

Behavioral Health Provider Geographic Distribution and Reimbursement Inequities

December 2019

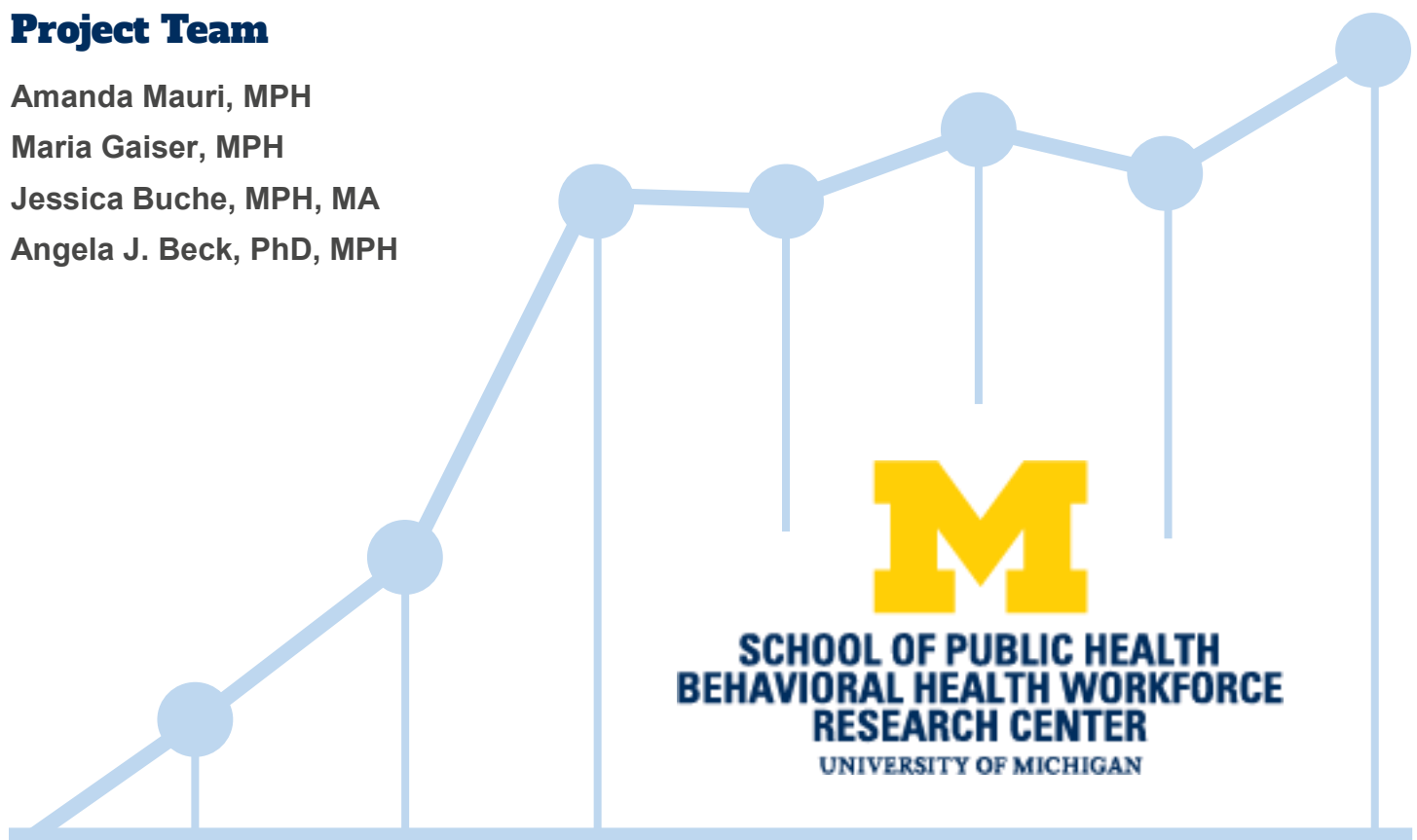
Project Team

Amanda Mauri, MPH

Maria Gaiser, MPH

Jessica Buche, MPH, MA

Angela J. Beck, PhD, MPH



ACKNOWLEDGEMENTS

This project was supported by the Substance Abuse and Mental Health Services Administration (SAMHSA) and the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS) as part of an award totaling \$1.2 million. The contents are those of the author and do not necessarily represent the official views of, nor an endorsement by, SAMHSA, HRSA, HHS, or the U.S. Government. For more information, please visit HRSA.gov.

