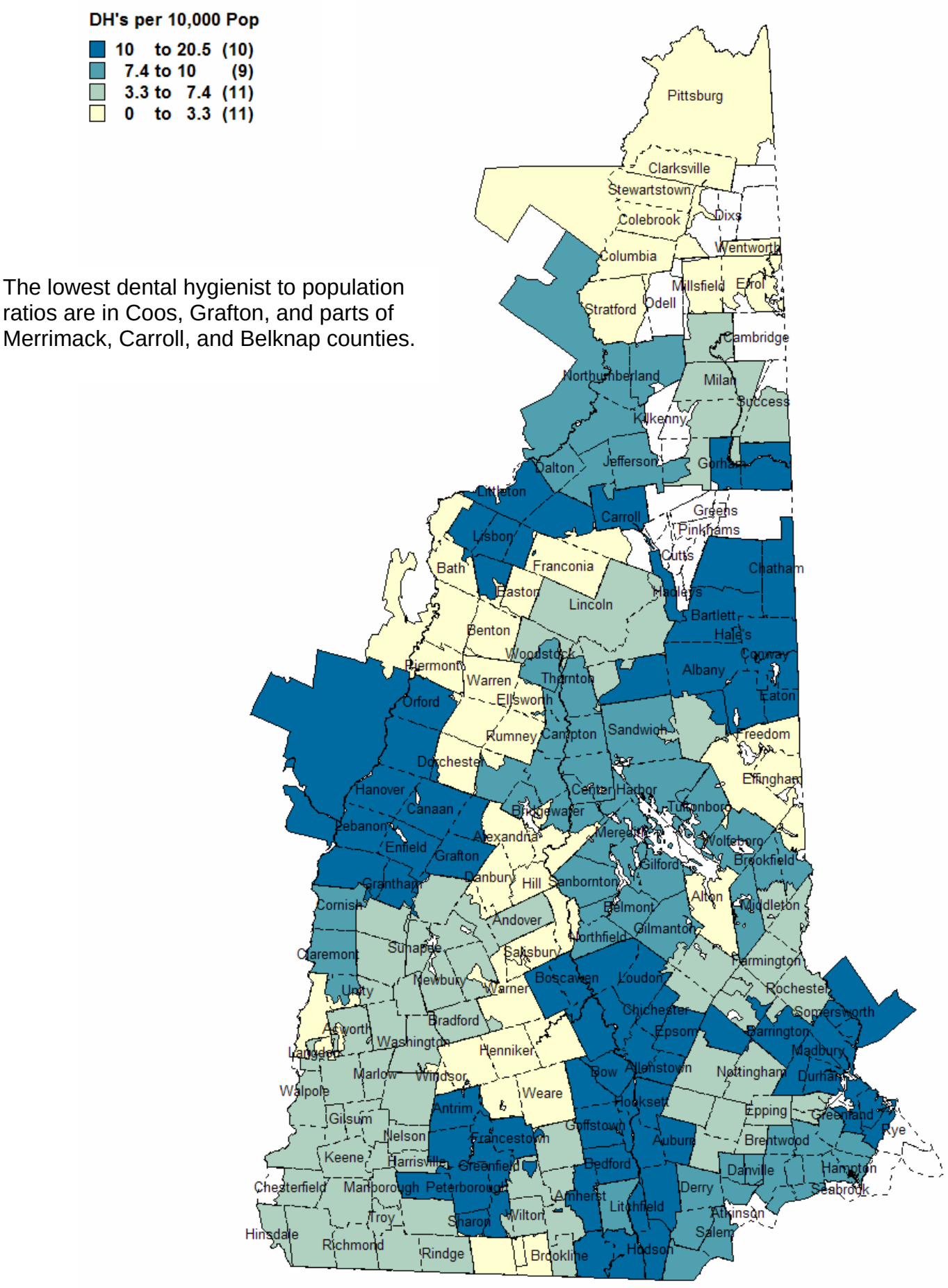
Areas of NH with the highest population to dentist ratios include parts of Coos, Grafton, Carroll, Belknap and Merrimack counties.



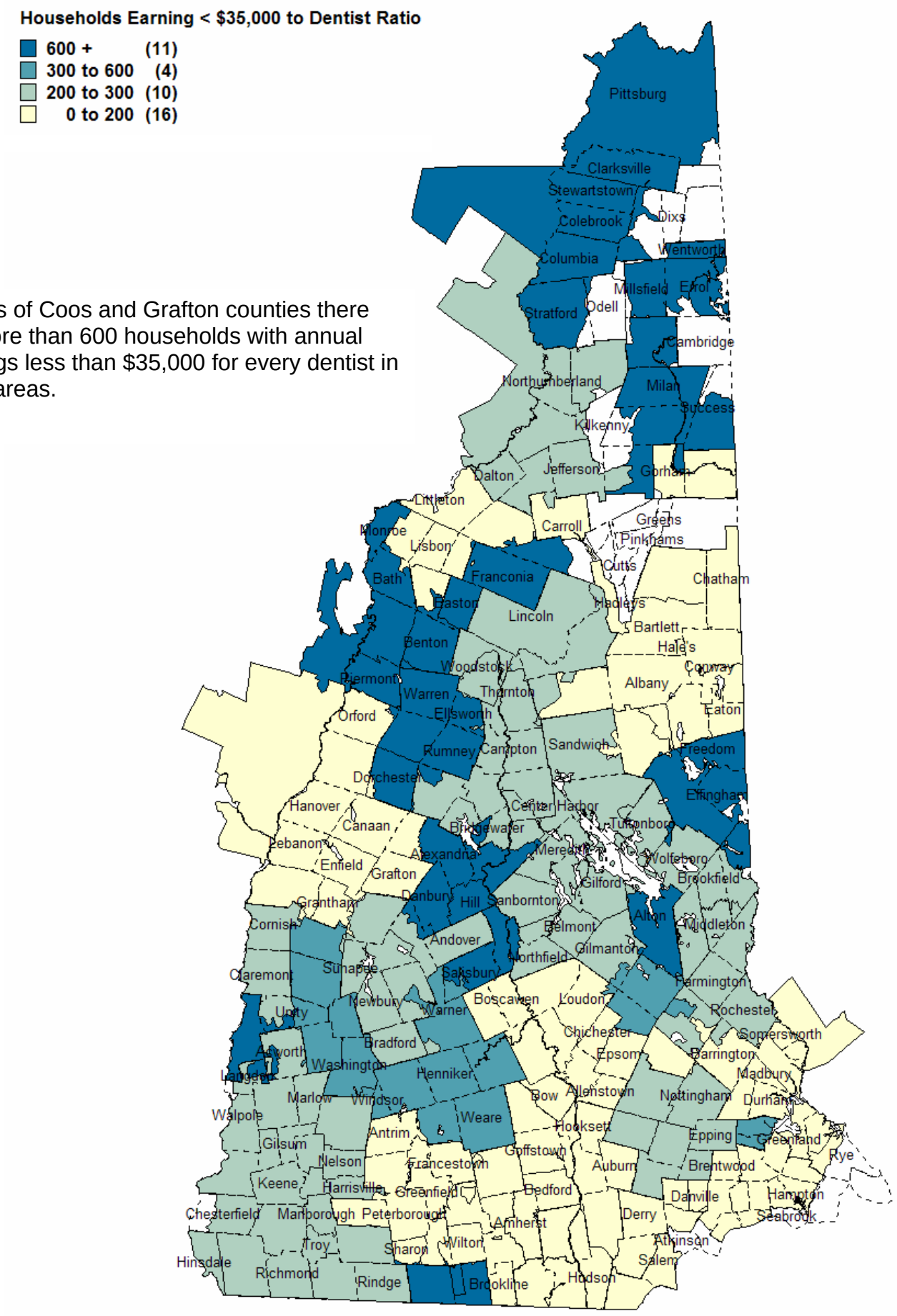
Local areas with the lowest dentist to population ratios are in Coos, Grafton, Merrimack, Carroll and Belknap counties.



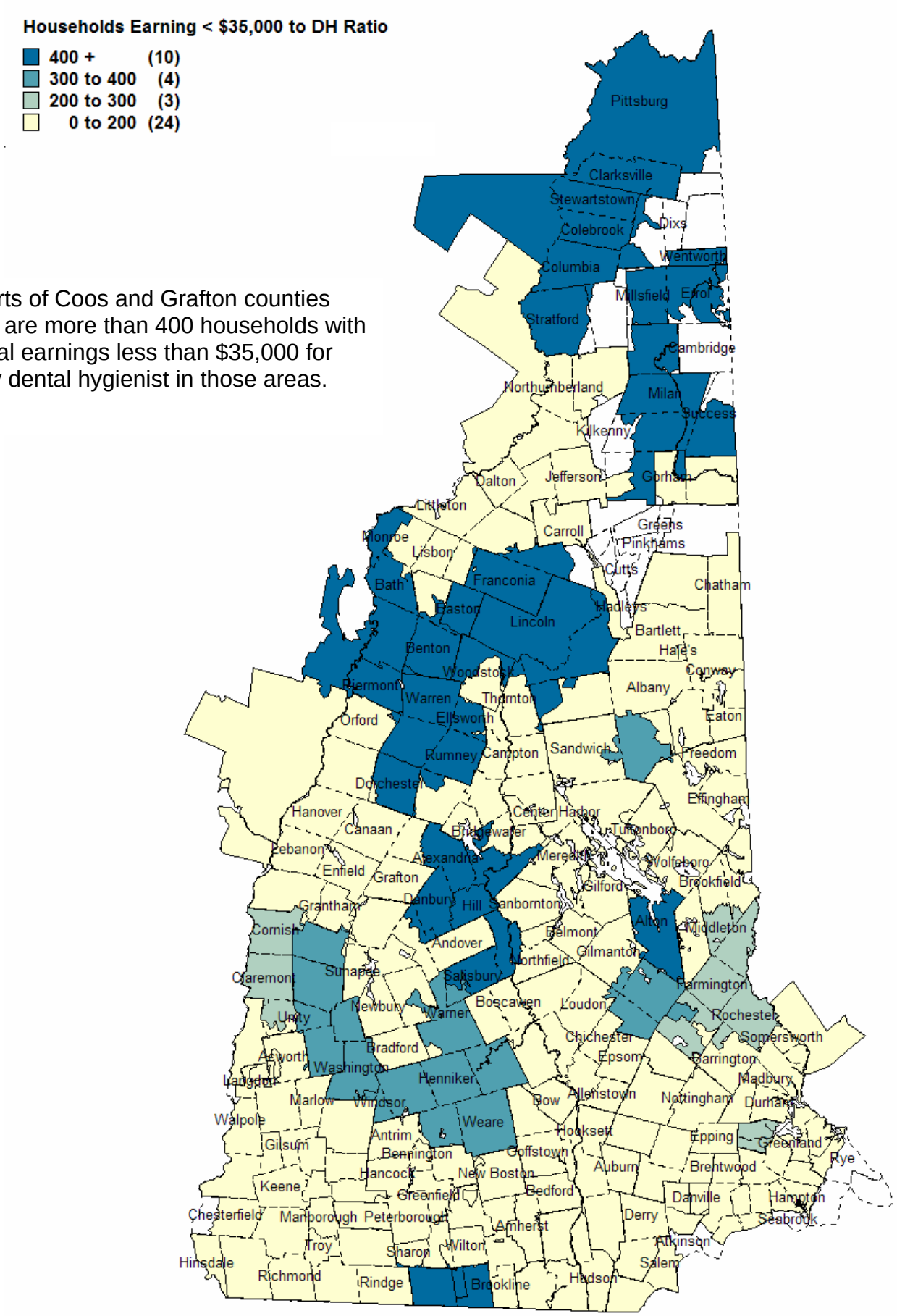
Areas of NH where there are the highest population to dental hygienists ratios include parts of Coos, Grafton, Belknap, Merrimack and Rockingham counties.



