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## Recruitment and Retention of Primary Care Nurse Practitioners in Underserved Areas: A Scoping Review

**Supakorn Kueakomoldej, MPhil, BSN, RN [PhD Candidate],**

Columbia University School of Nursing

**Eleanor Turi, BSN, RN, CCRN [PhD Student],**

Columbia University School of Nursing

**Amy McMenamain, BSN, RN [PhD Student],**

Columbia University School of Nursing

**Ying Xue, DNSc, RN [Associate Professor],**

Loretta C. Ford Endowed Professorship in Primary Care Nursing, University of Rochester, Rochester, NY

**Lusine Poghosyan, PhD, RN, FAAN [Stone Foundation and Elise D. Fish Professor of Nursing]**

Columbia University School of Nursing and Professor of Health Policy and Management, Department of Health Policy and Management, Mailman School of Public Health, Columbia University, New York, NY

### Abstract

**Background:** The growing nurse practitioner (NP) workforce plays a critical role in primary care delivery in the United States. However, better recruitment and retention of the robust NP workforce in underserved areas are needed; evidence to inform such effort is limited.

**Purpose:** This scoping review aimed to examine the findings, scope, and knowledge gaps of available literature on factors associated with NP recruitment and retention in underserved areas.

**Methods:** This review was guided by Joanna Briggs' Scoping Review Methodology and PRISMA-SCR reporting standards. Literature search for peer-reviewed and gray literature was conducted in six databases.

**Findings:** A total of 22 studies met inclusion criteria. Factors associated with NP recruitment and retention in underserved areas were mapped into five themes, including factors related to: the individual NP, NP education programs/financial aid, organizations employing NPs, the communities NPs work in, and autonomous practice. Majority of the included studies were

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\*Corresponding author: Supakorn Kueakomoldej, MPhil, BSN, RN, 560 W 168<sup>th</sup> St, New York, NY 10032, sk4739@cumc.columbia.edu.

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published before 2010; few used rigorous study designs and analysis methods; and few exclusively studied NPs and unique challenges facing the NP workforce.

**Discussion and Conclusion:** Available studies show that NP recruitment and retention can be addressed by various stakeholders (e.g., educators, policy makers); however, up-to-date, methodologically rigorous, and NP-focused studies are needed.

### Keywords

Nurse practitioner; scoping review; recruitment; retention; workforce; underserved population; underserved area

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Primary care, a critical sector of the United States healthcare system, improves health outcomes and reduces mortality across the lifespan (National Academy of Medicine, 2021; Starfield et al., 2005). Despite its merits, the nation continues to struggle with inadequate primary care access and persistent workforce shortages. These issues may be aggravated as the 65 and older population increases (Dall et al., 2020) and efforts to increase healthcare access, such as the executive order to strengthen Medicaid and the Affordable Care Act (Exec. Order No. 14009, 2021), expand healthcare coverage among Americans.

The healthcare workforce shortage is worse in certain geographic areas, and may be attributed to maldistribution, where providers are concentrated in metropolitan areas and insufficient in rural and/or low-income areas (Naylor et al., 2019). The consequences of this maldistribution are especially concerning as individuals in these underserved communities have poorer health and may need more healthcare services to maintain their health. For example, rural residents are more likely to be older, obese, low-income, and use tobacco compared to residents in metropolitan areas (Meit et al., 2014; US Department of Agriculture, 2021).

The growing nurse practitioner (NP) workforce is a solution to meeting the nation's primary care demands and increasing access to care. The NP workforce grew by 109% from 2010–2017 (Auerbach et al., 2020), and is projected to continue growing at 6.8% annually (Auerbach et al., 2018). NPs provide cost-efficient and high-quality care with comparable or better outcomes than physician care (Muench et al., 2019; Swan et al., 2015). Compared to physicians, NPs are also more likely to work in underserved areas and care for vulnerable populations, including rural, non-white, and Medicare-Medicaid dual-eligible patients (Buerhaus et al., 2018; DesRoches et al., 2013). While physician supply has decreased in rural and low-income areas, the supply of actively practicing NPs has grown (Xue et al., 2019).

Despite their propensity for working with underserved populations, the NP workforce is also experiencing a degree of maldistribution. Although the NP workforce has and will continue to grow, the robust NP supply is not well-reflected in underserved areas. For example, in a sample of rural health clinics, half of the clinics reported difficulty recruiting NPs (Wright et al., 2015). Nationwide, 50% of community health centers—safety net institutions caring for underserved populations—reported at least one NP position vacancy, with an average of five months to fill a vacancy (National Association of Community Health Centers, 2016). More

primary care NP graduates have chosen to work in private practices compared to community health or federally qualified health centers (Faraz & Salsberg, 2019).

By ensuring that the robust NP workforce is well-distributed to areas with the most need, NPs' impact in increasing primary care access and reducing health disparities can be maximized. To develop strategies to improve NP distribution, it is important to first understand what factors help to recruit and retain NPs in underserved areas. This knowledge, however, is limited. Majority of studies on clinician recruitment and retention in underserved areas focus on physicians and physician assistants (Goodfellow et al., 2016; MacQueen et al., 2018; Rabinowitz et al., 2000; Smith et al., 2012; Walker et al., 2010; Yuen & Lessard, 2018). While these studies produce critical insights, they cannot be fully utilized to inform recruitment and retention strategies for NPs as NPs have unique professional attributes, such as state-level scope of practice policies that determine NPs' ability to independently deliver care to patients (American Association of Nurse Practitioners, 2021).