SUGGESTED CITATION

University of Michigan Behavioral Health Workforce Research Center. Behavioral Health Provider Geographic Distribution and Reimbursement Inequities. Ann Arbor, MI: UMSPH; 2019.

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Background

Behavioral health care is considered one of the country's most expensive health conditions, with an estimated annual cost of \$201 billion.¹ Despite the significant cost associated with behavioral health care, unmet need remains high. In 2017, nearly 20.7 million people aged 12 years or older needed substance use disorder care (7.6%), yet only 19.3% of this population received any substance use disorder treatment in the past year.² Individuals in need of behavioral health services are also subject to poor treatment access. For example, only 66.8% of adults aged 18 years or older with a major depressive disorder received treatment in the past year.²

Behavioral health provider shortages and associated maldistribution of practitioners across the country may contribute to suboptimal behavioral healthcare availability.^{3–8} The Health Resources and Services Administration estimates that 59.8% of the 5,035 mental health provider shortage areas in the U.S. are located in rural and partially rural areas.⁹ In an examination of geographic distribution of psychiatrists, psychologists, and psychiatric nurse practitioners, Andrilla and colleagues¹⁰ observed a similar disparity by rurality: 27% of metropolitan counties lacked a psychiatrist and 19% lacked a psychologist, compared with 65% of nonmetropolitan counties without a psychiatrist and 47% without a psychologist.

Few published studies investigate how reimbursement influences geographic provider distribution. One study by Barnes et al.¹¹ observed that state policies that reimburse nurse practitioners at 100% of the physician Medicaid fee-for-service rate were associated with increased odds of nurse practitioners practicing in primary care. Further, practices with nurse practitioners in these states were more likely to accept Medicaid compared with peer practices without nurse practitioners.

For the purpose of this study, licensed psychologists act as an example of a provider type within the behavioral health workforce with inequitable geographic distribution.^{10,12} Approximately 106,500 clinical, counseling, and school psychologists are licensed in the U.S.¹³ The distribution of these providers varies by region and rurality: The Northeast region has the highest (54.2 per 100,000 population) and the South has the lowest (24.0 per 100,000 population) representation of licensed psychologists.¹⁴ Differences in psychologist distributions also exist between metropolitan areas. In New England, metropolitan areas had 57.1 psychologists per 100,000 persons, as compared with 35.3 per 100,000 in the East North Central region and 16.4 per 100,000 in the West South Central region.¹⁰

Our study seeks to build on this limited body of literature through examination of relationship between reimbursement and provider shortages within the behavioral health workforce. We hypothesize that variation in reimbursement across the country contributes to disparities in the geographic distribution of behavioral health providers. Specifically, we suspect that behavioral health providers are responsive to variation in reimbursement through the location of their practice. We anticipate that this population is particularly vulnerable to geographic disparities in pay due to consistently lower reimbursement rates, relative to their non-behavioral health peers.^{15,16} Although federal and state policies, namely parity laws, intend to address inequitable design of reimbursement rates between behavioral health and non-behavioral health providers, disparities remain in payment.^{15,16} Using the case study of licensed psychologists in metropolitan areas, we propose the following hypothesis: Reimbursement within a geographic area will be positively correlated with number of behavioral health providers in this region.

This is the first study to explore the relationship between provider geographic distribution and reimbursement using a sample of the behavioral health workforce. Through this analysis, we aim to provide insight into the persistent provider shortages across the countries and provide a potential solution for addressing inequitable distribution of behavioral health providers.