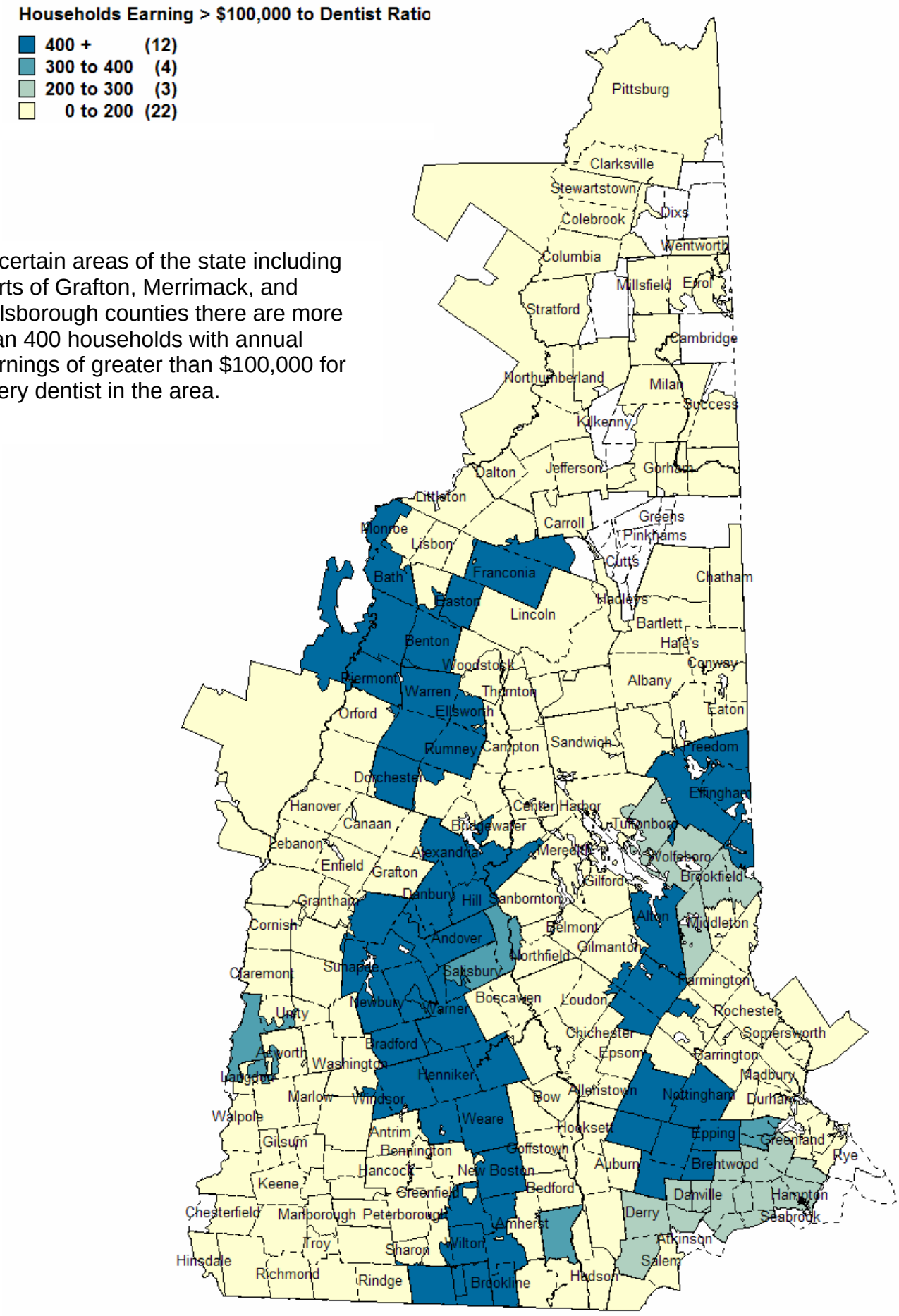
The lowest dental hygienist to population ratios are in Coos, Grafton, and parts of Merrimack, Carroll, and Belknap counties.



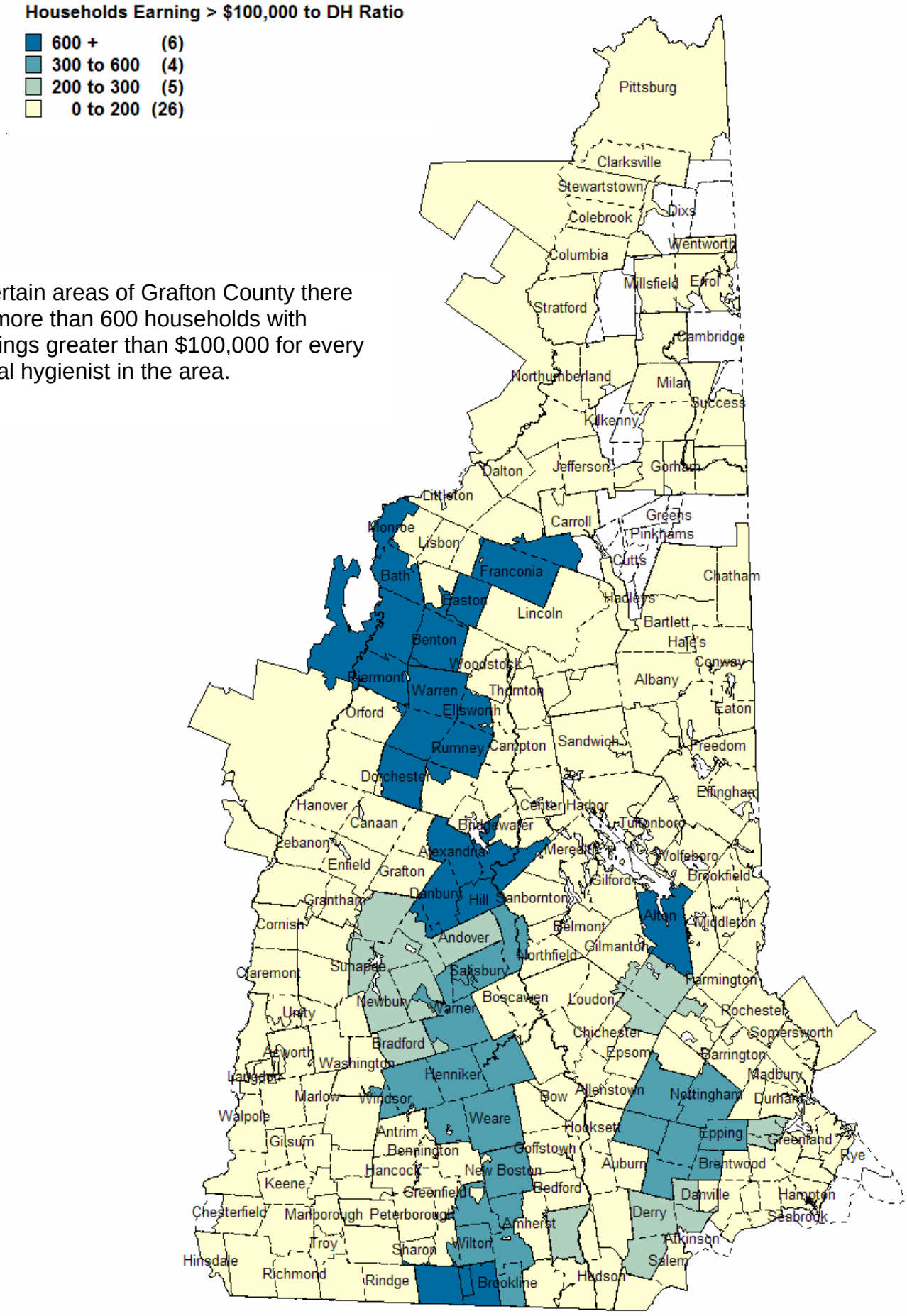
In parts of Coos and Grafton counties there are more than 600 households with annual earnings less than $35,000 for every dentist in those areas.



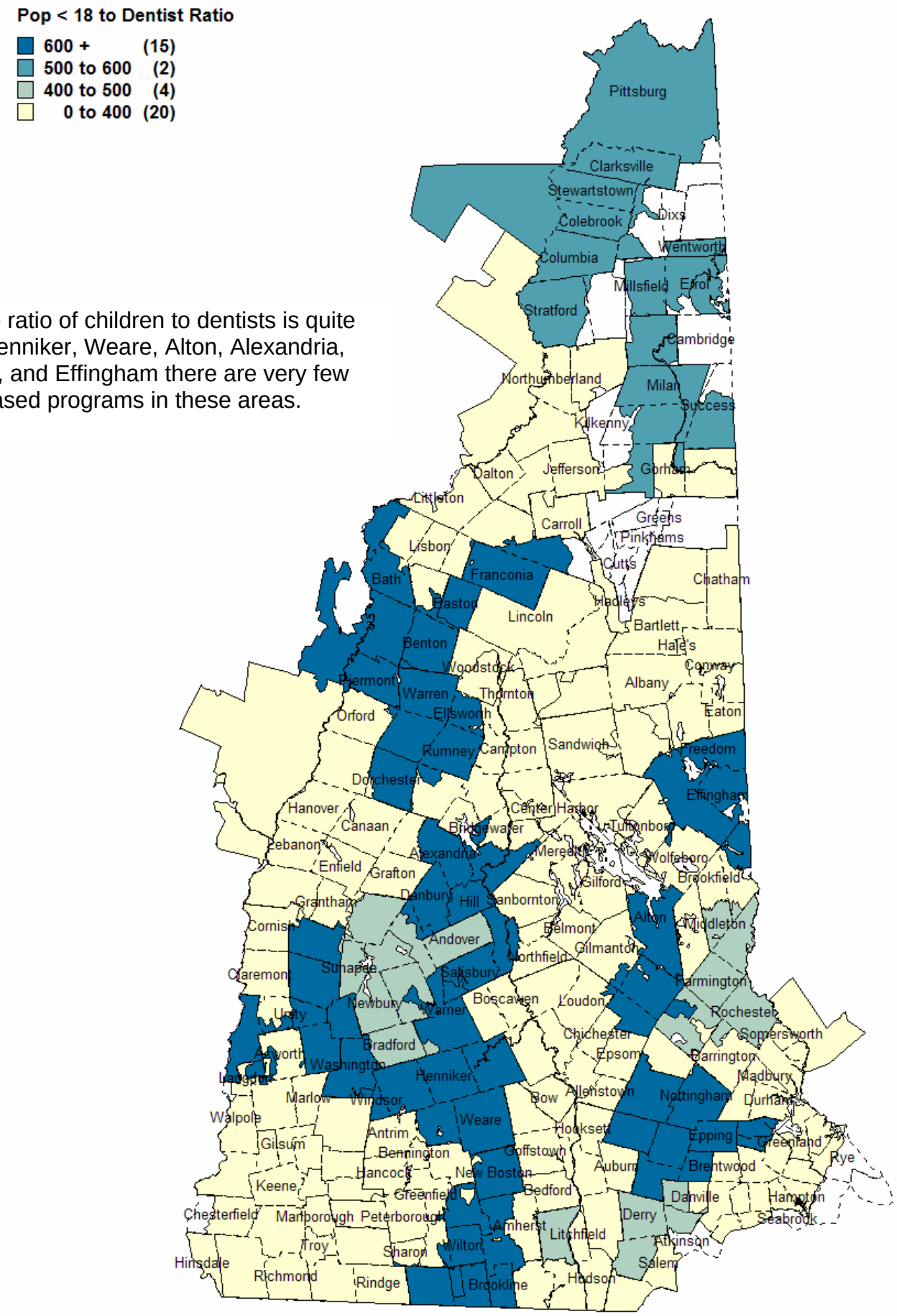
In parts of Coos and Grafton counties there are more than 400 households with annual earnings less than $35,000 for every dental hygienist in those areas.



In certain areas of the state including parts of Grafton, Merrimack, and Hillsborough counties there are more than 400 households with annual earnings of greater than $100,000 for every dentist in the area.

