

Where is Behavioral Health Integration Occurring? Mapping National Co-location Trends Using National Provider Identifier Data

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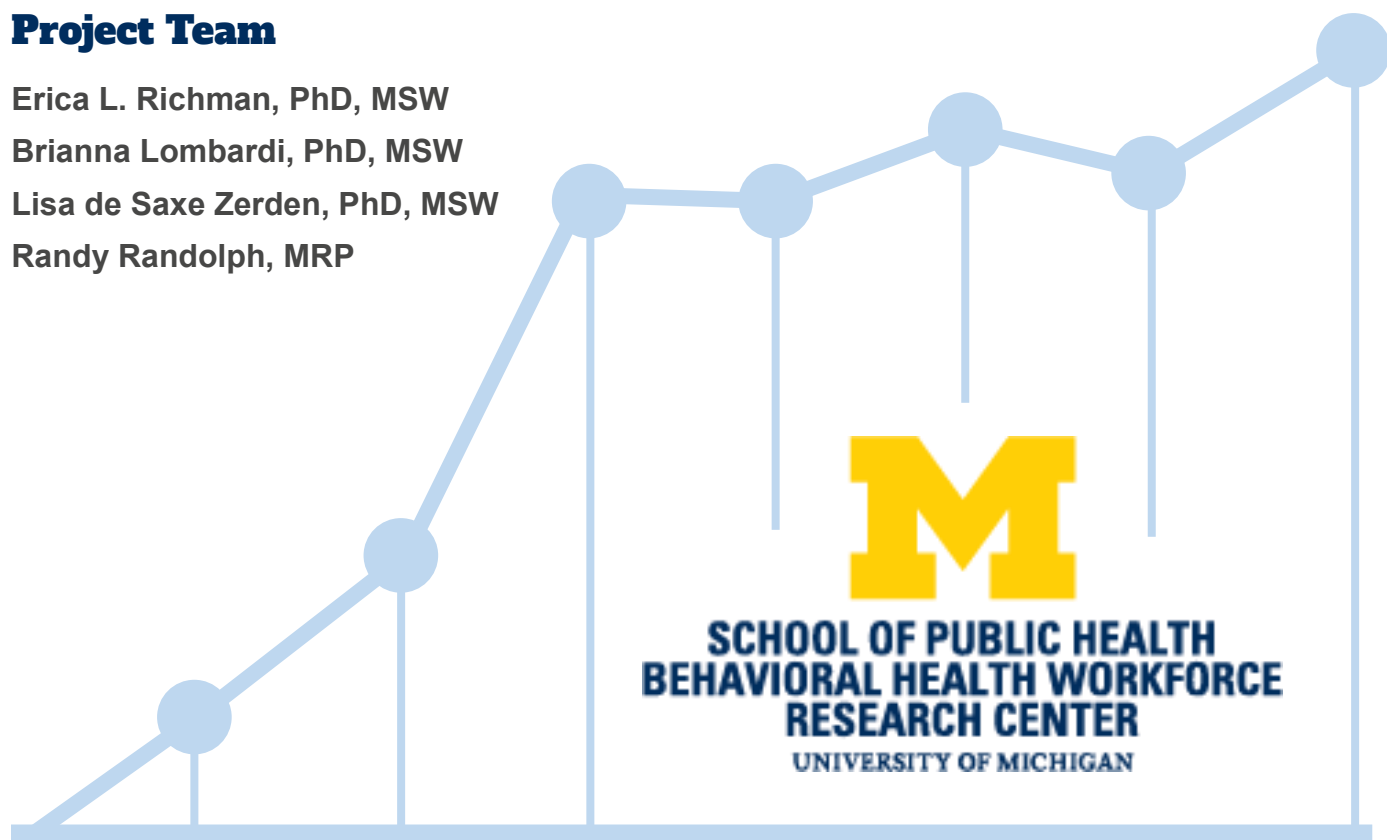
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Background