Methods

In 2018–2019, the Behavioral Health Workforce Research Center conducted an empirical study using secondary sources to investigate the relationship between provider distribution and reimbursement. This cross-sectional study used data from two sources: (1) the 2017 Bureau of Labor Statistics (BLS) Occupational Employment Statistics system¹⁷ and (2) the 2017 American Community Survey (ACS) 1-year files.¹⁸

Bureau of Labor Statistics

We collected two measures from the May 2017 BLS Occupational Employment Statistics (OES) system.¹⁷ The OES program collects data on employment and wages for about 800 occupations, producing nationwide, state, and metropolitan and nonmetropolitan area occupational and wage estimates. The OES program surveys approximately 180,000–200,000 establishments every six months.

Our dependent variable is *percent psychologist*. Percent psychologists equal the number of clinical, school, and counseling psychologists in a metropolitan area divided by the total non-institutionalized civilian population of that area. The ACS section below provides details on collection of total non-institutionalized civilian population. The data do not include self-employed individuals. We limited BLS data to clinical, school, and counseling psychologists identified through the BLS Standard Occupational Classification code 193031.

Our main independent variable is *median hourly wage*. Median hourly wage equals the amount at which half of the workers in a given occupation earn more than the median wage, and half of the workers earn less than the median wage. The BLS collects compensation measures, including median hourly wage, through the National Compensation Survey¹⁹—a voluntary establishment-based survey that gathers wages and salary data from payroll records.¹⁹

We analyzed data at the metropolitan level. Areas are included if complete information was available for both number of psychologists and hourly median wage at the metropolitan level. Nonmetropolitan areas, metropolitan areas with New England City and Town Area codes, and metropolitan divisions were excluded from the analysis.

American Community Survey

We used the 2017 ACS 1-year files to collect data on relevant controls, including: racial distribution, employment, veteran status, household income, education, and disability.¹⁸ ACS is an annual, nationwide survey conducted by the U.S. Census Bureau that collects information on demographic, education, employment, housing, and disability characteristics. The ACS 1-year files are publicly available through American FactFinder.¹⁸ All information reflects data self-reported by ACS respondents. We analyzed data at the metropolitan level.

We report all non-income measures as a percentage of the total non-institutionalized civilian population. The size of the total non-institutionalized civilian population was also collected from the ACS. The education level equals the highest level of education completed, as reported by each ACS respondent. Categories include *percent high school graduate or higher* and *percent bachelor's degree or higher*. *Percent disabled* includes individuals who reported at least one of the following disabilities: hearing, vision, cognitive, ambulatory, self-care, and independent living. *Percent white* includes individuals who selected Hispanic or non-Hispanic white alone as their racial group. It does not include individuals who selected two or more races with one including white. *Percent employed* refers to individuals aged ≥16 years who self-reported full-time, year-round employment. *Household median income* equals the total income of the householder and all other persons aged ≥15 years in the household, regardless of familial relationship. *Percent veteran* includes an individual who self-reported that he or she served, but is not currently serving, on active duty in the U.S. Army, Navy, Marine Corps, or the Coast Guard, or who served in the U.S. Merchant Marine during World War II. National Guard or military Reserves members are only classified as veterans if he or she had been called or ordered to active duty.

Analysis

We conducted all analyses using Stata, version 15.1. Data from BLS and ACS were merged using core-based statistical area codes for metropolitan areas. First, we describe the descriptive statistics, including mean, standard deviation, and range, for all relevant dependent and independent variables, as well as control measures. Second, we used a generalized linear model with a log link and a gamma distribution to examine the association between median hourly wage and psychologist provider distribution. We selected the link function and variance distribution using the Box–Cox test and Modified Park test, respectively.