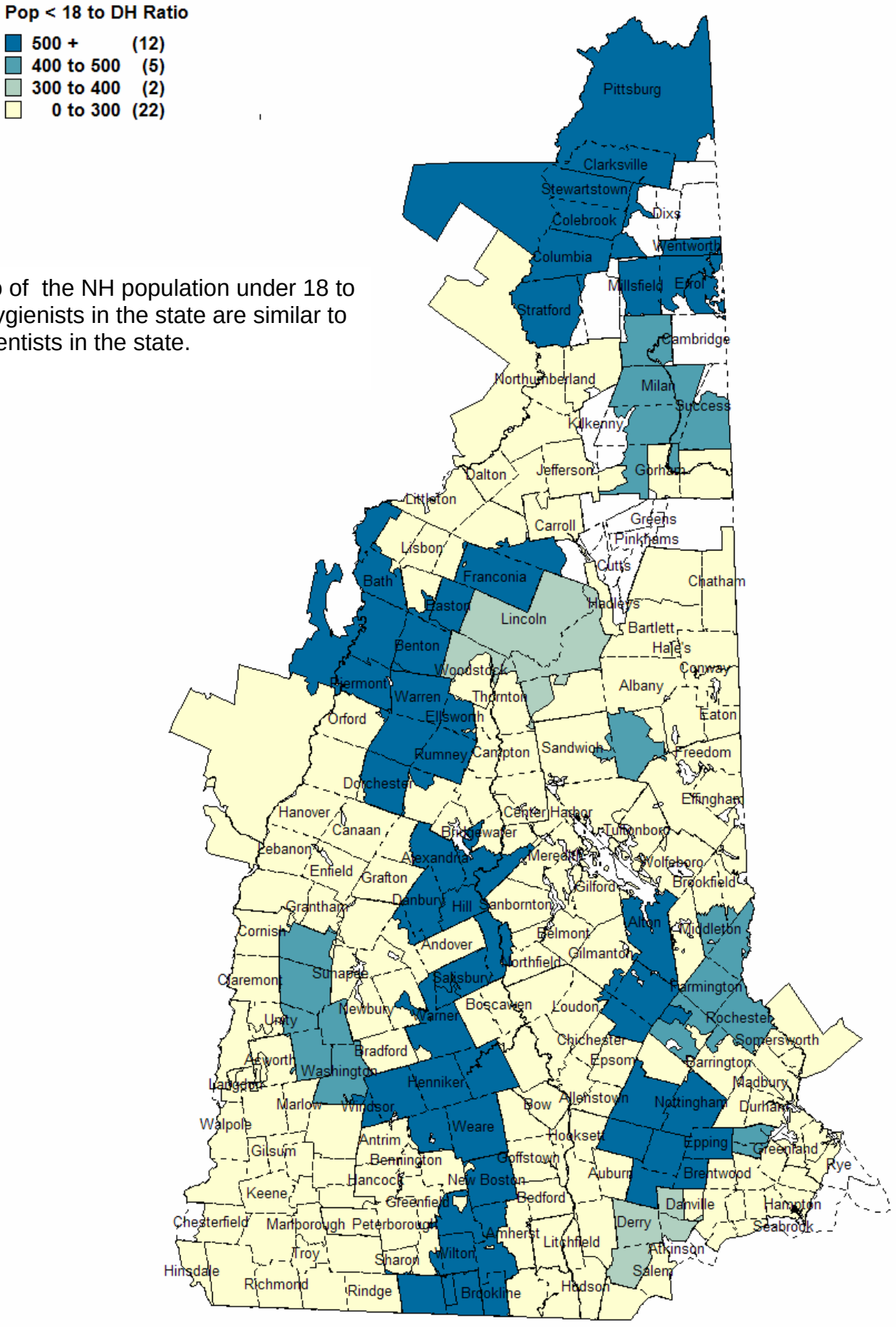


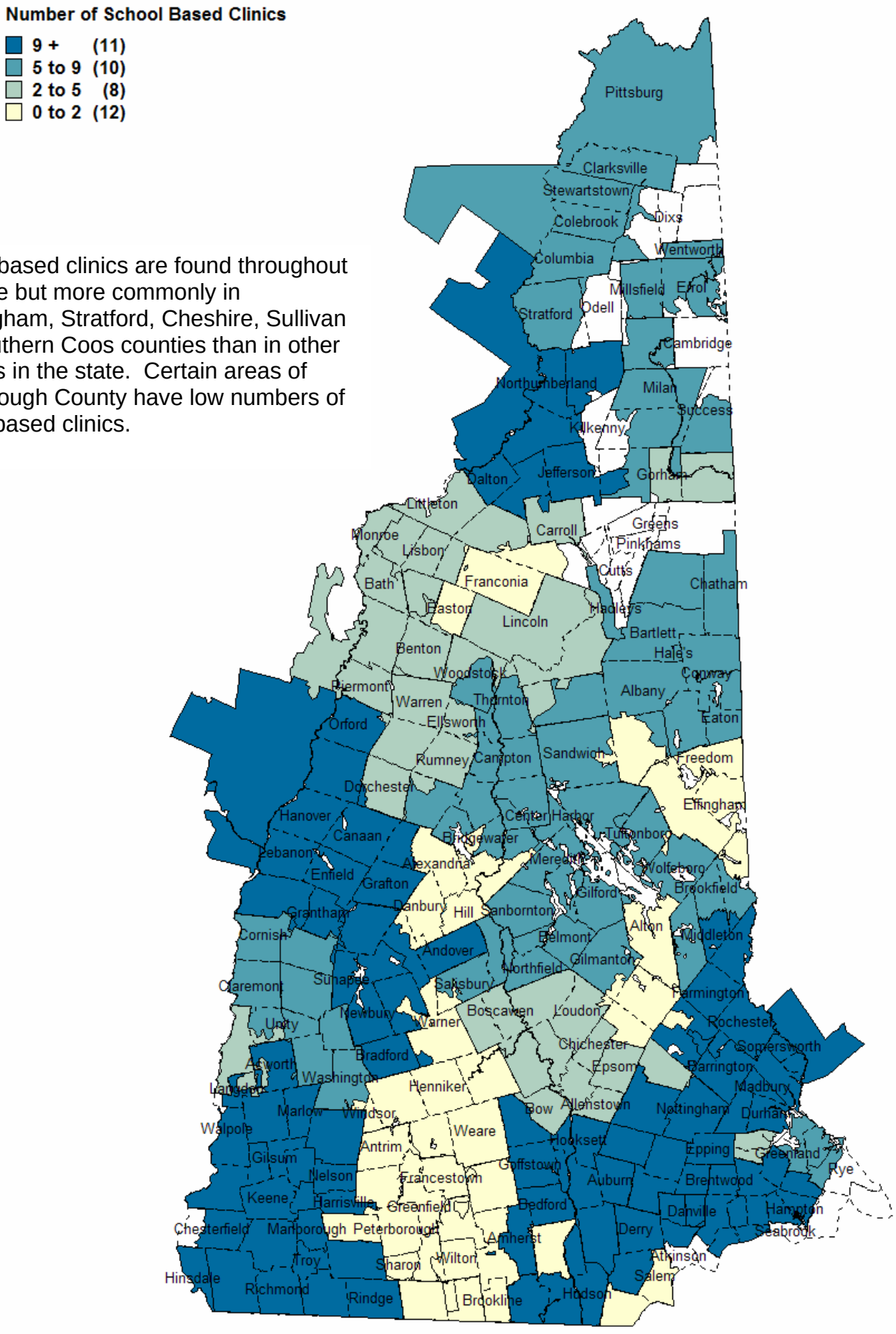
In certain areas of Grafton County there are more than 600 households with earnings greater than $100,000 for every dental hygienist in the area.



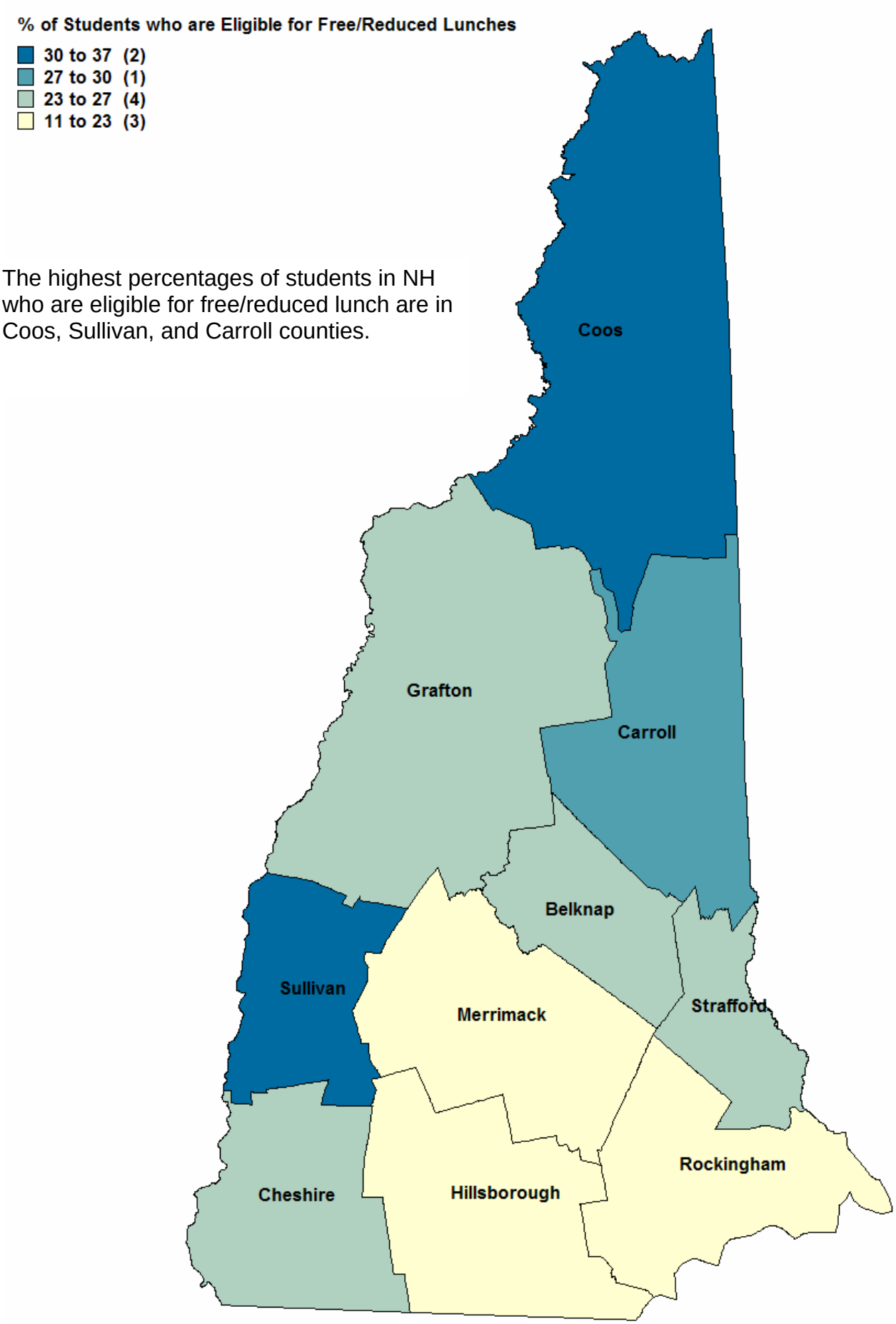
While the ratio of children to dentists is quite high in Henniker, Weare, Alton, Alexandria, Freedom, and Effingham there are very few school based programs in these areas.

The ratio of the NH population under 18 to dental hygienists in the state are similar to that of dentists in the state.