Currently, no synthesis of evidence on recruitment and retention of NPs in underserved areas exist, and little is known about the content, scope, and gaps of this literature. Thus, we conducted a scoping review. Scoping reviews are ideal to provide an overview of extant knowledge, especially for an unexplored body of literature (Munn et al., 2018; Peters et al., 2015, 2020; Pollock et al., 2021). More specifically, the purpose of this scoping review is to 1) map factors associated with NP recruitment and retention in underserved areas from available literature; 2) examine the characteristics and scope of current literature (e.g., study designs, populations studied); and 3) assess gaps and discuss implications for future studies.

## Method

We followed the Joanna Brigg's scoping review framework (Peters et al., 2015) and results are reported according to the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analysis extension for Scoping Reviews) reporting guidelines (Tricco et al., 2018) (see supplementary materials for PRISMA-ScR reporting checklist). The Population-Concept-Context framework (Peters et al., 2015) was used to inform the inclusion criteria and search strategies for studies (Table 1). An *a priori* protocol was developed and uploaded to Open Science Framework website (Kueakomoldej, 2021). Unlike systematic reviews which focus on appraisal and synthesis of findings for targeted research questions, scoping reviews prioritize breadth in their inclusion criteria to fully understand the range of evidence available (Peters et al., 2015, 2020). Studies are included regardless of quality, and appraisal of individual studies are usually not completed with scoping reviews (Peters et al., 2015).

## Eligibility Criteria

Studies were included in this review if they examined factors associated with recruitment and/or retention of primary care NPs in underserved areas. Informed by recruitment and retention studies in extant literature, *recruitment* was defined as attracting or placing NPs in positions in underserved areas (MacQueen et al., 2018; Walker et al., 2010); *retention* was defined as keeping NPs in positions in underserved areas (Rabinowitz et al., 2001). Recruitment and retention can be measured by either objective measures (e.g., retention

rate, employment time) or subjective report (e.g., practice location decision, intent to stay in underserved area). NPs studied must provide direct patient care in the primary care setting; studies examining NPs in acute care settings, education, or non-patient facing roles were excluded.

In our review, underserved areas refer to settings frequently faced with primary care provider shortages, more specifically: a) settings with Health Professional Shortage Area (HPSA) status—a federal designation identifying areas, populations, or facilities with health professional shortages (Health Resources and Services Administration, 2021); b) rural areas including rural health clinics; and c) health centers caring for underserved populations, such as federally qualified and community health centers. To best understand the scope of extant literature, we did not restrict our search by timeframe. Also, studies did not need to exclusively focus on NPs (e.g., NPs may be studied collectively with other providers).

Relevant peer-reviewed quantitative, qualitative, and mixed method studies were considered for inclusion. Gray literature was also included to maximize breadth of search and understanding of the literature body. Gray literature had to report empirical data (e.g., dissertation, program reports and evaluations) to be considered; editorials and expert opinions were excluded. Only U.S. studies were included due to vast regulatory and cultural differences between NPs in different countries (Pulcini et al., 2010; Sheer & Wong, 2008).

### Information Sources and Search Strategy

After search strategy consultation with a library informationist, a comprehensive literature search was completed in six databases: PubMed, Embase, Scopus, CINAHL, PsycINFO, and ProQuest (see complete search strategy in supplementary materials). Gray literature hand search, using a combination of terms in Table 1, was completed in Google, Google Scholar, Agency for Healthcare and Research Quality (AHRQ) website, EvidenceNOW, and relevant NP association websites such as American Association of Nurse Practitioners ([www.AANP.com](http://www.AANP.com)). Included studies' reference lists were also searched for additional studies. Results were imported into Covidence, a review management program (Veritas Health Innovation, n.d.), for screening and data management.

### Study Selection and Data Extraction

Literature search retrieved 2351 articles. After duplicate removal, 1185 abstracts were screened, and then, 45 full-text articles were assessed for eligibility. Seven additional studies were found from reference lists of eligible studies and gray literature search (see Figure 1 for PRISMA diagram). Studies were independently screened by SK and AM; discrepancies were discussed and conflicts were resolved with a third author (ET). A total of three meetings were held to discuss conflicts. Data were independently extracted by SK and ET using a standardized form. After all studies were extracted, data were reviewed and conflicts were resolved with discussion by the two authors. A third author (LP) was available for any unresolved conflicts.

The data extraction form included author information, year published, study design, analysis method, purpose, study sample, setting, measure of recruitment/retention, and key findings. Factors found to influence NP recruitment and retention in underserved areas were grouped

together into common themes by the researchers. The findings were then discussed narratively in the Results section, tabulated in Table 2, and visually mapped in Figure 2. In this review, *clinicians* refer to study samples that included healthcare professionals beyond NPs (e.g., physicians, physician assistants, nurses).

## Results

### Description and Scope of Included Studies

A total of 22 articles were included in this review. Out of these 22 studies, nine were gray literature (Andrus & Fenley, 1976; Bailey, 1997; Flinter, 2011; Gilman, 2013; Holland et al., 2019; Negrusa et al., 2014; Pathman, Fannell, et al., 2012; Pathman, Konrad, et al., 2012; Ryan et al., 1986) and 13 remaining were peer-reviewed articles. Of the peer-reviewed articles, ten studies were quantitative, two were qualitative, and one was mixed methods. The majority of quantitative studies were cross-sectional (8/10) and two were cohort studies (Daniels et al., 2007; Doyle et al., 2017). Publication date ranged from 1976–2019; most (12/22) of the studies were published before 2010, only one study was published within the past three years (Holland et al., 2019). Majority of the studies inclusively examined recruitment and retention of different healthcare professions (e.g., NPs, physicians, and physician assistants were studied together). Only eight out of the 22 included studies examined recruitment and retention of NPs exclusively (Andrus & Fenley, 1976; Doyle et al., 2017; Flinter, 2011; Holland et al., 2019; Kippenbrock et al., 2004; Ryan et al., 1986; Spetz et al., 2017; Sullivan et al., 1978).

