Pharmacists Colocated with Primary Care Physicians: Teaming up for Patient Access

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◆ I. Introduction

Integrated, team-based models of care are a critical component of high-quality primary care.[1] Although integration occurs on a spectrum, proximity increases the opportunities for collaboration, consultation, and patient interaction. Colocation represents an arrangement where care is housed in the same physical space. Although there are limited data sources available to evaluate team composition and integration in primary care on a national level, colocation can be used as an indicator of integration. One such model that includes pharmacists on primary care teams has been shown to improve health outcomes and optimize medication use, with impacts across all aspects of the quadruple aim.[1-6] Pharmacists working in primary care as members of the care team contribute by managing medications and ensuring that drug regimens are safe, effective, affordable, and convenient.[2]

Policy Implications

The colocation of pharmacists and primary care physicians can increase access to integrated interprofessional care models. Presently, one in ten pharmacists working outside of hospitals are colocated with PCPs.

This study provides information on predictors of colocation. This study finds that colocation varies geographically:

1) Pharmacists in urban areas were more likely to be colocated with PCPs.
2) Pharmacists in states that have expanded Medicaid were more likely to be colocated.
3) States with expanded pharmacist scope of practice regulations had higher rates of colocation.
4) Colocated pharmacists are most commonly working in larger physician practices.

Despite evidence supporting the integration of pharmacists in team-based primary care, little evidence exists on the colocation of pharmacists with primary care physicians in the United States and even less information exists on the factors associated with these models in primary care. As the integration of pharmacists in primary care teams continues to expand, knowing the prevalence and facilitators of integrated models of care will be helpful to policymakers, researchers, and clinical administrators.

Increasing the colocation of pharmacists and PCPs gives practitioners greater ability to meet the patient's healthcare needs at the point of care. However, integrated health care delivery models may be less present in rural and underserved areas and in states with restricted pharmacist scope of practice (SOP), potentially contributing to unequal access to this model of care.[4-8] This study aimed to investigate the prevalence of colocation of pharmacists in PCPs and examine the factors associated with colocation, including geographic location.

◆ II. Methods

This study utilized the National Plan and Provider Enumeration System's (NPPES) National Provider Identifier (NPI) database, a national and publicly available data source that includes all health providers with an NPI. Data

were downloaded in September 2021. All health care workers reimbursed by CMS are required to obtain an NPI. NPPES uses taxonomy codes to identify specialties or types of practitioners. To identity pharmacists in the NPPES file, this study used the following taxonomies: Pharmacist, Pharmacist-Ambulatory Care, Pharmacist-Geriatric, Pharmacist-Pediatrics, Pharmacist-Pharmacist Clinician, Pharmacist-Pharmacotherapy. To identify PCPs, the study used taxonomies for Family Medicine, General Practice, Internal Medicine, Pediatrics, and Geriatrics physician specialties.

The NPPES practice addresses for Pharmacists and PCPs were geocoded using ESRI ArcGIS Online World Geocoding Service and ESRI ArcMap software after initial cleaning and formatting of the practice addresses. Following geocoding, less than 0.01% were excluded for either having a low-quality score (<90) or having an address type that was not precise enough for colocation (e.g., only a postal code).[7-8]

The study compared pharmacist-PCP colocation across a number of covariates. To evaluate rurality, the study used the Rural-Urban Commuting Area (RUCA) codes where a RUCA score 4 or greater was considered rural. The study also examined colocation by pharmacist setting type (hospital versus community-based pharmacists). Pharmacists that were co-located with a hospital as defined by the NPPES facility file were considered hospital-based, whereas pharmacists not co-located with a hospital were considered community-based. The study examined differences in colocation in states with Medicaid expansion and expanded pharmacist scope of practice (SOP) measured by three indicators: prescribe hormonal birth control, vaccines, and tobacco cessation aids without a collaborative practice agreement.[9] Of the pharmacists that were co-located, the study examined if PCP specialty type and practice size was associated with colocation. Maps were created to visualize state colocation mean rates. Chi square analyses were used to compare colocated and non-colocated pharmacists. Multivariate logistic regression was used to predict colocation by all covariates.