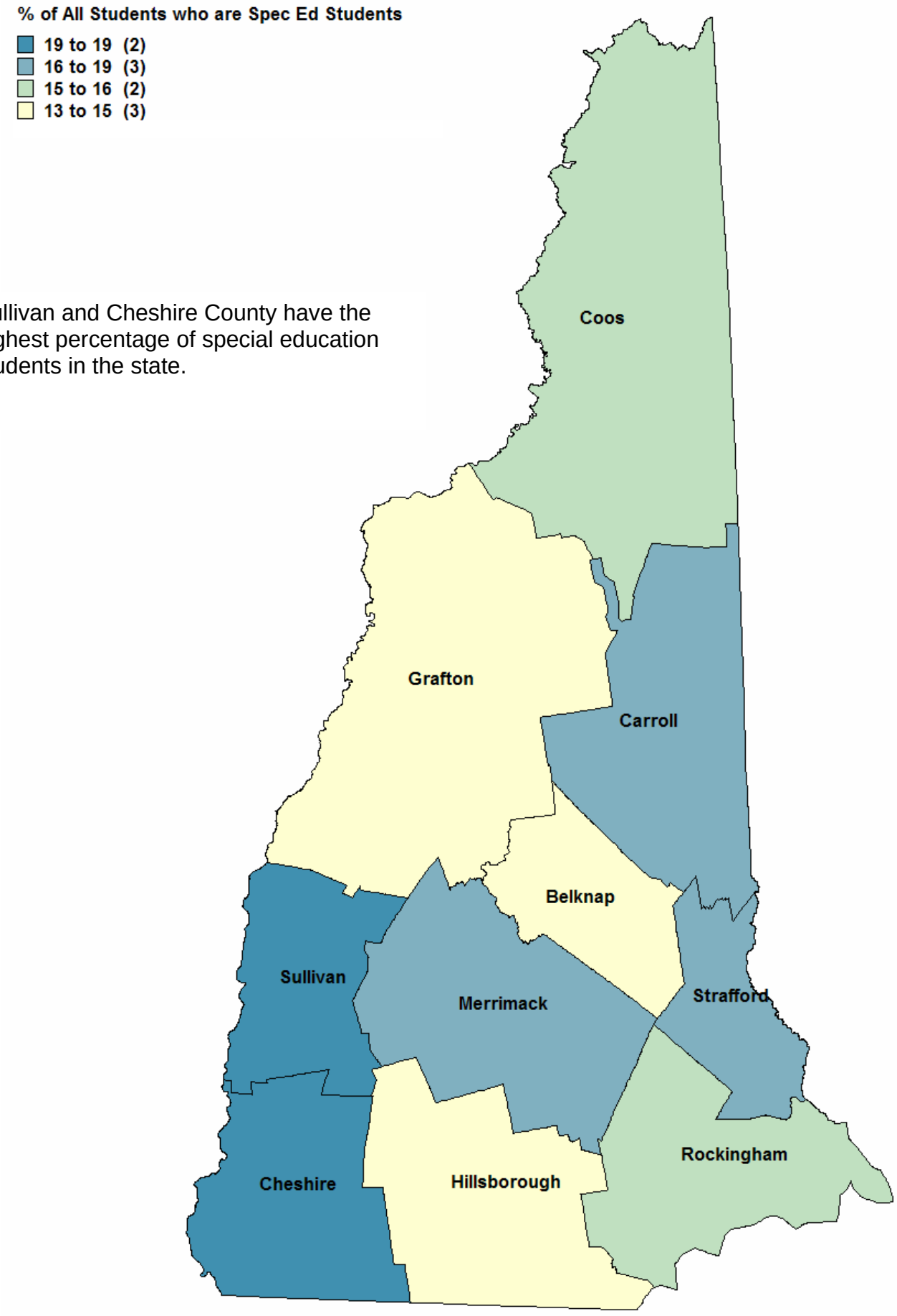




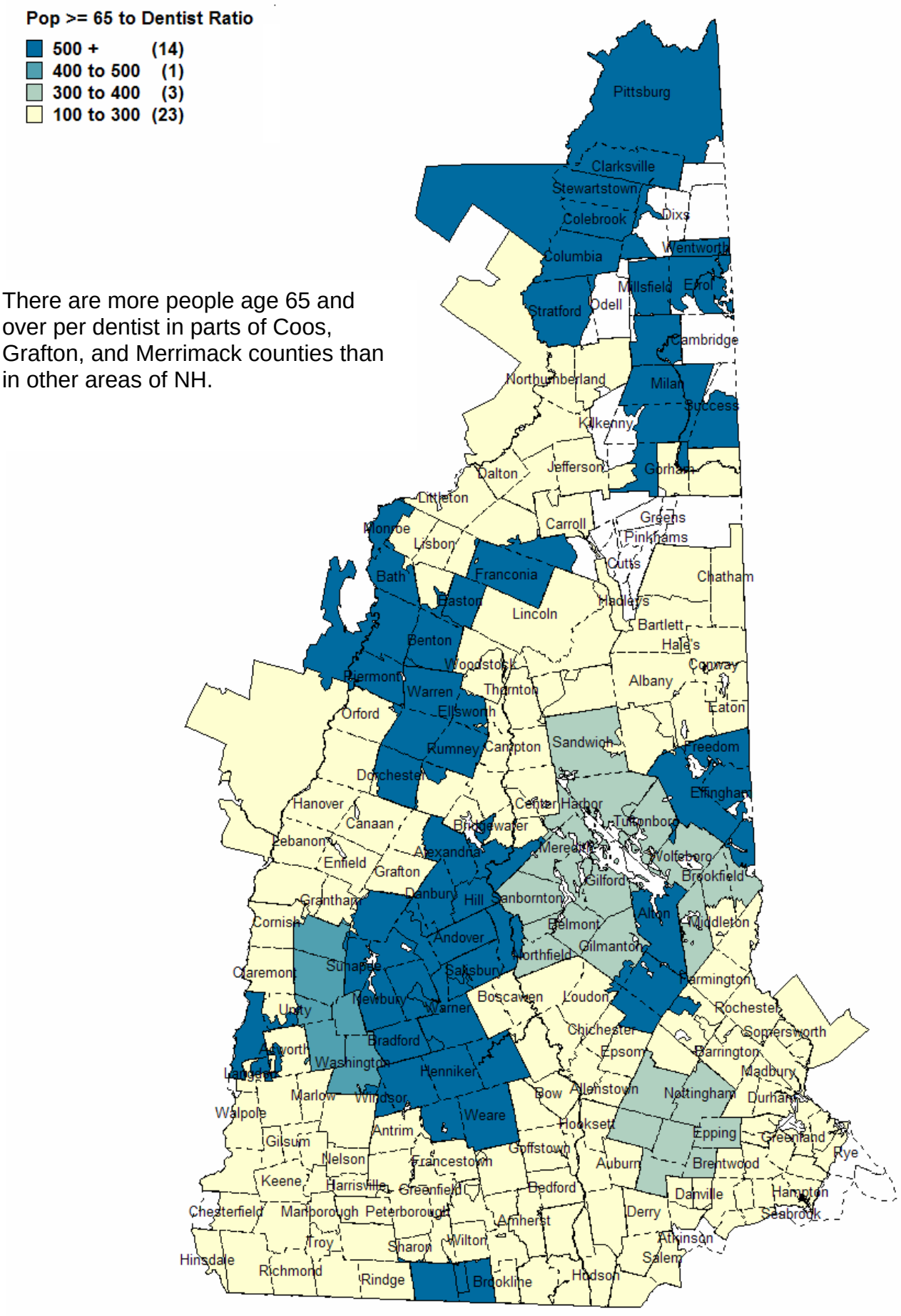
School based clinics are found throughout the state but more commonly in Rockingham, Stratford, Cheshire, Sullivan and southern Coos counties than in other counties in the state. Certain areas of Hillsborough County have low numbers of school based clinics.



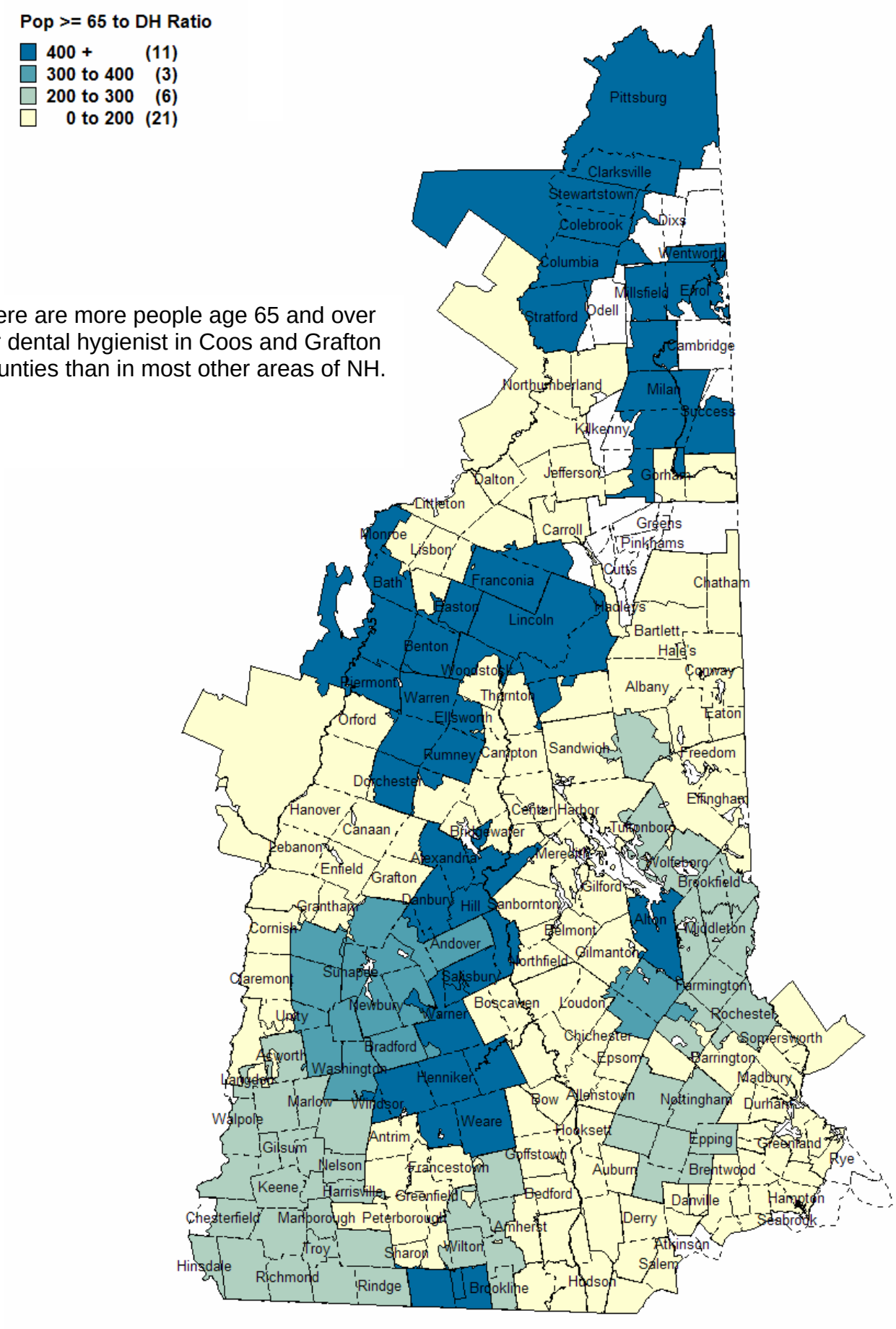
The highest percentages of students in NH who are eligible for free/reduced lunch are in Coos, Sullivan, and Carroll counties.