Findings

This report begins by presenting summary statistics of all relevant independent, dependent, and control variables (Table 1). Two hundred thirty-one metropolitan areas met the criteria for complete information for employment and hourly wage measures. One metropolitan area was dropped because the ACS education data were not available at the metropolitan level, resulting in a final 230 included metropolitan areas. The number of psychologists as a percentage of the total non-civilian institutionalized population was <1% across all metropolitan areas with an interquartile range equal to 0.02% (25th percentile: 0.02; 75th percentile: 0.04). Median hourly wage ranged from approximately \$20.00 to >\$56.00 per hour with an average wage of \$33.69 across metropolitan areas. Only four metropolitan areas contained <50% of its residents identifying as Hispanic or non-Hispanic white. Of the 230 metropolitan areas, 68.70% had 75% or greater residents identifying as white.

Table 1: Summary Statistics

Variable	Mean	SD	10%	25%	75%	90%
Percent psychologists	0.04%	0.02%	0.02%	0.02%	0.04%	0.06%
Median hourly wage	\$33.69	\$6.38	\$26.30	\$29.31	\$36.63	\$41.71
Percent employed	33.25%	3.52%	28.70%	30.77%	35.66%	37.46%
Percent white	78.72%	11.85%	60.39%	71.91%	87.61%	92.03%
Percent veteran	6.30%	2.04%	3.97%	5.15%	7.29%	8.50%
Household median income	\$57,475.39	\$10,859.03	\$45,905.00	\$50,654.00	\$63,107.00	\$71,203.50
Percent high school graduate or higher	88.78%	5.22%	83.15%	87.00%	91.60%	93.75%
Percent bachelor's degree or higher	30.56%	8.48%	20.45%	24.40%	35.50%	40.60%
Percent disabled	13.19%	2.64%	9.66%	11.51%	14.62%	16.83%

Note: All percentages refer to percentage of the total non-institutionalized civilian population of the area.
SD, standard deviation.

Table 2 presents the results from the generalized linear model assessing the association between median hourly wage and percentage of non-civilian institutionalized population who are psychologists. Models 1 and 2 are of the same specification. Model 1 contains all 230 metropolitan areas included in the data set. Model 2 contains metropolitan areas within the 10th and 90th percentile of percentage of residents that identify as psychologists. If we find support for our hypothesis that payment rate is positively correlated with number of psychologists in a metropolitan area, we expect the coefficient on the variable *hourly median wage* to be positive and significant. Indeed, the coefficients on *hourly median wage* in both Models 1 and 2 are positively correlated with the percentage of residents who identify as psychologists.

In addition to percentage of psychologists, percentage of total non-institutionalized civilian population employed and white is also correlated with the number of psychologists in a metropolitan area (Table 2). The magnitude of the marginal effects on both *percent employed* and *percent white* in both models are small. One percentage point increase in the employed population is associated with an average 0.001 percent decrease in *percent psychologist* in Model 1. The average marginal effect of *percent employed* is not statistically significant at the 0.05 level in Model 2. *Percent white* is positively correlated with the *percent psychologist* in both Models 1 and 2.

Table 2: Association between median hourly wage and percentage of residents who identify as psychologists in metropolitan areas

VARIABLES	Model 1 N = 230		Model 2 N=184	
	β	SE	β	SE
Hourly median wage	0.02***	0.01	0.01***	0.00
Percent employed	-0.04***	0.01	-0.01	0.01
Percent white	0.01**	0.00	0.00**	0.00
Percent veteran	-0.01	0.02	-0.01	0.01
Household median income	0.00	0.00	0.00**	0.00
Percent high school graduate or higher	0.02	0.01	0.01	0.01
Percent bachelor's degree or higher	0.01	0.01	0.0	0.01
Percent disabled	-0.02	0.02	0.01	0.01
Constant	-4.85***	0.76	-4.92***	0.57

Note: Models 1 and 2 use a generalized linear models with a log link and gamma family distribution.
 *** p<0.01, ** p<0.05, * p<0.1, SE, standard error.