◆ III. Findings

The sample included 502,373 Physicians (51% Internal Medicine, 28% Family Medicine, 21% Other PCP sub-specialties) and 221,534 Pharmacists. About 15% of Pharmacists in the sample were in a hospital-based setting, whereas 85% of the pharmacists worked in community-based settings. The vast majority of pharmacists worked in urban areas (86.7%). Of pharmacists in the sample, 23% percent (n=51,034) were colocated with a PCP. There was significant variation in colocation by state. Colocation frequencies vary across states, ranging from 5.2% (Maine) to 58.7% (District of Columbia), with most states having between 20% and 30% colocation. Of those pharmacists that were colocated, the vast majority were colocated with an Internal Medicine (81.2%) and Family Medicine (74.5%) physician. Pharmacists who were working in hospital-based settings were much more likely to be colocated, compared to pharmacists in community-based settings (95% versus 11%, p<0.001). When excluding hospital-based pharmacists, one in 10 (11%) NPI-holding pharmacists were colocated with a PCP. Figure 1 displays the proportion of non-hospital based pharmacists colocated with a PCP by state.

There was a difference in colocation rates by urban/rural location—with 24% of pharmacists in urban settings colocated and 17% of Pharmacists in rural settings colocated (OR = 1.32, CI = 1.26-1.38). The counties with the highest proportion of licensed pharmacists per 100,000 people in the county had higher colocation rates (OR = 1.38, CI = 1.32-1.45). There was a small, but significant difference in colocation rates by states with expanded SOP. In states with expanded SOP, 25% were colocated while in states without expanded SOP 21% were colocated. Pharmacists in states with expanded pharmacist SOP laws for tobacco cessation, immunizations, and

hormonal contraception had 1.37 times higher odds of colocation. Colocation was significantly higher in states that have expanded Medicaid (OR 1.07, CI = 1.03-1.11). Colocated pharmacists more commonly worked in larger physician practices. When excluding hospital-based pharmacists, 64.4% of colocated pharmacists were in physician practices with 3 or more PCPs (Figure 2).

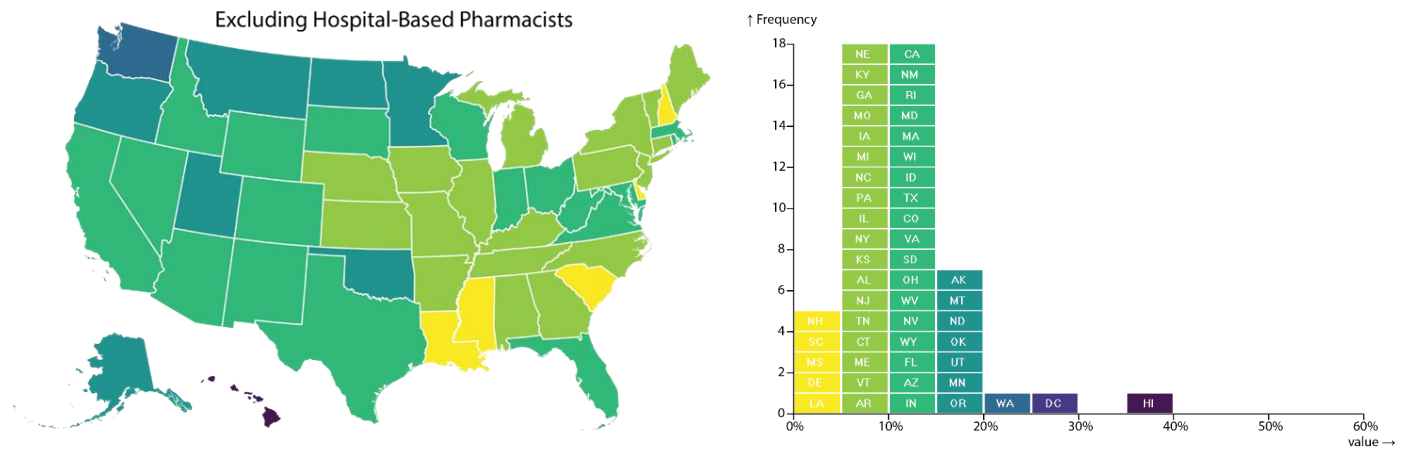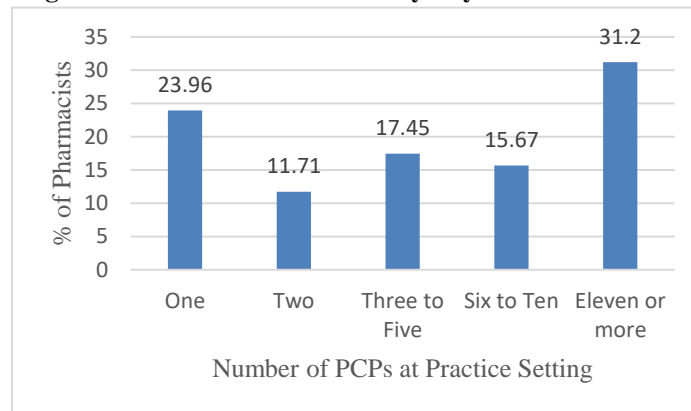**Figure 1. Proportion of Non-Hospital based Pharmacists Colocated with a PCP by State**

