A Socio-Demographic Profile of the Population in Health Occupations

Carlos Siordia

PhD, Center for Aging and Population Health, University of Pittsburgh, PA, USA

cas271@pitt.edu

BACKGROUND

Occupational therapists have hypothesized that occupation and physical well-being are related [1]. While public health professionals invest their efforts in delineating the health profile of the population, few have described the sociodemographic characteristics of those working in health occupations. The health workforce population is important because participating in health occupations may be inherently stressful—as many work related interactions are "emotionally charged, with feeling of tension, anxiety, embarrassment, fear, or even hostility underlying the verbal exchange [2]. Working in health occupations has been associated with work-place "burnout" [3]. Burnout refers to a depletion of enthusiasm for the job that normally leads to poor job performance or leaving the job.

Because working in health occupation may be stressful, some have recommended for the formation of work-place protocols that help individuals in these professions to receive stress coping training [4]. Although public health frequently highlights differences in health by race, socioeconomic status, sex, geography, and other factors: occupation as a risk factor for morbidity is given less attention [5]. Understanding demographic profiles of populations in different occupations may help public health understand the degree to which work environments may increase (or decrease) risk for morbidity relative to personal vulnerabilities and resources.

A first step towards helping these efforts may be to delineate the sociodemographic characteristics of individuals working in health occupations. The list of health occupations is provided at the end of the report in **Appendix A**. The sociodemographic profile of the health occupation population may reveal to what degree work-place interventions need to address outside-of-work risk factors for adverse health. The specific aim of this report was to describe the sociodemographic characteristics of individuals in health occupations. The overarching goal was to show that the health occupation population is socio-demographically heterogeneous.

DATA & SAMPLE

Information on health workers came from the American Community Survey (ACS) Public Use Microdata Sample (PUMS) 5-year 2008-2012 file. From the 15,318,124 observations in the full PUMS file, a total of 633,894 individuals were selected. Information from this survey sample can be used to generalize to the population of the public health workers in the US mainland. Actual numbers of people in the survey are referred to as "unweighted" count and the representative count as "weighted" count [6]. Weighted counts are estimate by applying a population weight as follows:

$$Weithed\ Count = \left(S_i \times P_{w_i}\right);$$

where the weighed count is the product of ith subject (S_i) and her or his population weight (P_{w_i}). For example, assume person-A has a population weight of 40, then: (1 × 40 = 40). In this case, the characteristics of the person would be used to represent 40 other individuals in the population. **Table 1** presents unweighted and weighed counts by geographic divisions in the US mainland. After applying population weights, information on the 633,894 individuals in the data is used to generalize to the population of 12,664,125 people in health occupations who reside within the US mainland. About 19% are found in the South Atlantic division, and 16% in both the Middle Atlantic and East North Central divisions. This means the population of individuals working in health occupations is most concentrated in the South Atlantic division (green area in map below).
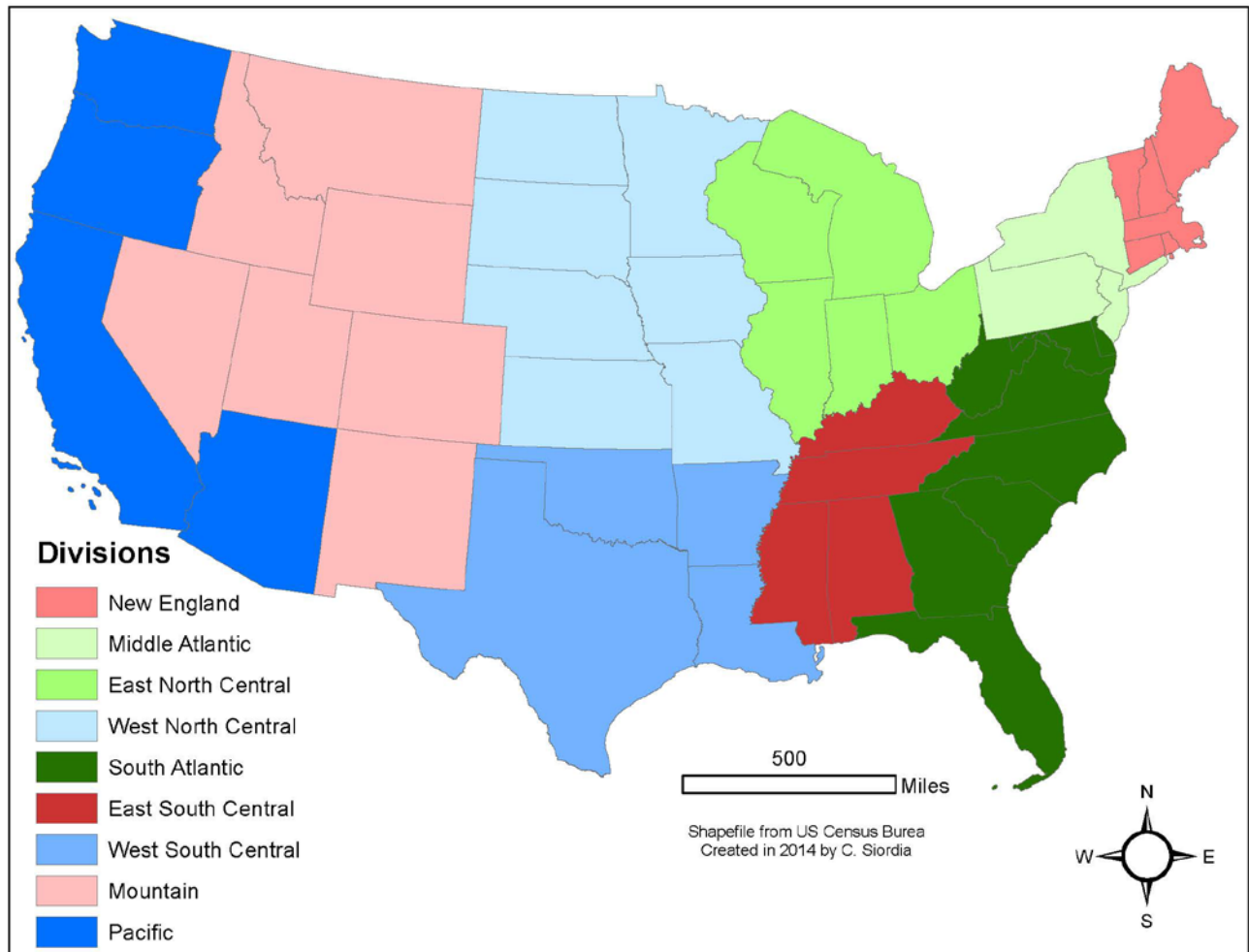
Table 1
Sample size by geographical division