Because 60–80% of all primary care visits include a behavioral health component,^{1,2} providing integrated services in primary care is now considered a priority for health systems as they strive to meet patient needs and improve population health. Integrated care typically involves behavioral healthcare workers such as social workers and psychologists working on teams with primary care providers to help address behavioral health and social determinants of health alongside physical health.^{3–5} Health systems can increase service utilization of behavioral health services by reducing typical barriers to behavioral health such as stigma and accessibility—key components of integrated health.⁶ Most importantly, integrated health care is related to improved patient health and well-being.^{4,7} Co-location, where behavioral and physical health components of care are housed in the same physical space, is one of the key elements of integration.⁸ Co-location creates a natural environment for providers to interact, thereby streamlining referrals and improving communication and continuity of care.^{9,10}

Using 2010 National Plan and Provider Enumeration System (NPPES) data, past work has identified that 40% of primary care physicians (PCPs) in urban areas and 23% in rural areas were co-located with behavioral health providers.¹¹ Little is known, however, about the rate of expansion of co-located services in the U.S. in the past 8 years. The current study expands on earlier work by analyzing data after implementation of the Affordable Care Act and after the expansion of the Behavioral Health Workforce Education and Training program, a 2014 and 2017 federal initiative to expand the behavioral health workforce in integrated settings. The rate of physical co-location between PCPs and social workers/psychologists is examined using geo-spatial analysis to:

1. Identify what percentage of PCPs are physically co-located with social workers/psychologists in the U.S.;
2. Assess if co-location rates vary by state, region, rurality, or practice size; and
3. Determine if co-location rates vary by physician specialty.

Methods

Data were drawn in April of 2018 from the Centers for Medicare and Medicaid (CMS) NPPES, a national and publicly available data source.¹² The NPPES comprises information on providers organized by their National Provider Identifier (NPI); all healthcare professionals involved in clinical practice who are eligible to bill CMS are required to have an NPI. The NPPES data include self-reported information on provider specialty, geographic practice location, and demographic information.

The sample used for these analyses includes PCPs, social workers, and psychologists. PCPs include physicians with a self-reported specialty in family medicine, general practice, internal medicine, pediatrics, or obstetrics/gynecology. Physicians in the NPPES may select more than one specialty. If a physician selected at least one of the five primary care specialties listed above, they were included in the sample. Social workers were identified using two codes—social worker and clinical social worker. Psychologists were identified by 22 codes specified by the American Psychological Association for those psychologists providing clinical care.

Rurality was defined by the Office of Management and Budget's Core Based Statistical Areas,¹³ and served as a dichotomous measure of urban versus rural practice location. For analyses, PCPs who reported having more than one specialty were separated into a "two or more specialties" category. Lastly, the number of PCPs working at one latitude and longitude point was considered a proxy for practice size. The number of

PCPs was broken into four categories: single physician location, small practice (two to ten PCPs), medium practice (11–25 PCPs), and large practice (>25 PCPs).

Provider practice addresses were geocoded to latitude and longitude coordinates using the Environmental Systems Research Institute (ESRI) StreetMap database and ESRI ArcGIS software.¹⁴ The geocoding system provides information on the quality of each geocoding result. If the quality score was <40 (out of 100), an algorithm was applied to choose the best address. Mailing address quality was evaluated and used as the alternative if the quality was >40. A small number of addresses (4%) were indecipherable and excluded from the analysis. Straight-line distances between practice locations of behavioral healthcare providers and PCPs were summarized. Distances <0.01 miles were considered co-located whereas those further away were considered not co-located. Latitude and longitude coordinates were overlaid with County and Census Tract files to classify rurality.

Co-location rates were analyzed by type of PCP, number of providers working at the same location (practice size), rural/urban setting, Health and Human Services (HHS) region, state, and Medicaid expansion state status. Descriptive and bivariate analyses (chi-squares) were conducted. Maps were generated to better display and understand co-location trends across the 50 states and Washington, DC. A state map was created using MapInfo Pro V16, and a U.S. map broken out into 38-mile-wide/tall hexagons using D3, an open-source java script library with a hexgrid plug-in, illustrates co-location at a more local level.