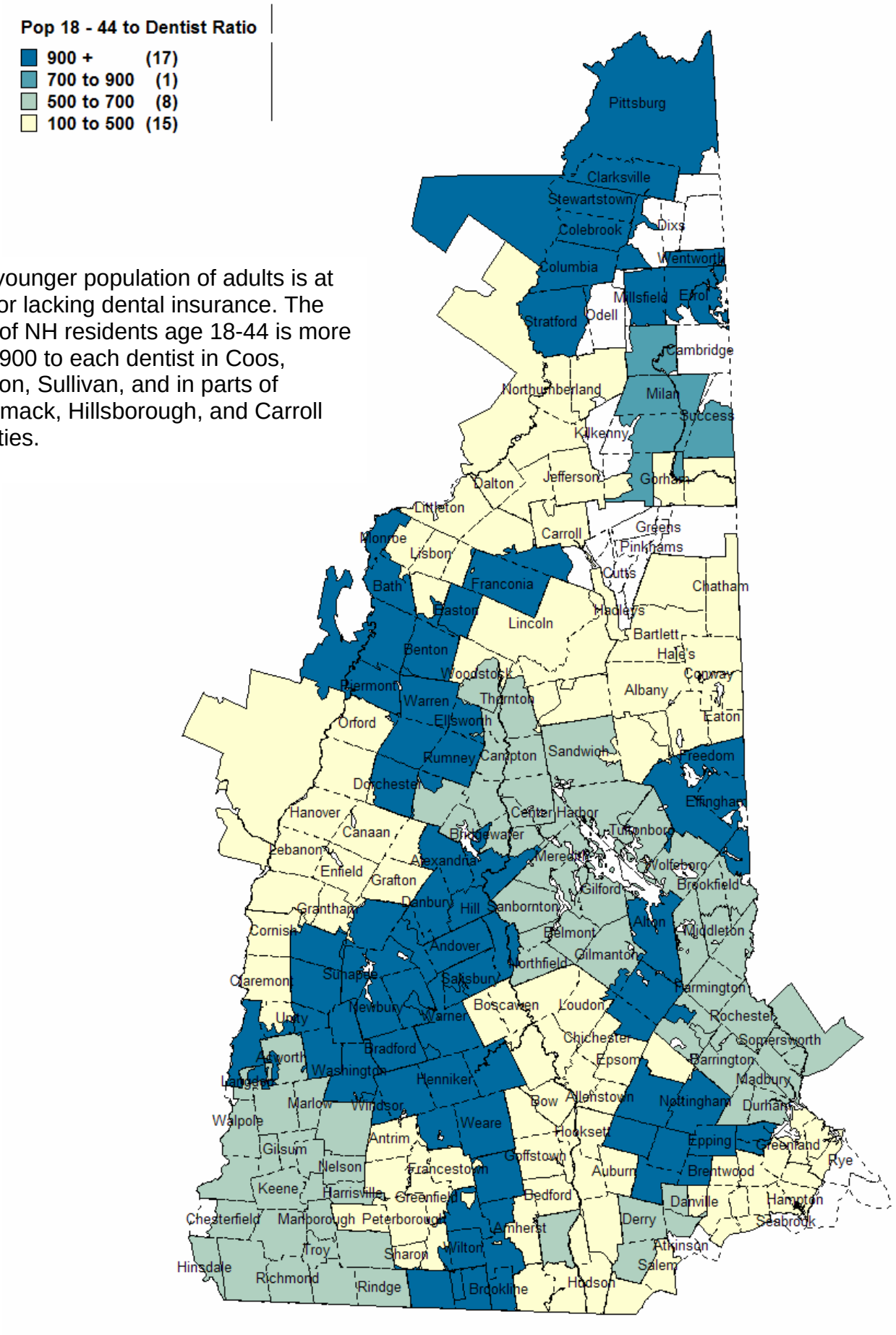
Sullivan and Cheshire County have the highest percentage of special education students in the state.



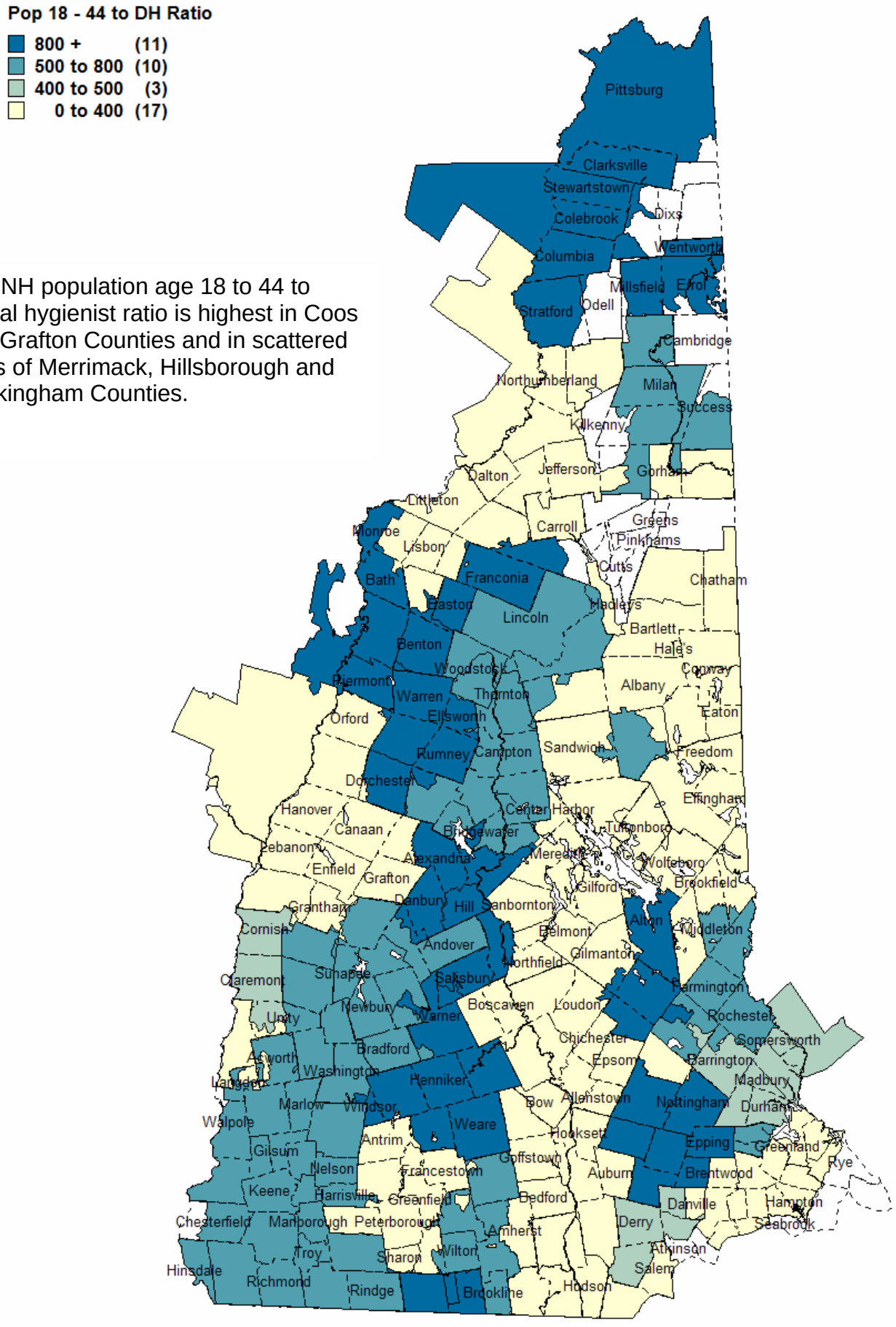
There are more people age 65 and over per dentist in parts of Coos, Grafton, and Merrimack counties than in other areas of NH.



There are more people age 65 and over per dental hygienist in Coos and Grafton Counties than in most other areas of NH.



The younger population of adults is at risk for lacking dental insurance. The ratio of NH residents age 18-44 is more than 900 to each dentist in Coos, Grafton, Sullivan, and in parts of Merrimack, Hillsborough, and Carroll counties.



The NH population age 18 to 44 to dental hygienist ratio is highest in Coos and Grafton Counties and in scattered parts of Merrimack, Hillsborough and Rockingham Counties.

Dental Rational Service Areas (RSAs) in New Hampshire

The basic element for constructing the dental RSAs in New Hampshire was commuting flows between dentist zip code and patient zip code. A single basic dental care provider was determined for each patient. Basic or general dental care was identified using CDT codes. In cases where a patient had seen more than one dentist for basic care, the most recent visit was used. The information was then arranged in a matrix with rows of the matrix indicating residential zip codes and columns indicating provider zip codes. Entries in each cell represented the number of persons residing in one zip code and obtaining care in a particular zip code, either their zip code of residence or another zip code.

The frequencies in each cell were then converted to proportions in order to take into account different population sizes and a hierarchical cluster analysis was performed. Hierarchical clusters were built from the individual elements by progressively merging them. Each merger occurred at a greater distance between clusters than the previous merge. That is, zip codes were gradually combined based on similar patient commuting patterns.

This methodology was based on the one employed by the Economic Research Service of the U.S. Department of Agriculture to construct commuting zones based on 1980 and 1990 journey-to-work data: "U.S. Commuting Zones and Labor Market Areas: 1990 Update." By Charles M. Tolbert and Molly Sizer. Rural Economy Division, Economic Research Service, U.S. Department of Agriculture. Staff Paper No. AGES-9614.

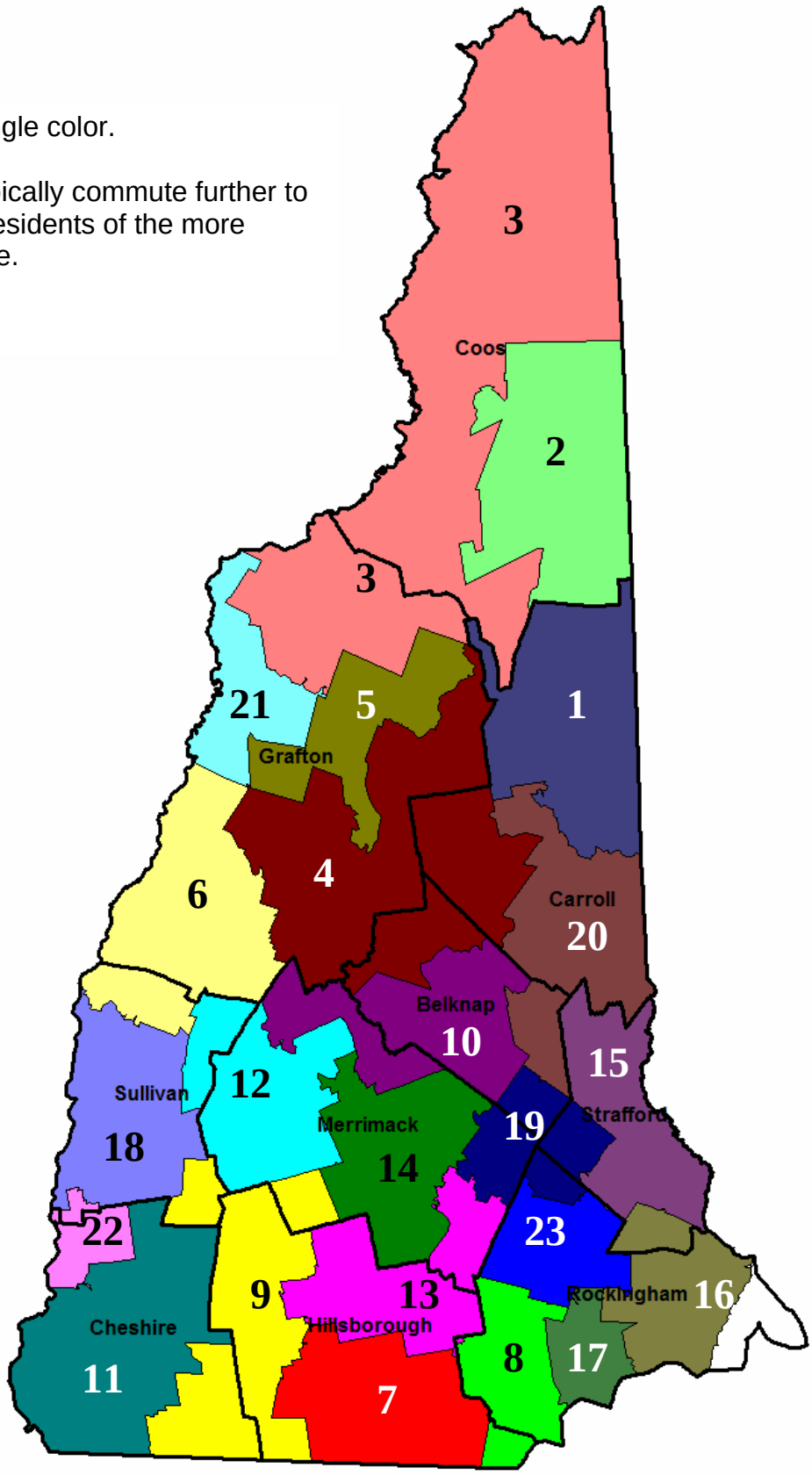
The data used to construct the rational service areas was the New Hampshire Commercial Insurance data set maintained by Onpoint Health Data of Maine. The data set contained all dental claims filed from January 2009 to December 2010 for commercially insured patients including both adults and children. The data set originally contained about 3.8 million claims, 3.2 million of which were for primary care dental services. All claims for dental services obtained out of state were eliminated from the data set. The data set was de-duplicated so that only one claim for primary care dental services was included for each patient represented in the data set. This process resulted in identification of just over 420,600 commercially insured dental patients in NH who had received a primary care dental service in the time period.

This booklet also contains a table listing average commuting distances for patients in each township to obtain dental services. There are some limitations to this data. The calculations presented in the table are accomplished by identifying the geographic center of the patient's residential zip code and calculating the Euclidean (straight line) distance to the geographic center of the dental provider's zip code. Therefore patients commuting from the border of a zip code to the border of another zip code may be commuting further or less of a distance than is reported in this table. The date is reported in averages to present a general idea of how far people in a township commute for dental services.