### Overview of Findings

Factors associated with NP recruitment and retention in underserved areas were mapped into five themes, including factors related to the individual NP, NP education programs and financial aid, organizations employing NPs, the communities NPs work in, and NPs' autonomous practice. Studies most frequently focused on NP training (9 studies) and background (8 studies) in underserved areas.

**Factors Related to the Individual Nurse Practitioner**—A total of 10 studies demonstrated associations between working in underserved areas and clinicians' individual factors—including background, demographic characteristics, and personal mission to serve (Andrus & Fenley, 1976; Daniels et al., 2007; Fowkes et al., 1994; Hafferty & Goldberg, 1986; Li et al., 1995; Lindsay, 2007; Negrusa et al., 2014; Pathman, Fannell, et al., 2012; Pathman, Konrad, et al., 2012; Ryan et al., 1986). Eight studies found that clinicians who grew up in rural or underserved areas were more likely to practice and stay in such areas (Andrus & Fenley, 1976; Daniels et al., 2007; Fowkes et al., 1994; Hafferty & Goldberg, 1986; Lindsay, 2007; Pathman, Fannell, et al., 2012; Pathman, Konrad, et al., 2012; Ryan et al., 1986). Three studies found that demographic characteristics including older age, whether one has children, and White race were associated with retention in underserved areas (Negrusa et al., 2014; Pathman, Fannell, et al., 2012; Pathman, Konrad, et al., 2012).

Four studies found associations between clinicians' personal mission to serve underserved populations and their recruitment/retention in underserved areas (Daniels et al., 2007; Li

et al., 1995; Pathman, Fannell, et al., 2012; Pathman, Konrad, et al., 2012). Researchers discovered themes of moral conviction and strong sense of service when exploring why clinicians chose to work with underserved populations (Li et al., 1995). Daniels et al. also found that clinicians' mission to serve significantly influenced their decision to choose rural areas as their first practice location ( $OR = 1.7$ ;  $CI\ 95\% [1.0, 2.7]$ ) (Daniels et al., 2007).

#### **Factors Related to Nurse Practitioner Education Programs and Financial Aid**

—A total of 13 studies examined the association between education-related factors and recruitment and retention of NPs and other clinicians in underserved areas (Andrus & Fenley, 1976; Daniels et al., 2007; Doyle et al., 2017; Edwards et al., 2006; Flinter, 2011; Fowkes et al., 1994; Hafferty & Goldberg, 1986; Holland et al., 2019; Kippenbrock et al., 2004; Negrusa et al., 2014; Pathman, Fannell, et al., 2012; Pathman, Konrad, et al., 2012; Ryan et al., 1986). Nine studies showed that programs that emphasized training and curriculum in underserved areas had high success in deploying their graduates to, and keeping them in, underserved areas (Andrus & Fenley, 1976; Daniels et al., 2007; Doyle et al., 2017; Edwards et al., 2006; Flinter, 2011; Fowkes et al., 1994; Hafferty & Goldberg, 1986; Holland et al., 2019; Ryan et al., 1986). Participants with clinical or practicum experiences in rural areas had 2.7 times higher odds of choosing rural versus urban as their first practice location ( $OR = 2.7$ ;  $CI\ 95\% [1.6, 4.8]$ ) (Daniels et al., 2007). In fact, when training location was examined with other variables (e.g., age, sex, marital status), only training location significantly predicted practice in underserved areas while other variables did not (Hafferty & Goldberg, 1986).

Five studies examined the impact of educational financial aid (i.e., loan repayment, scholarship) on clinician recruitment and retention (Daniels et al., 2007; Kippenbrock et al., 2004; Negrusa et al., 2014; Pathman, Fannell, et al., 2012; Pathman, Konrad, et al., 2012). In Daniels et al., clinicians reported that financial aid obligations influenced their decision to work in rural practices ( $OR = 1.9$ ;  $95\% CI [1.3, 2.9]$ ) (Daniels et al., 2007). However, financial aid may not be the dominant factor attracting clinicians to underserved settings. In a study of rural Arkansas NPs, only 37% of NPs reported that they chose to practice in rural areas because of loan repayment obligation (Kippenbrock et al., 2004). Another study surveyed clinicians in the National Health Service Corps (NHSC), a scholarship and loan repayment program for clinicians working in underserved areas (Health Resources and Services Administration, 2020). The researchers found that NHSC clinicians who were motivated to practice in underserved areas due to financial support were less likely to anticipate staying in their service sites over time (Pathman, Fannell, et al., 2012).

#### **Factors Related to the Organization Employing Nurse Practitioners**

—A total of six studies (Aysola et al., 2015; Gilman, 2013; Pathman, Fannell, et al., 2012; Pathman, Konrad, et al., 2012; Scarbrough et al., 2016; Sinclair-Lian et al., 2008) examined the associations between clinician recruitment and retention in underserved areas and organizational factors. Organizational factors included attributes of the healthcare organizations employing clinicians (e.g., practice environment) and benefits offered by the organization (e.g., availability of professional development program, salary).