Results

The final sample included 717,798 providers: 380,690 PCPs and 337,108 behavioral health providers (Table 1). Social workers made up about 70% (232,847) of the behavioral health providers. The majority of PCPs reported specialty types of internal medicine (38%) and family medicine (31%).

Table 1: Sample Description

	n	Proportion of Sample
Primary Care Providers	380,690	47%
Behavioral Health Providers	337,108	53%
Total Sample	717,798	100%

Forty-four percent of PCPs were physically co-located with a behavioral healthcare provider. Among co-located physicians, 28% (46,613) were co-located with a social worker, 18% (30,085) were co-located with a psychologist, and 54% (90,171) were co-located with both.

As practice size increased, co-location rates also rose ($p<0.001$). PCPs working in larger practices had a much higher likelihood of co-location. For example, 12% of PCPs who were the sole PCP at an address were co-located compared with 48% of PCPs at medium size practices and 82% of PCPs in large practices (Table 2). Practice size was also associated with rurality ($p<0.001$). Providers in rural settings were more likely to be in small or single provider practices.

Providers in urban settings were significantly more likely to be co-located than providers in rural locations (46% vs. 26%, $p<0.001$). Rates of co-location also varied significantly by PCP specialty (Table 3). Pediatricians, obstetricians/gynecologists, and internal medicine physicians were more likely to be co-located than general practitioners and family medicine doctors ($\chi^2=110,000$, $p<0.001$). General practitioners and family medicine doctors, however, were also the physicians most likely to be working in rural locations, indicating that type of PCP and rurality may both be predictive of co-location. Figure 1 shows co-location rates and rurality of primary care physicians.

Table 2: Co-location by Practice Size

Practice Size	Total PCPs		Co-location	
	n	%	n	%
Single PCP	65,577	17	7,797	12
2–10 PCPs	142,793	38	38,866	27
11–25 PCPs	61,993	16	29,481	48
≥26 PCPs	110,327	29	90,725	82

Co-location varied significantly by HHS region ($\chi^2=8,400$, $p<0.001$). Region 1 (CT, ME MA, NH, RI, and VT) reported the most co-location (59%) whereas Region 4 (AL, FL, GA, KY, MS, NC, SC, and TN) had the least (33%). Interestingly, despite Region 4 having the lowest overall co-location rate, it had the second highest co-location rate (35%) among providers in rural areas. Figure 2 displays PCP information for 100-mile radius segments and creates distance-weighted averages of co-location. Darker areas have a higher proportion of PCPs co-located with social workers and psychologists.

Table 3: Co-location and Rurality of Primary Care Physicians by Specialty

	Total PCPs		Co-location		% Providers Working in Rural Locations	
	n	%	n	%	n	%
Pediatricians	63,873	17	33,300	52	4,340	7
Internal Medicine Doctors	143,461	38	71,357	50	10,445	7
Obstetricians/Gynecologists	36,842	10	16,167	44	3,573	10
General Practitioners	11,000	3	3,220	29	1,621	15
Family Medicine Doctors	118,008	21	39,744	34	22,805	19
Two or More Specialties	7,506	2	3,081	41	1,011	13
Total PCPs	380,690	100	166,869	44	43,795	12

Co-location rates also varied by state (Figure 3). For example, Washington, DC (77%), Massachusetts (69%), and Minnesota (62%) had the highest rates of co-location whereas Nevada (23%), Alabama (24%), and Nebraska (25%), had the lowest. PCPs in states that adopted Medicaid expansion were more likely to be co-located than PCPs in states that had not ($p<0.001$).