Dental Rational Service Areas (RSA) in New Hampshire

Each RSA is defined by a single color.

Residents of northern NH typically commute further to obtain dental services than residents of the more southern counties in the State.



Commuting Distances for Dental Services by Town or City of Residence in New Hampshire, 2009-2010

Township	Total People Within the Township Who Have Commuted for Dental Care	Average Miles Commuted for Dental Care
Acworth	61	15.7
Alstead	629	10.5
Alton	1,273	17.9
Amherst	5,555	6.0
Andover	828	16.0
Antrim	1,130	9.8
Ashland	593	14.7
Atkinson	1,403	4.7
Auburn	2,384	7.1
Barnstead	1,641	15.7
Barrington	3,348	9.2
Bartlett	106	11.9
Bath	174	16.8
Bedford	11,248	5.4
Belmont	2,398	9.9
Bennington	638	10.7
Berlin	1,794	14.1
Bethlehem	700	11.8
Bow	4,546	8.3
Bradford	872	17.1
Bristol	1,601	19.3
Brookline	2,117	9.1
Campton	1,431	18.7
Canaan	1,357	13.7
Candia	1,895	9.5
Canterbury	1,021	10.6

Commuting Distances for Dental Services by Town or City of Residence in New Hampshire, 2009-2010

Township	Total People Within the Township Who Have Commuted for Dental Care	Average Miles Commuted for Dental Care
Center Harbor	625	13.3
Charlestown	874	11.7
Chester	1,913	8.9
Chesterfield	543	13.4
Chichester	1,035	7.8
Claremont	3,518	7.4
Colebrook	461	23.0
Concord	18,824	7.6
Conway	2,427	9.2
Cornish	410	11.6
Danbury	335	20.2
Danville	909	7.2
Deerfield	1,917	11.8
Derry	10,718	6.1
Dublin	497	9.0
Dunbarton	1,245	11.5
Durham	3,204	7.8
East Kingston	653	7.7
Effingham	173	21.4
Enfield	1,700	7.8
Epping	2,120	7.9
Epsom	2,001	10.6
Errol	60	25.1
Exeter	7,241	6.1
Farmington	1,890	10.5
Fitzwilliam	613	13.5

Commuting Distances for Dental Services by Town or City of Residence in New Hampshire, 2009-2010

Township	Total People Within the Township Who Have Commuted for Dental Care	Average Miles Commuted for Dental Care
Francestown	637	12.7
Franconia	404	16.0
Franklin	2,441	11.8
Freedom	215	20.6
Fremont	1,374	9.6
Gilford	2,279	9.0
Gilmanton	1,484	13.5
Gilsum	262	7.0
Goffstown	5,991	7.1
Gorham	923	10.6
Goshen	215	11.6
Grafton	342	16.9
Grantham	1,408	12.1
Greenfield	627	11.2
Greenland	1,457	4.9
Greenville	690	11.9
Hampstead	2,578	5.6
Hampton	4,504	7.7
Hampton Falls	616	8.0
Hancock	681	9.9
Hanover	2,315	5.1
Harrisville	356	10.2
Haverhill	307	23.3
Hebron	171	21.1
Henniker	1,899	12.5
Hill	321	17.1

Commuting Distances for Dental Services by Town or City of Residence in New Hampshire, 2009-2010

Township	Total People Within the Township Who Have Commuted for Dental Care	Average Miles Commuted for Dental Care
Hillsborough	3,340	11.7
Hinsdale	331	17.2
Hollis	3,434	6.7
Hooksett	6,163	8.1
Hudson	7,223	4.7
Jackson	185	16.7
Jaffrey	1,656	7.4
Jefferson	281	12.7
Keene	7,926	5.4
Kingston	1,400	7.4
Laconia	4,820	8.3
Lancaster	911	11.4
Lebanon	4,328	5.2
Lee	1,210	8.3
Lempster	238	16.1
Lincoln	294	19.9
Lisbon	715	13.3
Litchfield	3,496	6.9
Littleton	1,499	9.9
Londonderry	9,679	6.0
Loudon	2,234	8.2
Lyme	561	10.9
Lyndeborough	543	10.7
Madbury	659	6.1
Madison	339	11.8
Manchester	34,021	5.8

Commuting Distances for Dental Services by Town or City of Residence in New Hampshire, 2009-2010

Township	Total People Within the Township Who Have Commuted for Dental Care	Average Miles Commuted for Dental Care
Marlborough	716	8.0
Marlow	222	12.4
Meredith	2,006	11.7
Merrimack	11,704	6.2
Milan	433	21.0
Milford	5,729	6.7
Milton	1,303	12.9
Monroe	158	16.3
Mont Vernon	1,184	8.6
Moultonborough	941	12.9
Nashua	24,378	4.3
Nelson	223	8.5
New Boston	2,478	9.1
New Castle	290	7.7
New Durham	931	17.5
New Hampton	709	16.3
New London	1,348	8.8
Newbury	744	14.6
Newfields	894	6.6
Newmarket	2,991	6.7
Newport	2,056	10.3
Newton	512	7.5
North Hampton	1,529	7.0
Northwood	1,742	10.6
Nottingham	1,981	11.2
Orford	254	18.5

Commuting Distances for Dental Services by Town or City of Residence in New Hampshire, 2009-2010

Township	Total People Within the Township Who Have Commuted for Dental Care	Average Miles Commuted for Dental Care
Ossipee	805	17.2
Pelham	2,457	5.2
Peterborough	2,382	7.6
Piermont	124	24.5
Pittsburg	129	38.5
Pittsfield	1,115	10.5
Plainfield	612	8.3
Plaistow	999	5.2
Plymouth	1,603	15.2
Portsmouth	6,829	5.4
Randolph	80	7.1
Raymond	3,198	9.9
Rindge	1,291	9.6
Rochester	8,743	8.5
Rollinsford	842	5.5
Rumney	505	18.3
Rye	1,683	6.4
Salem	5,268	5.0
Salisbury	458	14.4
Sanbornton	1,258	12.8
Sandown	1,717	7.7
Sandwich	298	19.3
Seabrook	925	9.4
Somersworth	3,514	6.2
Springfield	260	14.3
Stoddard	366	13.1

Commuting Distances for Dental Services by Town or City of Residence in New Hampshire, 2009-2010

Township	Total People Within the Township Who Have Commuted for Dental Care	Average Miles Commuted for Dental Care
Strafford	1,692	11.9
Stratford	127	20.4
Stratham	3,075	6.3
Sugar Hill	97	9.7
Sunapee	1,207	12.7
Swanzey	2,339	8.3
Tamworth	351	17.4
Temple	484	11.0
Thornton	240	23.7
Tilton	3,007	11.2
Troy	635	10.7
Tuftonboro	368	16.4
Wakefield	208	24.3
Walpole	883	8.9
Warner	1,447	17.0
Warren	120	23.5
Washington	322	17.4
Weare	4,091	13.6
Wentworth	179	22.8
Westmoreland	635	8.9
Whitefield	969	11.9
Wilmot	388	11.8
Wilton	1,574	9.6
Winchester	1,075	14.9
Windham	4,601	5.8
Wolfeboro	1,350	10.4
Woodstock	276	20.8

NH Residents With Commercial Dental Insurance Who Utilized Dental Services in 2009-2010 by Age Group and Geography

The following tables represent the percent of each age group who visited a dentist using commercial dental insurance by geography of residence. The percentages were calculated by computing the total number of individual dental patients who visited a dentist (using commercial dental insurance) within each age group and dividing that number by the **total** residential population in the same age group within each of the geographical areas presented. Multiple studies demonstrate that the possession of dental insurance is a strong predictor of the receipt of dental care*, therefore these percents represent an approximation of access to dental care across different age groups within different geographical areas.

*Manski, R., Macek, M., and Moeller, J. 2002. Private dental coverage; who has it and how does it influence dental visits and expenditures? *Journal of the American Dental Association*, Volume 13, No. 11, pp. 1551-1559

*Sohn, W., Ismail, A. 2005. Regular dental visits and dental anxiety in an adult dentate population. *Journal of the American Dental Association*, Volume 136, No. 1, pp. 58-66

Percent of Total Commercial Dental Claims Data by Age as a Percent of the Total Population in New Hampshire by Geography

Sources: New Hampshire Commercial Health Insurance Data Set
Claritas, 2010 (NH Population Data)

By RUCA

RUCA	Under 18	18-44	45-64
Rural	26%	25%	32%
Small Town	28%	29%	38%
Micropolitan	35%	35%	45%
Metropolitan	32%	35%	40%

By RSA

RSA	Under18	18-44	45-64
1	25%	21%	28%
2	27%	27%	29%
3	23%	24%	29%
4	30%	26%	38%
5	12%	12%	16%
6	31%	32%	47%
7	32%	38%	41%
8	30%	31%	34%
9	32%	34%	42%
10	32%	32%	40%
11	30%	29%	41%
12	39%	32%	40%
13	35%	40%	45%
14	42%	43%	53%
15	28%	33%	41%
16	33%	28%	37%
17	24%	23%	27%
18	21%	26%	32%
19	38%	39%	47%
20	25%	25%	29%
21	14%	16%	21%
22	23%	26%	29%
23	36%	40%	45%

By County

County	Under 18	18-44	45-64
Belknap	34%	34%	42%
Carroll	23%	22%	26%
Cheshire	29%	28%	39%
Coos	24%	24%	26%
Grafton	27%	26%	39%
Hillsborough	33%	38%	42%
Merrimack	40%	40%	50%
Rockingham	31%	32%	36%
Strafford	28%	28%	42%
Sullivan	26%	30%	35%

By Township

Township	Under 18	18-44	45-64
Acworth	8%	10%	22%
Alstead	25%	23%	24%
Alton	45%	45%	48%
Amherst	45%	57%	51%
Andover	35%	38%	38%
Antrim	33%	49%	56%
Ashland	18%	26%	30%
Atkinson	24%	22%	24%
Auburn	44%	48%	56%
Barnstead	37%	39%	42%
Barrington	34%	41%	46%
Bartlett	9%	6%	11%
Bath	26%	20%	24%
Bedford	57%	64%	59%
Belmont	37%	34%	40%
Bennington	39%	53%	50%
Berlin	23%	24%	26%
Bethlehem	28%	29%	37%
Bow	48%	60%	66%
Bradford	52%	47%	62%
Bristol	31%	32%	38%
Brookline	39%	41%	52%
Campton	43%	42%	52%
Canaan	31%	38%	44%
Candia	43%	44%	54%
Canterbury	41%	49%	51%
Center Harbor	70%	72%	100%
Charlestown	16%	20%	22%
Chester	39%	42%	48%
Chesterfield	28%	31%	26%
Chichester	40%	38%	47%
Claremont	24%	29%	35%
Colebrook	10%	11%	13%
Concord	39%	39%	50%
Conway	28%	23%	30%
Cornish	19%	25%	32%
Danbury	46%	30%	32%
Danville	21%	21%	26%
Deerfield	41%	51%	52%
Derry	29%	32%	37%
Dover	34%	35%	46%
Dublin	33%	27%	47%
Dunbarton	39%	52%	55%
Durham	47%	11%	62%
East Kingston	19%	22%	22%
Effingham	12%	15%	24%
Enfield	26%	39%	44%

By Township			
Epping	31%	37%	38%
Epsom	49%	49%	58%
Errol	16%	22%	25%
Exeter	41%	39%	41%
Farmington	27%	31%	34%
Fitzwilliam	28%	27%	33%
Francestown	40%	44%	54%
Franconia	47%	29%	45%
Franklin	26%	32%	38%
Freedom	15%	18%	22%
Fremont	35%	31%	39%
Gilford	31%	33%	35%
Gilmanton	50%	46%	46%
Gilsum	29%	43%	44%
Goffstown	45%	51%	54%
Gorham	39%	35%	36%
Goshen	32%	21%	44%
Grafton	25%	29%	42%
Grantham	57%	67%	63%
Greenfield	33%	34%	40%
Greenland	45%	49%	49%
Greenville	18%	24%	23%
Hampstead	27%	30%	35%
Hampton	29%	32%	35%
Hampton Falls	27%	34%	31%
Hancock	34%	43%	49%
Hanover	41%	15%	55%
Harrisville	22%	36%	43%
Haverhill	13%	19%	22%
Hebron	17%	20%	28%
Henniker	40%	31%	52%
Hill	32%	25%	38%
Hillsborough	43%	50%	49%
Hinsdale	9%	8%	9%
Holderness	53%	58%	61%
Hollis	40%	53%	51%
Hooksett	49%	43%	58%
Hudson	29%	31%	33%
Jackson	24%	19%	28%
Jaffrey	29%	32%	41%
Jefferson	43%	33%	29%
Keene	38%	29%	49%
Kingston	29%	22%	25%
Laconia	24%	26%	40%
Lancaster	27%	30%	34%
Lebanon	26%	41%	47%
Lempster	14%	20%	21%
Lincoln	18%	22%	34%
Lisbon	24%	27%	40%
Litchfield	36%	43%	50%
Littleton	23%	26%	34%
Londonderry	35%	42%	46%
Loudon	41%	46%	56%