Issues related to practice environment—including good relationships with administration, job recognition, and adequate and competent support staff—influenced clinicians' retention in underserved areas in four studies (Gilman, 2013; Pathman, Fannell, et al., 2012; Pathman, Konrad, et al., 2012; Scarbrough et al., 2016). Three studies found that satisfaction with salary influenced clinicians' retention in underserved communities (Gilman, 2013; Pathman, Fannell, et al., 2012; Scarbrough et al., 2016). Organization-based professional development programs, such as career-ladder incentives and research partnerships (Aysola et al., 2015; Sinclair-Lian et al., 2008), also increased clinician recruitment and retention in underserved areas. Community health centers with career ladder programs reported less difficulty in recruiting (17.6% vs 10.6%,  $p = .01$ ) and retaining (39.4% vs 21.2%,  $p = .0001$ ) clinicians compared to health centers without such programs (Aysola et al., 2015). Clinicians also reported that availability of professional development opportunities significantly influenced their intention to stay in their jobs (Gilman, 2013; Scarbrough et al., 2016).

**Factors Related to Communities where Nurse Practitioners Work**—A total of eight studies found associations between community factors and clinicians' recruitment/retention in underserved areas (Bailey, 1997; Daniels et al., 2007; Gilman, 2013; Lindsay, 2007; Negrusa et al., 2014; Pathman, Fannell, et al., 2012; Pathman, Konrad, et al., 2012; Spetz et al., 2017). Community characteristics—including size, crime rate, cost of living, rurality, and income level—impacted clinicians' decision to work and stay in underserved areas in seven studies (Bailey, 1997; Daniels et al., 2007; Gilman, 2013; Negrusa et al., 2014; Pathman, Fannell, et al., 2012; Pathman, Konrad, et al., 2012; Spetz et al., 2017). Clinicians working in rural communities had higher retention compared to those in urban communities (Pathman, Fannell, et al., 2012; Pathman, Konrad, et al., 2012; Spetz et al., 2017). However, findings conflicted for community income level and clinician retention: One study found that communities with higher per-capita income were associated with increased NP and physician assistant retention (Bailey, 1997), while another study found that communities that are poorer and less educated had higher clinician retention (Negrusa et al., 2014). Three studies also reported that clinicians practiced and stayed in underserved areas because of their fit, belonging, and relationship with the communities they work with (Gilman, 2013; Lindsay, 2007; Pathman, Fannell, et al., 2012).

**Factors Related to Nurse Practitioners' Autonomous Practice**—In three studies, clinicians reported that autonomous and full scope of practice were associated with their decision to practice and stay in underserved areas (Lindsay, 2007; Pathman, Konrad, et al., 2012; Sullivan et al., 1978). Participants from the study by Lindsay (2007) reported preferring rural areas because of the higher “depth and breadth” to practice (p.74), ability to make independent decisions, and expansion of skills when faced with a wide variety of patient conditions. NHSC clinicians reported that being able to work to their fullest scope of practice influenced their decision to stay in underserved areas after their contract ended (Pathman, Konrad, et al., 2012).

## Discussion

Our scoping review aimed to map, scope, and assess gaps in the literature of factors influencing recruitment and retention of NPs in underserved areas. This review included

a total of 22 studies. Factors influencing NP recruitment and retention in underserved areas were mapped into five themes relating to: 1) the individual NP (e.g., background in underserved areas); 2) NP education programs and financial aid (e.g., training in underserved areas, loan repayment); 3) organizations employing NPs (e.g., practice environment, salary); 4) the communities NPs work in (e.g., community characteristics); and 5) autonomous practice (e.g., full scope of practice). This map of studies demonstrates that factors influencing NP recruitment and retention in underserved areas are broad and multileveled, from individual factors to community characteristics. NP recruitment and retention efforts may be initiated by stakeholders at various levels, including educators, practice administrators, and legislators. For example, educators can increase selection of students from underserved backgrounds and design curriculum focused on underserved populations. Practice administrators can implement professional development programs and ensure positive work environments. Legislators can support full scope of practice to attract NPs to underserved areas.

Scope of the literature was assessed in regard to study design, publication date, analysis method, and populations studied. We found that this literature is outdated, lacks robust study designs, and few studies focus exclusively on NPs—these characteristics are also gaps of the extant literature. The majority of the studies were conducted before 2010; outdated studies do not consider the implications of recent changes affecting healthcare workforces (e.g., the Affordable Care Act, recent expansions of scope of practice regulations). In addition, many studies are cross-sectional and provide only descriptive results. Also, of the 22 included studies, only eight studies have NP-only samples. Studies frequently surveyed NPs along with other clinicians, neglecting an NP-predominant perspective (i.e., the NP viewpoint may be lost when they are studied with other healthcare professionals). Although our map of studies demonstrates the breadth of factors influencing NP recruitment and retention in underserved areas, current and NP-focused studies with strong designs are needed to expand the literature and produce more compelling evidence.

Having an underserved background (i.e., growing up in underserved areas) and educational training focused on underserved communities were factors most often associated with NP recruitment and retention in underserved areas. These findings are consistent with literature demonstrating that among other primary care providers (i.e., physicians and physician assistants), underserved background and training also predict whether these providers practice in underserved areas (Goodfellow et al., 2016; MacQueen et al., 2018; Rabinowitz et al., 2000; Smith et al., 2012; Walker et al., 2010; Yuen & Lessard, 2018). We also found that autonomous and fuller scope of practice influenced NPs' decision to work and stay working in underserved areas, corroborating with Xue and colleagues' findings that states with less restrictive scope of practice regulations have increased NP number (Xue et al., 2016).