Figure 1. Co-location and Rurality of Primary Care Physicians

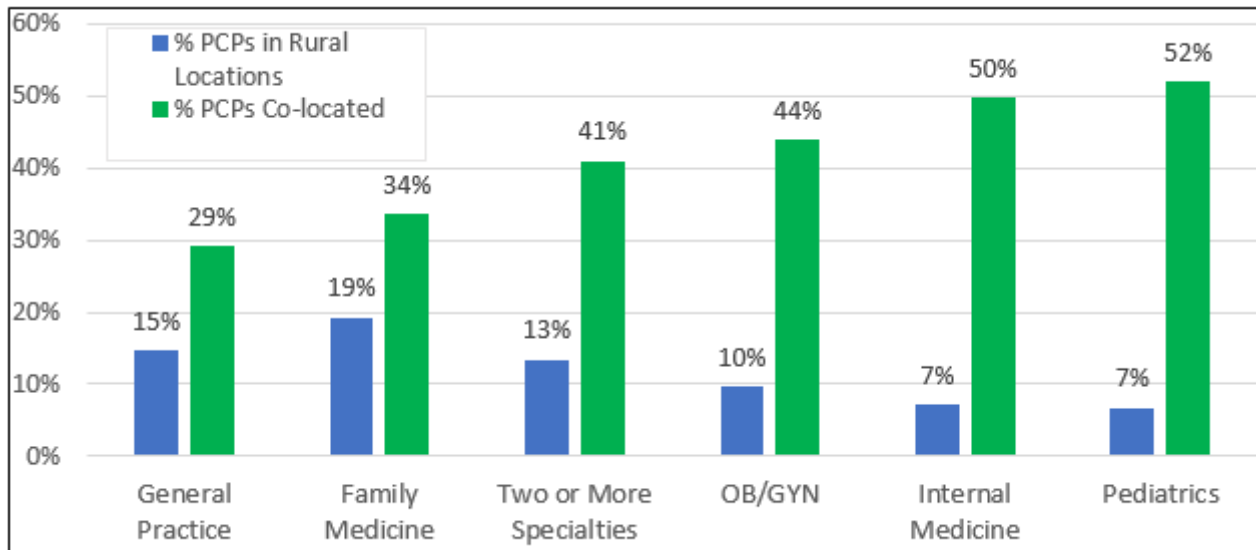


Figure 2. Percentage of Primary Care Physicians Co-located with Behavioral Health Providers