Figure 2. Pharmacist Colocation by Physician Practice Size

◆ IV. Discussion

Nationwide, one in ten pharmacists working outside hospitals are colocated with PCPs. This study provides a benchmark for the rate of pharmacist-PCP colocation that can be used to estimate patient access to these interprofessional primary care models. Analyses suggest that pharmacists in urban areas are more likely to be colocated, however, there was considerable variation in the prevalence and distribution across states. Rates of colocation were highest in counties with a higher supply of licensed pharmacists per 100,000 people. Understanding predictors for pharmacist-PCP colocation can provide information to policymakers, payors, and healthcare organizations to bolster colocation.

Scope of Practice: State SOP regulations (e.g. prescriptive authority, use of protocols) appear to influence pharmacist-PCP colocation, with greater colocation seen in states with more expansive SOP. SOP laws vary across states which may impede access to integrated pharmacist-primary care services. Several states have recently adopted or are currently considering incorporating policies to broaden pharmacist scope.[9] As states evaluate chronic disease burden and rural-urban disparities, policymakers could consider supporting policies that offer fuller scope of practice to pharmacists to facilitate greater access to pharmacist-PCP colocation.

Medicaid Expansion: Despite the documented return-on-investment for clinical pharmacy services (e.g. medication management, chronic disease management), reimbursement for clinical services is complex due to a different set of rules for each payer. Although CMS offers very restricted reimbursement for pharmacist services, CMS has encouraged state Medicaid programs to enroll and reimburse pharmacists for clinical care. Several Medicaid expansion states have already included pharmacists in their state plan as "other licensed providers".[10] The results of this analysis suggest that Medicaid expansion increases the likelihood of colocation. Future research should be conducted to evaluate the deployment and payment for pharmacist services in primary care across states. With the shift from fee-for-service to value-based care, there is increasing need to create diverse teams in primary care who are prepared and paid for clinical outcomes.

Practice Size: Colocation is more commonly seen in larger physician practices. Rural practices, which are often smaller in size, may have more difficulty finding and hiring a pharmacist. Creative partnership strategies could be considered to bolster colocation. Connecting smaller practices to academic medical centers, institutions of higher education (e.g. schools of pharmacies), as well as state-wide education collaboratives and practice support networks to share costs can serve as a catalyst to strategically boost primary care workforce and improve healthcare in rural and underserved areas.

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