Our review found that the general practice environment (e.g., good administration, adequate support staff) was associated with recruitment and retention of clinicians in underserved areas. However, included studies did not specifically examine the practice environment of NPs in underserved areas. The NP practice environment contains distinct aspects unique to the profession, such as visibility and acceptance of the NP role (Poghosyan et al.,



2017). Studying NP practice environment and understanding its effect specifically on NP recruitment and retention can help administrators create modifiable, organization-level strategies tailored for their practices. Other issues distinct to the NP profession may also affect NPs' recruitment and retention to underserved areas, such as equitable reimbursement rates. Medicaid reimbursement for NP services ranges from 75–100% of the physician rate (Kaiser Family Foundation, n.d.), yet, NPs have higher odds of working in states that reimburse NPs at 100% of the physician rate (Barnes et al., 2017). Future studies examining these NP-unique issues will help to deepen our knowledge to improve NP recruitment and retention in underserved areas.

Our findings also raise considerations for current policies. As underserved background is frequently associated with underserved practice, certain policies may have implications on recruitment and retention of NPs in underserved areas. One example is the DNP degree requirement for NP practice. In 2004, the American Association of Colleges of Nursing recommended the doctoral-level DNP degree as the standard educational preparation for advanced practice nurses in place of masters-level MSN degrees (American Associations of Colleges of Nursing, 2004). Despite the benefits, DNP programs are more cost and time intensive compared to MSN programs (McCauley et al., 2020), and may be prohibitive for prospective NP students from underserved backgrounds. As NPs from underserved backgrounds are more likely to work in underserved areas, the DNP degree requirement may impact the number of future NPs working in underserved communities.

The influence of clinicians' education and training on practice in underserved areas has been well-acknowledged by policymakers; several policies and grants exist to increase clinician training and number in underserved settings. One prominent example for NPs is the Advanced Nursing Education Workforce (ANEW) grant, awarded to schools to prepare NPs for practice in underserved communities (Health Resources & Services Administration, n.d.). Grants such as ANEW, however, may reach only a select number of schools and students. NP education leaders and researchers should consider the impact of prioritizing underserved population-focused curriculum throughout NP programs nationally, which may increase the number of NPs working in underserved areas.

## Limitations

Our review has limitations. To prioritize breadth in our inclusion criteria, we included studies that examined recruitment and retention of NPs along with other clinicians; thus, our map of findings may not accurately reflect the NP perspective or viewpoint. Second, the decision to exclude international studies was due to regulatory differences governing NP practice in different countries—insights from other countries may have been overlooked due to this exclusion. Lastly, critical appraisal of included studies was not conducted. Although not required in the scoping review methodology, lack of quality appraisal may limit comprehensive understanding of the literature body's quality (e.g., bias, reliability, validity of studies). Also, due to lack of quality appraisal, the synthesis of findings in this scoping review should not be used to inform practice changes but rather to inform further research and investigation efforts (Munn et al., 2018; Peters et al., 2020). However, this

approach is consistent with the methodology of scoping reviews (Peters et al., 2020; Pollock et al., 2021).

## Conclusion

The factors influencing NP recruitment and retention in underserved areas are broad and multileveled; several avenues exist for educators, practice administrators, and policymakers to address this issue. However, literature in this area is developing and there is a lack of current, robust, and NP-focused studies. Future studies closing these gaps can provide strong evidence to improve NP distribution in underserved areas, maximize the robust NP supply, and optimize NPs' contribution to equalizing primary care access and mitigating health disparities.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Declaration of Competing Interest

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## CRedit Statement

Author	Tasks
S. Kueakomoldej	Conceptualization, analysis, writing-original draft
E. Turi	Analysis, writing-original draft, writing-reviewing and editing
A. McMenamin	Analysis, writing-original draft, writing-reviewing and editing
Y. Xue	Writing-reviewing and editing
L. Poghosyan	Writing-reviewing and editing