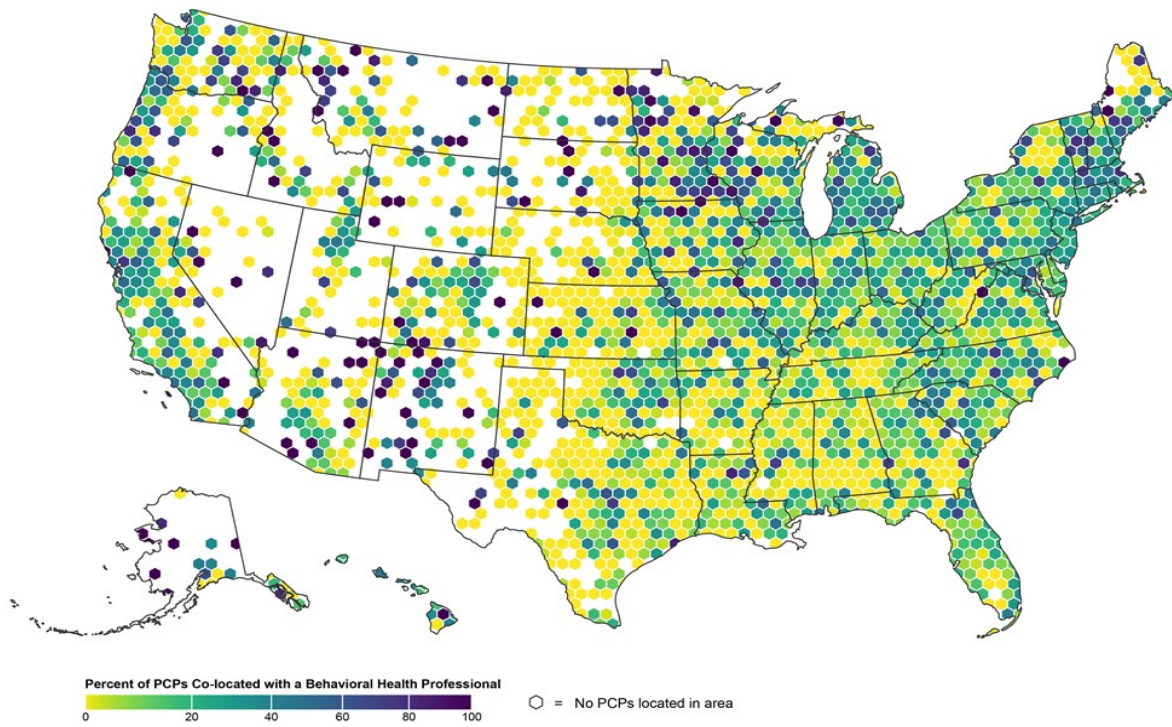
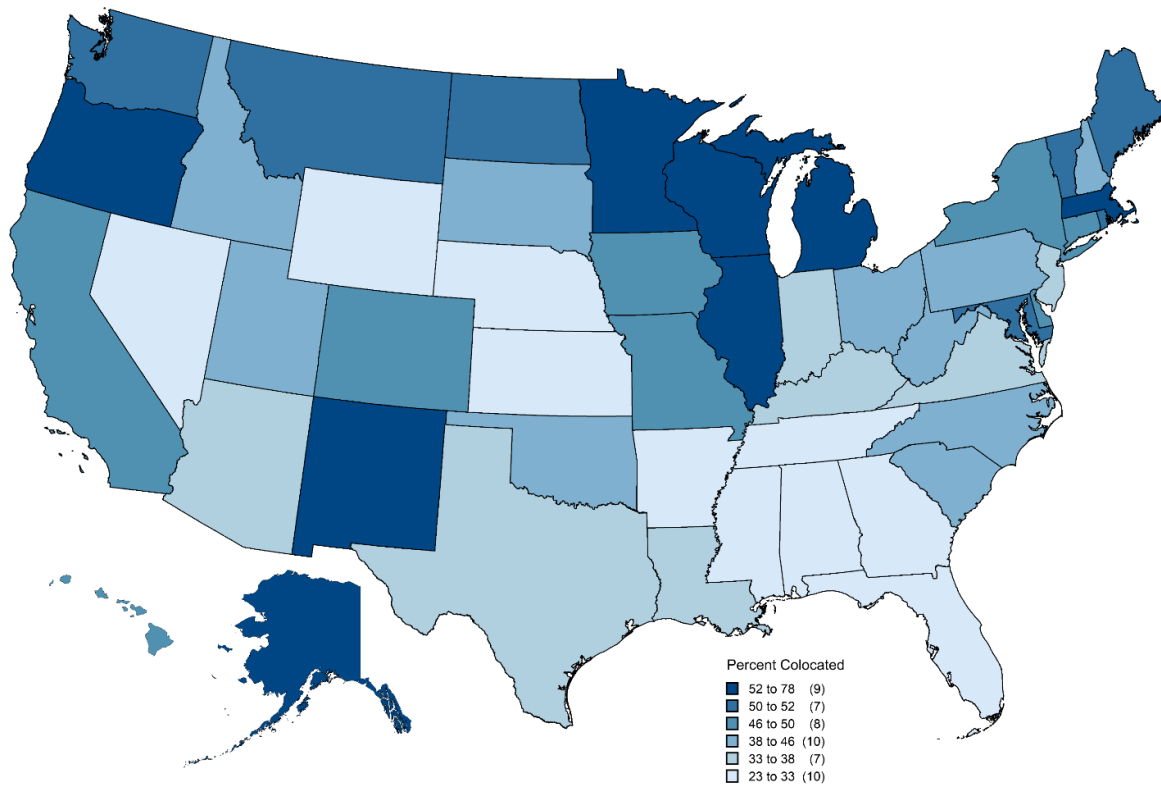


Figure 3. State Variation in Percentage of Primary Care Physicians Co-located with Behavioral Healthcare Providers