	Unweighted Counts	Weighted Counts	Percent From 12,664,125
New England	38,007	759,113	6%
Middle Atlantic	99,293	2,031,833	16%
East North Central	98,882	1,969,910	16%
West North Central	46,201	937,792	7%
South Atlantic	122,234	2,385,795	19%
East South Central	37,122	724,763	6%
West South Central	67,308	1,359,586	11%
Mountain	39,889	793,502	6%
Pacific	84,958	1,701,831	13%

GEOGRAPHIC DIVISON

Sociodemographic characteristics of the population working in health occupations are divided over nine geographical areas. Geographic divisions, shown in **Figure 1**, are delineated by the US Census Bureau and have been used in epidemiological research [7]. Note the Pacific division normally includes Alaska and Hawaii. Individuals from Alaska and Hawaii are not included in the current analysis. Focusing on the mainland reduces potential factors involved with not residing in the US mainland.

Figure 1
Geographical divisions by state boundaries

Divisions
- New England
- Middle Atlantic
- East North Central
- West North Central
- South Atlantic
- East South Central
- West South Central
- Mountain
- Pacific

500 Miles

Shapefile from US Census Bureau
Created in 2014 by C. Siordia

SEX, POVERTY, & DISABILITY

As shown in **Table 2**, about 3/4th of the population in health occupations is made up of women. In fact, 78% of health professionals in the following divisions are females: East North Central, West North Central, and East South Central. The level of poverty within the health occupation population ranges from 10% in the New England division to 17% in the West South Central division. The measurement of poverty in the ACS is discussed elsewhere [8]. The level of disability within the health occupation population ranges from 6% (New England) to 9% (West South Central). The measurement of disability in the ACS is discussed elsewhere [9]. These findings suggest health workers are more economically challenged and functionally challenged in the West South Central division relative to other regions of the US mainland.