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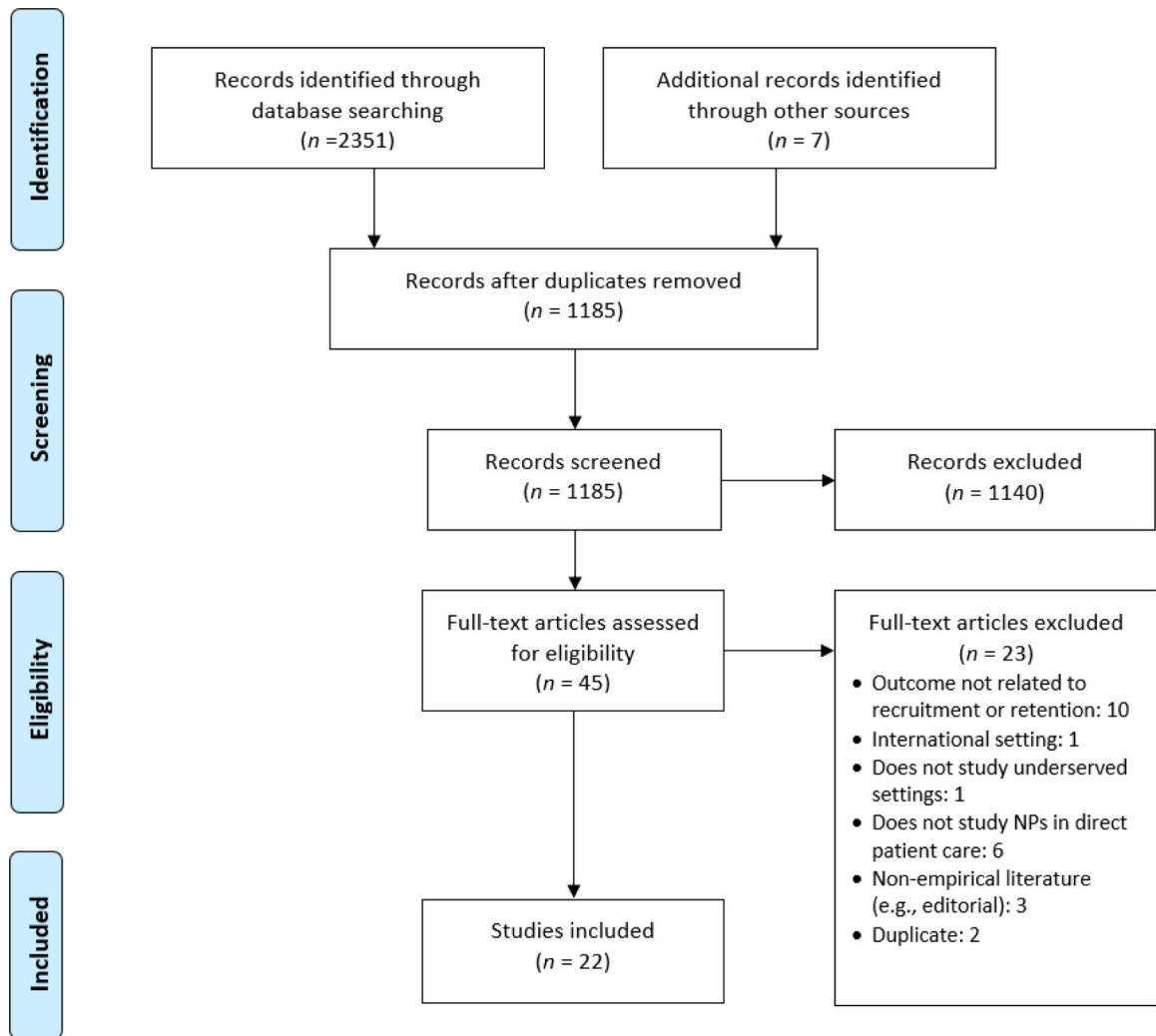
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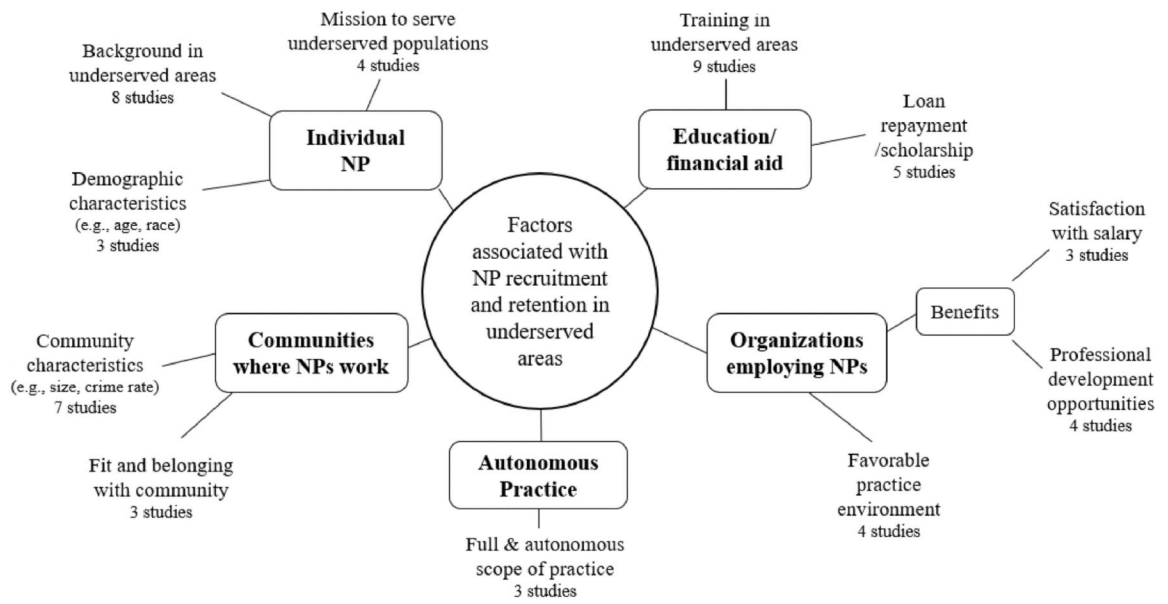
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**Figure 1.**  
PRISMA Diagram



**Figure 2.**  
 Map of Factors Associated with NP Recruitment and Retention in Underserved Areas  
*Note.* NP = nurse practitioner.



**Table 1.**

## Population-Concept-Context Framework

Criteria	Concept	Search terms
Population	Nurse practitioner	Nurse practitioner, NP, advanced practice nurse, APN
Concept	Recruitment and retention	Recruitment, retention, stay, practice, staffing, turnover, quit, relocate, remain, retain
Context	Underserved areas	Underserved, health professional shortage area (HPSA), rural, rural health clinics, indian, tribal, federally qualified health centers, community health centers, remote
	Primary care	Primary care, family practice, general practice

*Note.* Population-Concept-Context Framework from Peters et al. (2015)

Table 2.