Figures 1 and 2 display the estimated percent psychologists at varying hourly median wages for Models 1 and 2. Figure 1 displays Model 1, which contains all 230 included metropolitan areas. The marginal effect of median hourly wage for Model 1 is a 0.0006% increase. Figure 2 portrays Model 2, which contains only metropolitan areas within the 10th and 90th percentage of total population that identify as psychologists (N=184). In this model, every 1 unit increase in hourly median wage is associated with a 0.0004% increase in percent psychologist.

Figure 1. Average marginal effects of median hourly wage on percent psychologist with 95% confidence intervals (Model 1, N=230)

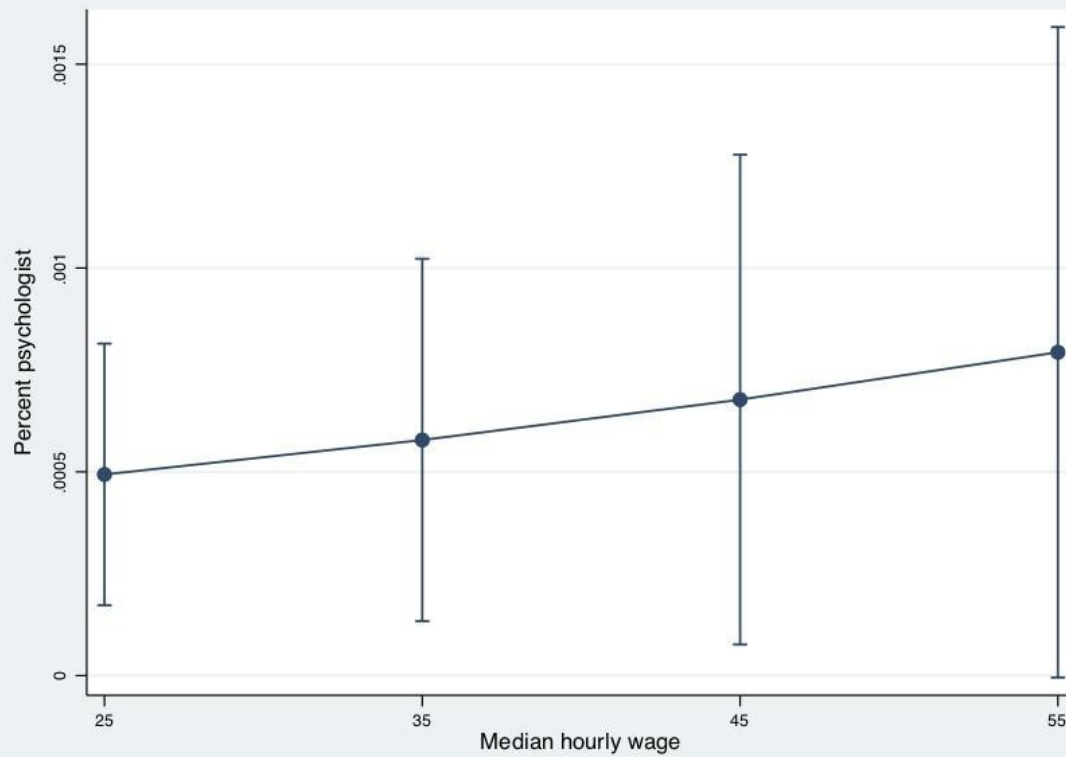
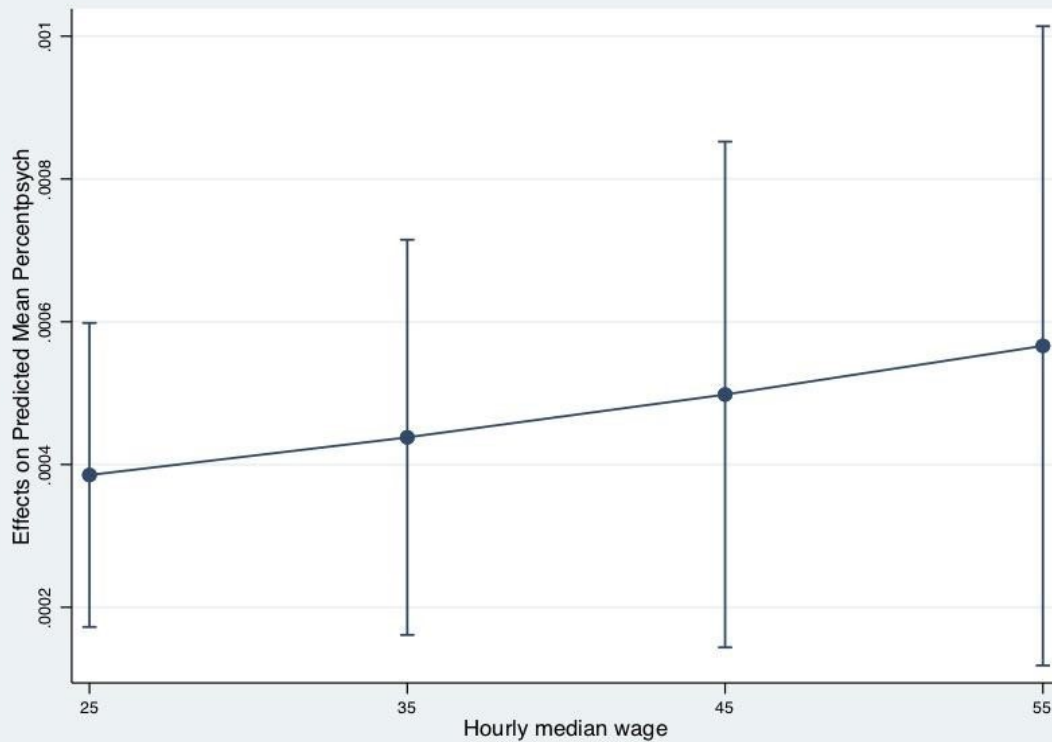