Table 2
Basic characteristics of population in health occupations by geographical division

	Female	%	In Poverty	%	Disable	%
New England	575,461	76%	73,629	10%	46,638	6%
Middle Atlantic	1,532,586	75%	243,934	12%	132,540	7%
East North Central	1,541,762	78%	282,743	14%	132,857	7%
West North Central	732,735	78%	141,774	15%	66,165	7%
South Atlantic	1,825,251	77%	323,002	14%	162,105	7%
East South Central	563,850	78%	116,080	16%	60,600	8%
West South Central	1,038,931	76%	235,181	17%	120,832	9%
Mountain	576,187	73%	102,903	13%	54,730	7%
Pacific	1,207,325	71%	190,438	11%	104,501	6%

MARITAL STATUS

As shown in **Table 3**, about 25% of the population in health occupations has never been married and 55.9% are married. Tables 3 through 6 present population-weighted estimates of health occupation workers by sociodemographic characteristics. The bottom portion of each table divides each cell (in upper section of table) by the total number of people in health occupations: 12,664,125. Thus, the bottom of Tables 3 through 6 shows how the public health worker population is divided over the characteristic of interest.

For example, New England has 199,170 never married people in health occupations, which represent 1.6% of the 12,664,125 people in the public health worker population in the

US mainland for the survey period 2008-2012. The South Atlantic has 1,314,535 married people in health occupations, which represent 10.4% of the 12,664,125 public health worker population in the US mainland for the survey period 2008-2012. Percent presented at the bottom of Tables 1 through 6 use the same approach.

Table 3
Marital characteristics of population in health occupations by geographical division

	Never Married	Widowed Separated or Divorced	Married
New England	199,170	136,908	423,035
Middle Atlantic	572,660	363,991	1,095,182
East North Central	501,906	353,683	1,114,321
West North Central	220,072	159,794	557,926
South Atlantic	575,927	495,333	1,314,535
East South Central	156,535	148,694	419,534
West South Central	313,019	293,770	752,797
Mountain	178,509	155,909	459,084
Pacific	442,858	310,943	948,030
Total	3,160,656	2,419,025	7,084,444
	Never Married	**Widowed Separated or Divorced**	**Married**
New England	1.6%	1.1%	3.3%
Middle Atlantic	4.5%	2.9%	8.6%
East North Central	4.0%	2.8%	8.8%
West North Central	1.7%	1.3%	4.4%
South Atlantic	4.5%	3.9%	10.4%
East South Central	1.2%	1.2%	3.3%
West South Central	2.5%	2.3%	5.9%
Mountain	1.4%	1.2%	3.6%
Pacific	3.5%	2.5%	7.5%
Total	25.0%	19.1%	55.9%

EDUCATIONAL ATTAINMENT

Table 4 shows the educational attainment of the health occupation population. As we can see, 54.1% of the health occupation population has an associate's degree or below. Only 4.1% of the health professional population has a doctorate. Note these tables can also be used to compute other estimates. For example, within the South Atlantic—the division with the largest concentration of the health occupation population—26% of the health workforce has a master's degree or higher: [(518,377+101,851) ÷ 2,385,795]. Using a similar approach, we see that within the West South Central division, about 60% of the health workforce has an associates or below level of educational attainment.

Table 4
Educational attainment in health occupation population by geographical division

	Less than HS Diploma	HS Diploma to Associates	Bachelor's Degree	Masters Degree	Doctorate
New England	25,116	341,595	158,313	195,833	38,256
Middle Atlantic	111,245	951,004	399,050	485,640	84,894
East North Central	62,814	1,048,142	385,797	407,867	65,290
West North Central	29,352	493,284	190,671	188,709	35,776
South Atlantic	90,638	1,229,607	445,322	518,377	101,851
East South Central	24,954	404,207	135,311	138,388	21,903
West South Central	89,291	726,320	240,349	258,584	45,042
Mountain	23,437	383,585	166,129	185,738	34,613
Pacific	67,344	758,655	356,039	429,843	89,950
Total	524,191	6,336,399	2,476,981	2,808,979	517,575
	Less than HS Diploma	**HS Diploma to Associates**	**Bachelor's Degree**	**Masters Degree**	**Doctorate**
New England	0.2%	2.7%	1.3%	1.5%	0.3%
Middle Atlantic	0.9%	7.5%	3.2%	3.8%	0.7%
East North Central	0.5%	8.3%	3.0%	3.2%	0.5%
West North Central	0.2%	3.9%	1.5%	1.5%	0.3%
South Atlantic	0.7%	9.7%	3.5%	4.1%	0.8%
East South Central	0.2%	3.2%	1.1%	1.1%	0.2%
West South Central	0.7%	5.7%	1.9%	2.0%	0.4%
Mountain	0.2%	3.0%	1.3%	1.5%	0.3%
Pacific	0.5%	6.0%	2.8%	3.4%	0.7%
Total	4.1%	50.0%	19.6%	22.2%	4.1%

RACIAL DISTRIBUTION

Table 5 shows the racial distribution of the health occupation population. The majority (65.8%) of the health occupation population is made up by Non-Latino-White, followed by Non-Latino-Blacks at 16.1%.