## Summary of Reviewed Articles

Author (year)	Study design	Analysis method	Purpose of study	Sample and setting	Measure of recruitment and/or retention	Key findings associated with recruitment and/or retention
Andrus & Fenley (1976)	Program Report/Evaluation	Descriptive statistics	Describe and evaluate a rural NP training program	10 NP graduates from rural California counties at UC Davis NP training program, evaluated years 1970–1976	Practice in rural area	<ul style="list-style-type: none"> <li>NP training program that focused on recruiting rural students and preceptors, training with underserved populations, and decentralized clinicals (moving training sites away from urban/metropolitan areas to more rural areas) had success in keeping NPs working in their rural communities</li> <li>All (10/10) rural NP graduates from the program worked in the same rural communities they have previously lived and worked in for several years</li> </ul>
Aysola et al. (2015)	Cross-sectional	Multivariable analysis	Evaluate the effectiveness of 1) health professional training program, 2) area health education center program, and 3) career ladder program on provider recruitment and retention	391 CHCs (employing NPs) in the United States	Practice-reported difficulty in primary care provider recruitment and retention	<ul style="list-style-type: none"> <li>CHCs with career ladder programs reported less difficulty with provider recruitment compared to CHCs without career ladder program</li> <li>CHCs with career ladder programs reported less difficulty retaining providers compared to those without programs</li> </ul>
Bailey (1997)	Mixed Methods	Quant: Multivariable analysis Qual: Inductive analysis	Assess the characteristics of communities that maintain access to care and the characteristics of NPs and PAs that practice in these communities	500 community residents, 11 NPs and 19 PAs from frontier communities in Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming	NP/PAs practiced for three or more years in a frontier community vs left before three years	<ul style="list-style-type: none"> <li>Communities with good leadership and higher per capita income are more likely to be successful in retaining NPs and PAs</li> </ul>
Daniels et al. (2007)	Longitudinal cohort	Multivariable analysis	Examine factors associated with recruitment and retention of health care	765 health professional program graduates from University of	Whether participant's first employment is rural or moved to	<ul style="list-style-type: none"> <li>Factors important in choosing rural practice included clinician's desire to serve community, rural background,</li> </ul>

Author (year)	Study design	Analysis method	Purpose of study	Sample and setting	Measure of recruitment and/or retention	Key findings associated with recruitment and/or retention
			professional graduates	New Mexico (incl. MDs, NPs, PAs.)	rural if previously urban, and whether rural participant stayed rural	<p>participation in rural training, loan forgiveness/financial aid obligation, preference for smaller community size, and return to hometown</p> <ul style="list-style-type: none"> <li>Factors important in staying rural include community size and return to hometown</li> </ul>
Doyle et al. (2017)	Retrospective cohort	Descriptive statistics	Assess the effectiveness of the Advanced Nursing Education Expansion (ANEE) program.	26 ANEE program grantees and 172 NP graduates	Practice location after graduation	<ul style="list-style-type: none"> <li>ANEE program was created to increase number of NPs in primary care, 40.8% of training sites were in underserved areas</li> <li>15.1% of ANEE graduates work in rural communities; 44.8% work in areas with HPSA designation</li> </ul>
Edwards et al. (2006)	Cross-sectional	Descriptive statistics	Examine the effect of East Tennessee State University's Title VII & VIII programs to promote interest in rural/underserved practices	371 family medicine and 342 NP program graduates from East Tennessee State University	Practice location of graduates	<ul style="list-style-type: none"> <li>Title VII and VIII helped to create educational programs that increase clinical experiences in rural and other underserved communities</li> <li>80% of NP graduates from this program work in HPSA or other underserved areas; 38% of NP graduates work in rural areas</li> </ul>
Flinter (2011)	Program Report/Evaluation	Descriptive statistics	Describe and evaluate an NP residency program in a FQHC	16 NP residents at an FQHC in Connecticut	Practice in FQHC after graduation	<ul style="list-style-type: none"> <li>CHC Inc's NP residency program included precepted clinics, specialty rotation, quality improvement, and didactic sessions to improved transition to practice in FQHCs. NP residents train under a CHC NP or physician.</li> <li>15/16 NP residents practiced in a FQHC after graduation</li> </ul>
Fowkes et al. (1994)	Mixed methods	Quant: Descriptive statistics and	Describe and evaluate the effectiveness of	51 NP, PA, and nurse midwife	Quant: Program success	<ul style="list-style-type: none"> <li>Background/ experience in underserved</li> </ul>

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Author (year)	Study design	Analysis method	Purpose of study	Sample and setting	Measure of recruitment and/or retention	Key findings associated with recruitment and/or retention
		bivariate analysis Qual: No information provided	training programs in preparing graduates for practice in underserved areas	training programs in the US that prepare graduates for practice in underserved areas (43 PA, NP, and CNM graduates interviewed)	defined as >60% of graduates in primary care and >25% in HPSA practices; towns with <10,000 population, or >60% serving in other underserved areas. Qual: Decision to practice in underserved area	<ul style="list-style-type: none"> <li>areas and minority language background were graduates' most frequently cited motivations for working in underserved areas</li> <li>Programs with dedication to underserved populations, training in underserved areas, and rural-health focused curriculum were more likely to be successful (as previously defined)</li> </ul>
Gilman (2013)	Program Report/ Evaluation	Descriptive statistics	Examine what draws health professionals to working in Delaware, what factors attract them to Delaware's underserved areas, and what factors retain those who participate in obligatory health care recruitment programs	38 healthcare professionals (including MDs, NPs, PAs) in Delaware who participated in obligatory health care recruitment programs (NHSC, Delaware state loan repayment program, J1 visa)	Whether participant stays or relocates after end of obligatory service	<ul style="list-style-type: none"> <li>Participants reported cost of living, quality of life, crime rate, and family-oriented setting as the most important community-oriented factors in their decision to stay</li> <li>Participants reported competitive salary, satisfactory contract terms, availability of support staff, use of technology, relationship with patients, recognition of effort, and growth opportunities as the most important job-oriented factors in their decision to stay</li> </ul>
Hafferty & Goldberg (1986)	Cross-sectional	Multivariable analysis	Examine how different training pathways place NPs and PAs in targeted areas	210 NP and PA students from the Primary Care Associate Program created to train primary care NPs and PAs for underserved areas in California	Working within the area that NPs or PAs resided in before entering the program	<ul style="list-style-type: none"> <li>Training/preceptorship close to graduate's home residence and employment with their preceptor increase likelihood that NP/PA graduates will practice in that area</li> <li>Personal variables (e.g., age, sex, marital status) did not predict retention when training was controlled for</li> <li>Having satellite training sites in rural/underserved areas close to graduate's home may improve likelihood for</li> </ul>