Sources: National Plan and Provider Enumeration System, April 2018; Centers for Medicare and Medicaid Services, 2018; StreetMap North America; ESRI, DeLorme, Automotive Navigation Data road data, and Tele Atlas, May 2013

Conclusions

This study identified co-location rates of PCPs and behavioral health providers close to 44%. This finding reflects an increase in co-location of providers since 2010.¹¹ As increasing co-location can facilitate primary care and behavioral healthcare integration, this increase in co-location rates may reflect an uptake of integrated health services across the U.S. post Affordable Care Act implementation and changing care delivery and payment models that incentivize co-location. Findings suggest that small and more rural practices face bigger challenges for co-location and integrated service delivery.

This study found significant variation in co-location rates by PCP specialty type, the number of physicians working at the same location, geographic location of providers, and Medicaid expansion status. Most notably, physicians working in rural settings were significantly less likely to be co-located with a behavioral health provider than those in urban settings. Rural communities have fewer behavioral health providers to integrate with physical health providers. Further research is needed to identify mechanisms that facilitate the adoption and viability of co-located services.

Findings indicate that single PCPs and small practices are co-located at rates well below the national average. This is a concerning because 55% of the PCPs in the sample were in a single or small practice setting. Practices indicate that billing and administrative difficulties are reasons for not implementing integrated care services.^{7,11} Future research should explore strategies to support behavioral health integration in small practices.

Co-location also varied by region and state. Difference in rates of co-location by HHS region and state may be due to the proportion of rural settings in each locale. State variation in the supply of behavioral health providers, state-level billing policy, and Medicaid expansion status may also play a role.

Several limitations of this study are worth considering. Geographic analyses focus on the physical co-location of providers and do not indicate the quality of care integration. The provider specialty measures may not fully capture context or role as this is a limitation of the NPI data available. It remains unknown how frequently providers' status is updated and if available data most accurately reflect nuanced practice trends. In this work, co-location is determined by spatial analyses that do not account for addresses stacked on top of one another. For example, providers in the same building could be located on different floors and not be providing integrated care. It would, however, indicate that these locations may have potential for co-locating services. Finally, based on NPI data, it is not known if providers are working in full-time/part-time capacities, which could impact the potential for collaborative practice.

Policy Considerations

Co-location is occurring less frequently in rural settings and in smaller practices and these are the practices that will need greater assistance to reach higher levels of integrated healthcare. This may be due to the “costs” of co-location and the needs for a more complex organization to support it. Finding physicians who want to work in rural healthcare is a constant challenge as many providers in rural settings feel overburdened and isolated.¹⁵ Increasing rates of co-location by incentivizing behavioral healthcare providers to work alongside physicians could reduce physician burnout by minimizing the rural physician's scope of practice and potentially reducing feelings of seclusion. Supporting co-location in rural and smaller practices may improve the well-being of PCPs in these settings.

Although co-location rates appear to be increasing, the health workforce must be trained to work in integrated settings and understand how practice can incorporate both physical and behavioral health needs concurrently. Medical education and residency training will need to teach and reflect integrated service delivery. Strategies are also needed to facilitate adaptation of integrated models into clinical practice.⁷

Access to adequate funding will likely determine which practices can successfully transition to integrated care. It will be important to document costs and benefits of integration to facilitate practice decision making. Notably, administrative barriers to integrated care vary by state, provider type, and licensure of the behavioral health provider. For example, there is considerable heterogeneity in social worker licensure requirements and definition of clinical practice, which greatly impacts their ability to bill for services.¹⁶

Currently, there are large areas of the U.S. in which co-location is not occurring, and the benefits of integrated services remain untapped. Given the importance of monitoring these efforts, the reliance on NPDES data warrants further administrative oversight at the federal level to better consider the frequency and accuracy of NPI data to assess national trends.¹⁷ Exploration of national integrated workforce data is needed to develop a clear understanding of which providers are needed, where, and how to better align workforce supply with patient need.

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