Table 5
Racial distribution in health occupation population by geographical division

	Non-Latino White	Non-Latino Black	Non-Latino Native	Non-Latino Asian	Non-Latino Other	Mexican	Non-Mexican Latino
New England	587,657	75,986	1,596	33,754	12,787	2,617	44,716
Middle Atlantic	1,237,209	407,718	3,702	159,207	29,650	10,009	184,338
East North Central	1,500,890	276,677	5,277	91,009	25,935	41,140	28,982
West North Central	795,363	73,422	7,276	25,213	12,477	16,673	7,368
South Atlantic	1,424,531	645,265	8,511	102,634	30,738	20,726	153,390
East South Central	541,498	150,608	1,812	13,740	7,277	3,813	6,015
West South Central	744,710	261,740	16,362	64,769	24,940	208,026	39,039
Mountain	581,141	31,955	19,747	33,981	13,637	78,780	34,261
Pacific	922,776	119,871	8,897	302,555	44,015	230,322	73,395
Total	8,335,775	2,043,242	73,180	826,862	201,456	612,106	571,504
	Non-Latino White	Non-Latino Black	Non-Latino Native	Non-Latino Asian	Non-Latino Other	Mexican	Non-Mexican Latino
New England	4.6%	0.6%	0.0%	0.3%	0.1%	0.0%	0.4%
Middle Atlantic	9.8%	3.2%	0.0%	1.3%	0.2%	0.1%	1.5%
East North Central	11.9%	2.2%	0.0%	0.7%	0.2%	0.3%	0.2%
West North Central	6.3%	0.6%	0.1%	0.2%	0.1%	0.1%	0.1%
South Atlantic	11.2%	5.1%	0.1%	0.8%	0.2%	0.2%	1.2%
East South Central	4.3%	1.2%	0.0%	0.1%	0.1%	0.0%	0.0%
West South Central	5.9%	2.1%	0.1%	0.5%	0.2%	1.6%	0.3%
Mountain	4.6%	0.3%	0.2%	0.3%	0.1%	0.6%	0.3%
Pacific	7.3%	0.9%	0.1%	2.4%	0.3%	1.8%	0.6%
Total	65.8%	16.1%	0.6%	6.5%	1.6%	4.8%	4.5%

AGE DISTRIBUTION

Table 6 shows the age distribution of the health occupation population. The majority (22.5%) of the health occupation population is made up by those aged 30 and below, and about 23.2% are between the ages of 31 and 40. Health workforce at age 51 or above for small concentration divisions is 2% for New England, 1.6% for East South Central, and 2% for Mountain.

Table 6
Age distribution in health occupation population by geographical division

	≤30	31 to 35	36 to 40	41 to 45	46 to 50	51 to 55	56 to 60	≥61
New England	153,129	84,084	85,654	86,047	90,705	89,601	75,698	94,195
Middle Atlantic	415,375	222,854	228,220	232,175	244,401	242,819	202,169	243,820
East North Central	469,138	228,384	222,997	212,664	225,987	221,063	180,562	209,115
West North Central	251,716	103,603	97,602	96,115	101,430	99,897	86,899	100,530
South Atlantic	504,896	275,577	287,713	278,986	274,168	265,584	221,651	277,220
East South Central	174,938	89,310	89,204	82,619	80,371	75,602	62,732	69,987
West South Central	331,222	166,227	164,997	152,138	149,726	140,162	115,934	139,180
Mountain	189,457	95,928	91,283	81,344	86,578	85,467	73,409	90,036
Pacific	358,459	204,422	202,834	183,958	191,990	185,785	165,395	208,988
Total	2,848,330	1,470,389	1,470,504	1,406,046	1,445,356	1,405,980	1,184,449	1,433,071