Figure 2. Average marginal effects of median hourly wage on percent psychologist with 95% confidence intervals (Model 2, N=184)



Conclusions and Policy Considerations

This cross-sectional study examined the relationship between reimbursement and behavioral health provider geographic distribution. Using the case study of clinical, counseling, and school psychologists in metropolitan areas, we tested the hypothesis that behavioral health providers are responsive to variations in payment across the country. We identified a positive correlation between hourly median wage and percentage of the population that identified as psychologists in metropolitan areas. This relationship persisted when controlling for racial distribution, employment, veteran status, household income, education, and disability.

We acknowledge that the marginal effect of median hourly wage on percentage of psychologists is of small magnitude across specifications. However, the interquartile range for *percent psychologist* equals 0.04, suggesting that a small unit increase in median hourly wage does contribute to variation in the distribution of psychologists across metropolitan areas. We suspect that the effect identified here will be of greater magnitude in a comparison between areas with even starker inequalities in number of behavioral health providers.

By demonstrating the positive relationship between hourly wage and number of psychologists in a metropolitan area, we highlight an inequality within a provider group that may contribute to the unmet need for behavioral health services² and associated provider shortages.^{4-6,9} This research adds to work on reimbursement differences between provider types. Previous scholarship documents persistent disparities in payment between behavioral health providers and other clinician types.^{15,16} This study demonstrates that reimbursement inequities also exist within the same provider category. Specifically, it highlights that geographic variation in reimbursement is correlated with the size of the psychologist population in metropolitan areas. Future policies should focus on addressing inequities both within provider groups by geographic area and across comparable clinical categories.

These findings suggest that a potential expansion of the National Health Service Corps Loan Repayment (NHSC) program may address inequitable geographic distribution amongst the psychologist's workforce.²⁰ The NHSC offers loan repayment for behavioral health providers, including clinical psychologists, who agree to a 2-year service contract in a health profession shortage area. This program offers a direct way to more equitably distribute the psychological workforce across the country. Further, this research suggests that the NHSC may address why some providers are relocating to areas of lower reimbursement to regions of higher payment.