By Township			
Lyme	28%	37%	40%
Lyndeborough	25%	33%	40%
Madbury	43%	35%	45%
Madison	15%	14%	20%
Manchester	25%	34%	38%
Marlborough	28%	34%	46%
Marlow	23%	30%	34%
Meredith	31%	32%	40%
Merrimack	40%	50%	52%
Milan	26%	33%	31%
Milford	37%	41%	43%
Milton	25%	32%	37%
Monroe	31%	21%	24%
Mont Vernon	53%	53%	55%
Moultonborough	23%	22%	22%
Nashua	26%	31%	34%
Nelson	24%	38%	52%
New Boston	45%	53%	53%
New Castle	28%	36%	36%
New Durham	27%	33%	48%
New Hampton	31%	32%	29%
New Ipswich	22%	27%	28%
New London	52%	26%	49%
Newbury	35%	28%	29%
Newfields	49%	55%	67%
Newmarket	31%	30%	39%
Newport	22%	29%	36%
Newton	12%	11%	11%
North Hampton	39%	36%	41%
Northwood	44%	42%	47%
Nottingham	47%	50%	49%
Orford	16%	30%	30%
Ossipee	16%	17%	21%
Pelham	23%	20%	22%
Peterborough	38%	42%	47%
Piermont	9%	19%	31%
Pittsburg	17%	12%	14%
Pittsfield	23%	27%	33%
Plainfield	21%	32%	31%
Plaistow	14%	14%	15%
Plymouth	31%	13%	50%
Portsmouth	36%	36%	38%
Randolph	32%	40%	37%
Raymond	30%	33%	39%
Rindge	23%	15%	26%
Rochester	23%	31%	37%
Rollinsford	29%	36%	49%
Rumney	20%	32%	35%
Rye	37%	41%	40%
Salem	22%	18%	20%
Salisbury	47%	50%	46%
Sanbornton	43%	45%	53%
Sandown	31%	27%	36%

By Township			
Sandwich	28%	27%	32%
Seabrook	11%	13%	13%
Somersworth	23%	33%	43%
Springfield	33%	32%	28%
Stoddard	54%	50%	42%
Strafford	40%	43%	56%
Stratford	19%	17%	14%
Stratham	41%	46%	47%
Sugar Hill	26%	19%	21%
Sullivan	26%	42%	44%
Sunapee	42%	32%	36%
Swanzey	33%	37%	45%
Tamworth	19%	20%	25%
Temple	31%	34%	40%
Tilton	37%	36%	41%
Troy	28%	38%	39%
Tuftonboro	25%	24%	23%
Wakefield	17%	19%	21%
Walpole	20%	28%	34%
Warner	32%	33%	40%
Warren	16%	12%	16%
Washington	36%	44%	29%
Weare	40%	47%	49%
Wentworth	37%	20%	33%
Westmoreland	44%	34%	47%
Whitefield	23%	26%	28%
Wilmot	25%	34%	33%
Wilton	39%	47%	44%
Winchester	19%	21%	32%
Windham	40%	38%	35%
Wolfeboro	26%	23%	25%
Woodstock	29%	33%	37%

Geographic Analysis of the Demographics and Employment of Dentists and Dental Hygienists in New Hampshire

The following analyses used data from two separate surveys of dentists and dental hygienists conducted by the Bi-State Primary Care Association and its contractors for the New Hampshire Department of Health and Human Services in 2010. These surveys were conducted to inform New Hampshire's Oral Health Workforce Strategic Plan of 2010. Both the New Hampshire Dental Hygienists' Association (NHDHA) and the New Hampshire Dental Society (NHDS) partnered with Bi-State Primary Care Association and the State of New Hampshire to solicit professionals in the state to participate in the survey. The work was funded with a grant from the Health Resources and Services Administration of the U.S. Department of Health and Human Services.

These partner organizations shared the de-identified survey data for both dentists and dental hygienists with the Center for Health Workforce Studies at SUNY Albany for the purpose of geographical analysis of the data. In order to accomplish this, the CHWS merged Rural Urban Continuum Area (RUCA) codes of the U.S. Census Bureau with the employment zip codes in the surveys for dentists and dental hygienists. Rural-Urban Commuting Area codes are a comparatively new Census tract-based classification scheme that utilize the standard Bureau of Census Urbanized Area and Urban Cluster definitions in combination with work commuting information to characterize all of the nation's Census tracts regarding their rural and urban status and relationships. In addition, a ZIP Code RUCA approximation was developed. This was used to analyze the practice patterns of New Hampshire dentists and dental hygienists using the RUCA-based geographical classification of their zip code.

The datasets (dentist and dental hygienist) contained both the respondent's residential zip code as well as the zip code for each site of employment. Two separate types of analyses were conducted. The first analysis measured commuting patterns of dentists and dental hygienists between the site of residence and the site of employment, including any secondary employment sites. The distance between the residential zip code and both the

first and second employment zip code were used in the analysis that follows. Very few respondents listed three or more employment zip codes so the decision was made to limit the analysis to primary and secondary employment sites.

The method employed by the Center to determine commuting distances was to calculate the straight line (Euclidean) distance between the geographic center of the residential zip code and the geographic center of the employment zip code using a mathematical formula that includes each zip code's latitude and longitude coordinates. The radius of the zip code was used as a distance measure for those respondents who both worked and resided within the same zip code in order to avoid assigning a value of zero commuting miles, which would artificially bias the averages downward. Average commuting distance to work was then calculated for both dentists and dental hygienists by county and by their RUCA classification (rural, small town, micropolitan, or metropolitan).

The second analysis involved merging the RUCA codes to respondents' employment-based zip code (primary employment site) and conducting cross-tabular analyses on differences in practice patterns within different RUCA-based geographies across the state of New Hampshire.

DENTISTS

The following analyses discuss commuting patterns of dentists who were licensed in New Hampshire and who also responded to the 2010 workforce survey.

- Dentists who live and work in different states commute an average of 13 more miles than dentists who both live and work in New Hampshire.

Table 1. Commuting Patterns of NH Dentists by State of Residence and State of Employment (in average miles), 2010

Dentists who live and work in different states	22.8 miles
Dentists who live and work in New Hampshire	9.6 miles

Table 2. Geographic Distribution of Dentists in NH by State of Residence, 2010

State of residence	Sample Size	Sample Percent
Connecticut	1	0.2%
Maine	4	0.8%
Massachusetts	49	10.0%
New Hampshire	429	87.7%
Vermont	6	1.2%
Total	**489**	

Table 3. Geographic Distribution of Dentists in NH by State of Employment, 2010

State of Employment	Sample Size	Sample Percent
Massachusetts	10	2.0%
New Hampshire	477	97.5%
Vermont	2	0.4%
Total	**489**	

- Dentists working in metropolitan areas in NH have a shorter average commute compared to dentists working in micropolitan, small town, or rural areas.

Table 4. Commuting Patterns Of Dentists Who Both Lived and Worked in NH, 2010

Geographic Area (RUCA)	Average Miles Commuted to Work	Sample Number of Dentists
Rural	11.2 miles	34
Small Town	14 miles	23
Micropolitan	9.9 miles	110
Metropolitan	8.9 miles	254

- There was variation in the commuting distances of dentists by county.

Table 5. Commuting Patterns Of Dentists Who Both Lived and Worked in NH by County, 2010

County	Average Miles Commuted to Work	Sample Number of Dentists
Belknap, NH	11.1 miles	21
Carroll, NH	8.8 miles	15
Cheshire, NH	8.4 miles	27
Coos, NH	6.8 miles	7
Grafton, NH	12.9 miles	37
Hillsborough, NH	7.8 miles	101
Merrimack, NH	10.8 miles	51
Rockingham, NH	9.5 miles	126
Strafford, NH	10.3 miles	32
Sullivan, NH	14.7 miles	6

Note: Due to the small number of cases in some of the NH counties, caution should be used when comparing average commuting patterns by county. However, variation is observed between counties with a sufficiently large number of cases for accurate comparison.

DENTAL HYGIENISTS

The following analyses discuss commuting patterns of dental hygienists who were licensed in New Hampshire and who also responded to the 2010 workforce survey.

- Dental hygienists who live and work in different states commute an average of 4 miles more than do dental hygienists who both live and work in New Hampshire.

Table 1. Commuting Patterns of NH Dental Hygienists by State of Residence and State of Employment (in average miles), 2010

Dental hygienists who live and work in different states	14.2 miles
Dental hygienists who live and work in New Hampshire	10.1 miles

Table 2. Geographic Distribution of Dental Hygienists in NH by State of Residence, 2010

State of Residence	Sample Size	Sample Percent
Massachusetts	9	2.6%
Maine	17	4.9%
New Hampshire	305	88.2%
Vermont	15	4.3%
Total	**346**	

Table 3. Geographic Distribution of Dental Hygienists in NH by State of Employment, 2010

State of Employment	Sample Size	Sample Percent
Massachusetts	6	1.7%
Maine	1	0.3%
New Hampshire	339	98.0%
Total	**346**	

- Dental hygienists who lived in rural areas commuted longer, on average, than those working in small towns, micropolitan, or metropolitan areas.

Table 4. Commuting Patterns Of Dental Hygienists Who Both Lived and Worked in NH, 2010

Geographic Area (RUCA)	Average Miles Commuted to Work	Sample Number of Dental Hygienists
Rural	13.4 miles	28
Small Town	9.9 miles	19
Micropolitan	10.2 miles	54
Metropolitan	9.6 miles	197

- There was variation in the commuting distances of dental hygienists by county

Table 5. Commuting Patterns of Dental Hygienists Who Both Lived and Worked in NH by County, 2010

County	Average miles commuted to work	Sample Number of Dental Hygienists
Belknap, NH	8.7 miles	10
Carroll, NH	15.5 miles	18
Cheshire, NH	7.5 miles	9
Coos, NH	10.2 miles	4
Grafton, NH	11.7 miles	18
Hillsborough, NH	8.4 miles	93
Merrimack, NH	11.3 miles	44
Rockingham, NH	9.7 miles	65
Strafford, NH	12.4 miles	33
Sullivan, NH	6.7 miles	7

Note: Due to the small number of cases in some of the counties, caution should be used when comparing average commuting patterns by county. However, variation is observed between counties with a sufficiently large number of cases for accurate comparison.

DENTISTS

The following analysis examines dental practice described in the dentist survey conducted in New Hampshire in 2010 cross tabulated with Rural Urban Commuting Area Codes (RUCA) developed by the U.S. Census Bureau.

- Dentists in urban areas had practiced fewer years, on average, than dentists in more rural areas.

Table. 1 Average Years Practicing Dentistry by RUCA, 2010

Geography (RUCA)	Average number of years practiced	Sample Size
Rural	29.6	30
Small Town	27.4	30
Micropolitan	25.6	106
Metropolitan	23.3	284
Total		**450**

- There was very little variation in the average number of hours spent per week in clinical patient care by RUCA among dentists.

Table 2. Average Hours Spent by Dentists per Week Providing Clinical Patient Care in NH by RUCA, 2010

Geography (RUCA)	Average Hours per Week in Clinical Patient Care	Sample Size
Rural	31.4	32
Small Town	30.5	30
Micropolitan	31.2	107
Metropolitan	31.7	287
Total		**455**

- A slightly larger percentage of dentists in smaller geographic areas worked at community health centers compared to more urban dentists.