	≤30	31 to 35	36 to 40	41 to 45	46 to 50	51 to 55	56 to 60	≥61
New England	1.2%	0.7%	0.7%	0.7%	0.7%	0.7%	0.6%	0.7%
Middle Atlantic	3.3%	1.8%	1.8%	1.8%	1.9%	1.9%	1.6%	1.9%
East North Central	3.7%	1.8%	1.8%	1.7%	1.8%	1.7%	1.4%	1.7%
West North Central	2.0%	0.8%	0.8%	0.8%	0.8%	0.8%	0.7%	0.8%
South Atlantic	4.0%	2.2%	2.3%	2.2%	2.2%	2.1%	1.8%	2.2%
East South Central	1.4%	0.7%	0.7%	0.7%	0.6%	0.6%	0.5%	0.6%
West South Central	2.6%	1.3%	1.3%	1.2%	1.2%	1.1%	0.9%	1.1%
Mountain	1.5%	0.8%	0.7%	0.6%	0.7%	0.7%	0.6%	0.7%
Pacific	2.8%	1.6%	1.6%	1.5%	1.5%	1.5%	1.3%	1.7%
Total	22.5%	11.6%	11.6%	11.1%	11.4%	11.1%	9.4%	11.3%

CONCLUSIONS

The population of individuals working in health occupations is most concentrated in the South Atlantic, Middle Atlantic, and East North Central divisions. The majority of the health occupation workforce is female, more than one in 10 are in poverty, and about 7% report having difficulties with functions of daily living (i.e., are disable). The majority of the health occupation workforce is married, has a bachelor's degree or below, is non-Latino-white, and below the age of 45. The West South Central division has the highest level of poverty concentration (17%), the highest prevalence of disability (9%), and highest level (60%) of people with an associate's degree or below amongst the health occupation population in the US mainland during the 2008-2012 survey period.

Please note the report presents "population estimates" with confidence intervals around them—as they are derived from a sample. Other data editing protocols, liked allocation of responses to missing items, may also affect to what degree the population estimate reflects the "true" characteristics of the population of people in health occupations. These issues are discussed in greater detail elsewhere [10, 11]. The ACS data provides the means to detect the quality of the population estimates [6]. Future research should use the 80 replicate weights in the ACS PUMS file to compute confidence intervals in the population estimates provided in this report. Estimates of the health occupation population can also be geographically reference to metropolitan areas by the use of Public Use Microdata Areas [12].

Notwithstanding these issues, the analysis uses information on 633,894 individuals—a very large number of observations relative to other samples used in public health research. When weighted, these 633,894 individuals are said to represent a total of 12,664,125 people—i.e., the health occupation population. Because of the large number of observations, population estimates in this brief report may be considered to be amongst the most reliable. The tables provided in this report are valuable because they can be used in multiple ways to delineate the sociodemographic characteristics of the US mainland population in health occupations. As evident by the results of the investigation, the health occupation population is socio-demographically diverse. Promoting physical well-being amongst those in health occupations may require that non-work-related risk factors for morbidity (e.g., poverty) be addressed in work-place stress-coping training.

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APPENDIX A

Index of Occupations Cross Classification (OCC) codes may be found at http://www.census.gov/people/io/methodology/indexes.html

Technical Note:

Occupations recoded for data years 2008 and 2009 to 2002 OCC codes

Occupations recoded for data years 2010, 2011, and 2012 to 2010 OCC codes

0350 mgr-medical and health services managers
1650 sci-medical scientists
1820 sci-psychologists
2000 cms-counselors
2010 cms-social workers
3000 med-chiropractors
3010 med-dentists
3030 med-dietitians and nutritionists
3040 med-optometrists
3050 med-pharmacists
3060 med-physicians and surgeons
3110 med-physician assistants
3120 med-podiatrists
3130 med-registered nurses
3140 med-audiologists
3150 med-occupational therapists
3160 med-physical therapists
3200 med-radiation therapists
3210 med-recreational therapists
3220 med-respiratory therapists
3230 med-speech-language pathologists
3240 med-therapists, all other
3250 med-veterinarians
3260 med-health diagnosing and treating practitioners, all other
3300 med-clinical laboratory technologists and technicians
3310 med-dental hygienists
3320 med-diagnostic related technologists and technicians
3400 med-emergency medical technicians and paramedics
3410 med-health diagnosing and treating practitioner support technicians
3500 med-licensed practical and licensed vocational nurses
3510 med-medical records and health information technicians
3520 med-opticians, dispensing
3530 med-miscellaneous health technologists and technicians
3540 med-other healthcare practitioners and technical occupations
3600 hls-nursing, psychiatric, and home health aides
3610 hls-occupational therapist assistants and aides
3620 hls-physical therapist assistants and aides
3630 hls-massage therapists
3640 hls-dental assistants
3650 hls-medical assistants and other healthcare support occupations, except dental assistants
9110 trn-ambulance drivers and attendants, except emergency medical technicians