Policymakers may also consider increasing public reimbursement for behavioral health services. Public reimbursement rates for many psychologist-delivered services have been declining, after adjusting for inflation.²¹ This may have two effects: First, providers may respond to a decline in public reimbursement by accepting fewer patients with public coverage. Second, in response to changes in reimbursement, our results suggests that psychologists might move to practice locations in areas where they are likely to get paid more, such as metropolitan areas with wealthier and privately insured residents. Increasing public reimbursement for services psychologists commonly bill for may increase the number of psychologists accepting public insurance and encourage providers to not move to areas concentrated with private insurance.

Policy may also be able to address inequitable distribution of psychologists by educating providers on billing practices. Psychologists remain unaware or incapable of submitting the totality of billing options available.²² Providers may concentrate in areas of higher reimbursement so they do not need to navigate complicated billing practices. This could be countered through continuing education, which is a requirement for psychologist licenses in every state, or by changing accredited curriculum standards to emphasize billing practices. Residencies and postgraduate internships could also incorporate these programs.

Our study suggests four research priorities: First, future studies should focus on the causal relationship between reimbursement and provider geographic distribution. Our data are limited by their cross-sectional nature. The findings only speak to the relationship between hourly median wage and the number of non-self-employed clinical, counseling, and school psychologists, not any causative association between the two variables. Research should examine if changes in reimbursement cause providers to move their residency or clinical practice to a new geographic area.

Second, we recommend researchers examine other geographic jurisdictions. An important limitation of our study is our focus on metropolitan areas. Researchers should investigate whether inequities in payment

between communities with different levels of urbanicity contribute to the pronounced disparity in the number of behavioral health providers between metropolitan and nonmetropolitan areas.^{9,10} This research could be conducted using the granular National Center for Health Statistics six-level urban–rural classification scheme,²³ or a more blunt measure such as the U.S. Office of Management and Budget delineation of metropolitan and micropolitan areas.²⁴ Although the OMB’s categorization does not include the most rural communities of the U.S., it will still provide a useful contrast by level of urbanicity.

Third, we elected to conduct this first examination into the relationship between reimbursement and behavioral health provider geographic distribution using a specific provider category: non-self-employed clinical, counseling, and school psychologists. We acknowledge that our focus on this provider groups is limited in three regards. First, psychologists are under-represented in the BLS because they often are self-employed and will not be included in the BLS catchment. Second, psychologists are not representative of the entire behavioral health workforce. We in no way claim that our findings here can be applied to other behavioral health providers. Third, our measure aggregates clinical, counseling, and school psychologists into a single category. The distribution within this category varies greatly by area. For example, college and university towns are more likely to see higher rates of school psychologists than others areas.

Research should test the consistency of our findings across other behavioral health provider types. For example, a future study could examine if the relationship observed here requires a minimum level of reimbursement to influence provider geographic distribution. Specific provider types may not be susceptible to the association between reimbursement and geographic location because they do not meet this payment threshold. Further, future work could disaggregate the clinical, counseling, and school psychologists’ category and determine if the effect of reimbursement is consistent across the three provider groups.

Fourth, research should expand upon our limited definition of reimbursement. We argue that non-self-employed clinical, counseling, and school psychologists are more likely to receive payment through an hourly standard wage relative to their self-employed peers whose reimbursement may be tied to a specific clinical service that varies in amount by insurer type and health care market. The hypothesis examined in this report should be tested among psychologists not paid through an hourly wage, such as through fee for service reimbursement. Further, future work should explore if the relationship between reimbursement and provider geographic distribution differs among behavioral health providers commonly paid through out-of-pocket care, compared with other behavioral health clinicians predominantly reimbursed through insurance covered in-network and out-of-network services.

This is the first study to examine the association between reimbursement and behavioral health provider geographic distribution. We identified that behavioral health providers concentrate in metropolitan areas of higher reimbursement compared with locations associated with lower pay. Future research should explore if these findings translate to other provider groups, reimbursement measures, and geographic locations.

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