Table 3. Primary Place of Dental Practice in NH by Geography, 2010

	Rural	Small Town	Micropolitan	Metropolitan
Private practice	90.6%	96.7%	90.7%	93.6%
Hospital-run affiliated practice	0%	0%	2.8%	2.8%
Community health center	6.3%	3.3%	1.9%	2.1%
School based program	0%	0%	0.9%	0%
Nursing home	3.1%	0%	0%	0%
Commercial business – Research/Sales	0%	0%	0%	0.4%
Other	0%	0%	3.7%	1.1%
Total	32	30	107	283

- A smaller percentage of dentists in rural areas provided services like orthodontics, pedodontics, and prosthodontics compared with dentists working in micropolitan or metropolitan areas.

Table 4. Average Percent of Work Time Spent by Dentists in NH in Each Area of Practice by Geography, 2010

	Rural	Small Town	Micropolitan	Metropolitan
Orthodontics	7.6%	10.6%	19.2%	14.1%
Periodontics	11.2%	11.0%	16.4%	13.6%
Endodontics	11.7%	9.9%	15.7%	11.3%
Pediatric Dentistry	13.9%	21.7%	15.3%	17.2%
Oral Surgery	19.7%	15.8%	19.7%	13.3%
Prosthodontics	28.8%	35.9%	35.7%	33.6%
Oral Pathology	1.3%	3.2%	1.4%	2.1%
Oral/Maxillofacial Radiology	4.3%	5.0%	2.3%	3.1%
Other	42.9%	38.3%	49.9%	43.7%

- Dentists in metropolitan areas were more likely to expect to remain in clinical practice during future years than dentists in smaller geographical areas. This is due at least in part to the fact that they were younger, on average.

Table 5. Average Number of Years Dentists in NH Expected to Remain in Clinical Practice by Geography, 2010

	Rural	Small Town	Micropolitan	Metropolitan
Fewer than 5 years	26.9%	20.7%	20.6%	11.1%
5-9 years	34.6%	20.7%	23.5%	25.6%
10-14 years	19.2%	37.9%	19.6%	21.0%
15+ years	19.2%	20.7%	36.3%	42.4%
Total Sample Size	**26**	**29**	**102**	**262**

- On average, dentists were older in less populated areas compared to more urban areas.

Table 6. Average Age of Dentists in NH by Geography (RUCA), 2010

Geography (RUCA)	Average Age in Years	Sample Size
Rural	57.4	32
Small Town	55.7	29
Micropolitan	52.9	104
Metropolitan	51.2	278

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- Dentists in larger geographical areas were much more likely to treat patients with private insurance and less likely to treat Medicaid enrollees compared to smaller geographical areas. Dentists employed in either rural areas or small towns are more likely to have self-pay patients compared with dentists working in either micropolitan or metropolitan areas.

Table 7. Average Percentage of Patients Seen by Dentists in NH by Type of Insurance and Geography, 2010

	Rural	Small Town	Micropolitan	Metropolitan
Private Insurance	36.4%	45.7%	52.3%	58.6%
Self-pay – Full Fee	33.4%	35.8%	26.9%	24.4%
Self-pay – Sliding Fee Discount	3.7%	2.3%	1.9%	2.5%
NH Medicaid Enrollees	13.6%	12.0%	7.9%	7.6%
Other	12.9%	4.2%	10.9%	6.9%

- Dentists in rural areas treated fewer new patients on average each month compared to dentists in more populous areas.

Table 8. Average Number of New Patients Treated Each Month by Dentists in NH By Geography, 2010

Geography (RUCA)	Average Number of New Patients Treated Each Month	Sample Size
Rural	20.7	31
Small Town	27.4	30
Micropolitan	25.6	102
Metropolitan	22.4	276

- Dentists in rural areas and small towns were significantly more likely to indicate a workforce shortage compared with dentists in either micropolitan or metropolitan areas. Shortages for dental hygienists were perceived by dentists to be greater in small towns. Shortages among dental assistants were perceived to be greatest among dentists working in micropolitan areas.

Table 9. Percent of Dentists Perceiving a Workforce Shortage by Geography in NH and by Type of Workforce, 2010

	Rural	Small Town	Micropolitan	Metropolitan
Shortage of Dentists	27.6%	26.1%	7.5%	6.3%
Shortage of Dental Hygienists	3.8%	27.6%	14.0%	8.6%
Shortage of Dental Assistants	16.7%	25.0%	33.7%	16.4%

DENTAL HYGIENISTS

The following analysis examines dental hygiene practice described in the dental hygiene survey conducted in New Hampshire in 2010 cross tabulated with Rural Urban Commuting Area Codes (RUCA) developed by the U.S. Census Bureau.

- Dental hygienists in rural areas had practiced for fewer years on average than dental hygienists in more populous areas.

Table. 1 Average Years Practicing Dental Hygiene by RUCA, 2010

Geography (RUCA)	Average Number of Years Practicing as a DH	Sample Size
Rural	18.8	22
Small Town	24.3	24
Micropolitan	19.9	72
Metropolitan	20.6	194
Total		312

- Dental hygienists in rural areas worked slightly more hours, on average compared with dental hygienists in more populous areas.

Table 2. Average Hours Spent by NH Dental Hygienists per Week Providing Clinical Patient Care by RUCA, 2010

Geography (RUCA)	Average Hours per week in Clinical Patient Care	Sample Size
Rural	30.5	22
Small Town	26.0	24
Micropolitan	27.2	72
Metropolitan	28.7	197
Total		393

- Dental hygienists are oldest, on average, in small towns and youngest in rural areas.

Table 3. Average Age of Dental Hygienists in NH by Geography (RUCA), 2010

	Average Age in Years	Sample Size
Rural	43.7	20
Small Town	50	23
Micropolitan	45.6	70
Metropolitan	45.8	197

- A greater percentage of dental hygienists in rural areas worked in community health centers as their primary place of employment compared with dental hygienists who work in more populous geographical areas.
- A greater percentage of dental hygienists in small towns worked in school based programs compared to dental hygienists in other geographical areas.

Table 4. Primary Employers of Dental Hygienists in Current Practice in NH by Geography, 2010

	Rural	Small Town	Micropolitan	Metropolitan
Dentist owned private practice	90.9%	91.7%	94.2%	95.4%
Hospital-run affiliated practice	0.0%	0.0%	2.9%	1.0%
Community health center	9.1%	0.0%	1.4%	1.0%
School based program	0.0%	8.3%	1.4%	2.0%
Other	0.0%	0.0%	0.0%	0.5%
Total	22	24	69	197

- A larger percentage of dental hygienists in micropolitan and metropolitan areas reported their primary reason for choosing dental hygiene as a career to be service to patients than did dental hygienists in rural or small town areas.
- A larger percent of dental hygienists in rural or small towns reported good pay as their primary reason for being attracted to the profession than did dental hygienists in micropolitan or metropolitan areas.
- The percentage of dental hygienists citing job flexibility as a reason for career choice was highest in rural areas. Dental hygienists in small towns were most likely to report that dental hygiene was the best career available at the time.

Table 5. Primary Reason for Choosing Dental Hygiene as a Career by Geography, 2010

	Rural	Small Town	Micropolitan	Metropolitan
Service, to help people	33.3%	34.8%	43.3%	42.4%
Job flexibility	23.8%	8.7%	17.9%	19.9%
Job security	4.8%	4.3%	9.0%	6.8%
Good pay	14.3%	13.0%	4.5%	11.0%
Good benefits	0.0%	0.0%	0.0%	0.5%
Dental hygiene was the best career available at the time	9.5%	26.1%	11.9%	12.0%
Other	14.3%	13.0%	13.4%	7.3%
Total	21	23	67	191

- Earnings potential as a motivation for remaining within the field of dental hygiene does not vary significantly by type of geography.
- Consistency of work schedule is more important for dental hygienists in rural areas than in any other geographic area.
- The availability of benefits, the relationship with dentists, the decision-making authority in patient care, and opportunities for promotion and advancement is a stronger motivation for dental hygienists in small towns compared with other geographic areas.
- The negative impact of the physical demands of the work environment is not as much of a negative factor for dental hygienists in rural areas or small towns than it is in micropolitan or metropolitan areas

Table 6. Percent of Dental Hygienists in NH Indicating One or More of the Following Factors Increase Their Desire to Stay in the Field of DH by Geography, 2010

	Rural	Small Town	Micropolitan	Metropolitan
Earnings potential	86.4%	83.3%	88.4%	86.1%
How I am paid (e.g.: daily, hourly)	61.9%	50.0%	63.8%	63.2%
Benefits available (Health/Retirement/Paid Leave)	36.4%	62.5%	37.3%	39.8%
Consistency of work schedule	86.4%	68.2%	77.9%	70.3%
Variety in clinical practice	66.7%	70.8%	55.8%	62.1%
Working with patients and their families	100%	95.8%	97.1%	94.4%
Demands of the physical work environment	31.8%	21.7%	14.7%	19.9%
Opportunities for promotion, advancement	9.1%	20.8%	11.8%	12.9%
Decision-making authority in patient care	50%	70.8%	61.8%	64.6%
Relationship with dentists	50%	73.9%	57.4%	66%

- A higher percentage of dental hygienists in rural areas or small towns indicated they expected to leave dental hygiene practice in fewer than 5 years than did dental hygienists in micropolitan or metropolitan areas.
- A smaller percentage of dental hygienists working in metropolitan areas expected to be working in dental hygiene in 15 or more years compared to dental hygienists working in other areas.

Table 7. Length of Time NH Dental Hygienists Were Planning to Remain Within the Field of Dental Hygiene by Geography, 2010

	Rural	Small Town	Micropolitan	Metropolitan
Fewer than 5 Years	14.3%	27.3%	9.8%	6.5%
5-9 Years	9.5%	18.2%	24.6%	23.9%
10-14 Years	28.6%	13.6%	16.4%	30.4%
15+ Years	47.6%	40.9%	49.2%	39.1%
Total	21	22	61	184

- A significantly greater percentage of dental hygienists living in rural areas or small towns plan to retire in less than 5 years compared with those in micropolitan or metropolitan areas.
- A higher percent of dental hygienists in micropolitan or metropolitan areas indicated a higher degree of burn-out/job related stress, a desire to change careers, and issues related to scope of practice/autonomy as reasons for planned departure from the profession compared to dental hygienists in rural areas or small towns.

Table 8. Primary Reason Dental Hygienists in NH Were Planning to Leave Dental Hygiene in Fewer than 5 Years*

	Rural or Small Town	Micropolitan or Metropolitan
Retirement	75%	38.2%
Career change to pursue different career	0%	11.8%
Burnout or job related stress	8.3%	29.4%
Family considerations, needs	8.3%	2.9%
Scope of practice/autonomy	0%	8.8%
Other reasons not related to dental hygiene	8.3%	8.8%

*categories combined to increase sample size

- Dental hygienists working in small towns or micropolitan areas were more likely than dental hygienists in other areas of the state to perceive a shortage of dentists or a shortage of dental hygienists.
- No dental hygienist working in a rural area perceived a shortage of dental hygienists in their area. This may be due to a lack of available jobs in rural areas due to the small supply of dentists.

Table 9. Dental Hygienists' Perception of Current Shortages of Oral Health Professionals Within Their Practice Community in NH, 2010

	Rural	Small Town	Micropolitan	Metropolitan
Shortage of DHs in your community	0%	16.7%	6.6%	1.7%
Shortage of Dentists in your community	19.1%	39.1%	39%	13.4%

- Dental hygienists in less populated geographic areas were more likely to work full-time than dental hygienists in more populated areas.

Table 10. Percent of Dental Hygienists in NH Working Full-Time by Geography, 2010

	Percent of DHs Working Full-Time (32 or more hours per week)
Rural	68.2%
Small Town	58.3%
Micropolitan	51.4%
Metropolitan	52.6%

- Despite the fact that dental hygienists in rural areas were more likely to work full-time (32 or more hours per week) they were less likely to receive health insurance, paid holidays, or have training opportunities than dental hygienists from more populous geographic areas.

Table 11. Percent of Dental Hygienists in NH Who Receive the Employment Benefits by Type and by Geography, 2010

	Rural	Small Town	Micropolitan	Metropolitan
Health Insurance	41%	63%	47%	53%
Paid holidays	68%	87%	72%	78%
Training opportunities	36%	42%	47%	41%
Total	22	24	72	197