Author (year)	Study design	Analysis method	Purpose of study	Sample and setting	Measure of recruitment and/or retention	Key findings associated with recruitment and/or retention
						NP/PA student to stay in underserved areas
Holland et al. (2019)	Program Report/ Evaluation	Descriptive statistics	Describe and evaluate the Rural Primary Care Scholars Initiative curriculum to prepare NPs for rural practice in Alabama	47 NP program graduates from the Rural Primary Care Scholars Initiative in rural Alabama	Employment as NPs in rural Alabama	<ul style="list-style-type: none"> <li>NP students who participated in the Rural Primary Care Scholars Initiative program received additional placement hours with rural providers, mentoring from faculty who are experts in rural and underserved populations, training in leadership and health policy issues, and networking with rural providers</li> <li>80% of program graduates are serving in rural Alabama</li> </ul>
Kippenbrock (2004)	Cross-sectional	Descriptive statistics	Examine factors associated with NP employment in rural areas	121 NPs in rural Arkansas	Selection of employment in rural area	<ul style="list-style-type: none"> <li>37% of sample reported loan repayment as a factor in choosing rural employment</li> </ul>
Li et al. (1995)	Qualitative, focus groups	Thematic analysis	To understand the rationale behind career choices for healthcare providers who work with underserved populations	24 providers (MDs, NPs, PAs and dentist) in Salt Lake City, Utah	Decision to work with underserved populations	<ul style="list-style-type: none"> <li>Providers chose to work with underserved populations because of their moral conviction, strong sense of service; they enjoyed the challenge of holistically addressing patients' needs under limited resources.</li> </ul>
Lindsay (2007)	Qualitative, semi-structured interviews	Thematic analysis	Explore experience of NPs and PAs by gender and geographic area	55 NPs, PAs, and nurse anesthetists in New York and Pennsylvania	Decision to work in current location (rural vs urban)	<ul style="list-style-type: none"> <li>Providers were attracted to rural areas because of the rewarding work environment and appreciation from patients; greater independence, fewer "turf issues" and broad scope of practice; and their community and family ties</li> </ul>
Negrusa et al. (2014)	Program Report/ Evaluation	Multivariable analysis	Examine NHSC clinicians' retention in high-need areas	1 <sup>st</sup> dataset: 8,973 NHSC participants; over 1 million	Serving in the same HPSA and same county or	<ul style="list-style-type: none"> <li>Retention in HPSA area increases with age</li> </ul>

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Author (year)	Study design	Analysis method	Purpose of study	Sample and setting	Measure of recruitment and/or retention	Key findings associated with recruitment and/or retention
			after completion of their program, and characteristics contributing to retention	non-NHSC providers 2 <sup>nd</sup> dataset: 18,500 NHSC participants including MDs, NPs, PAs, social workers, dentists	another HPSA in a different county after completion of NHSC program	<ul style="list-style-type: none"> <li>Higher NHSC provider retention in poorer and less educated communities</li> <li>NSHC participant less likely to remain in same HPSA area compared to non-NHSC participants, however, when NHSC participants often relocate from one HPSA area to another HPSA area; NHSC participants have higher long-term retention after initial relocation</li> </ul>
Pathman, Fannell et. al (2012)	Program Report/ Evaluation	Multivariable analysis	Examine practice, clinician, and experience factors associated with clinicians' intention to remain at retention program sites	996 clinicians from NHSC and other similar state-run clinician retention programs, including MDs, NPs, PAs	Anticipated intention to remain at service site for 1, 2, 3, and up to 10 years after end of service term	<ul style="list-style-type: none"> <li>Some states reported higher rural vs urban anticipated retention</li> <li>Anticipated retention was associated with clinicians' age (&gt;29 years), race (non-Hispanic white), whether they have children, and whether they grew up/trained in area</li> <li>Clinicians who reported being motivated by working with the underserved anticipated longer retention</li> <li>Clinicians motivated by financial support were less likely to anticipate retention</li> <li>Being satisfied with the practice's administration, salary/income, and access to specialists are associated with higher anticipated retention</li> <li>Clinicians who report community belonging, family safety, and spousal belonging also are more likely to report anticipated retention</li> </ul>
Pathman, Konrad et al. (2012)	Program Report/ Evaluation	Multivariable analysis	Assess short, medium, and long term retention rates	2,731 NHSC clinicians and alumni including	Remaining in NHSC practice after completion of	<ul style="list-style-type: none"> <li>Higher retention for participants in rural vs urban settings</li> </ul>

Author (year)	Study design	Analysis method	Purpose of study	Sample and setting	Measure of recruitment and/or retention	Key findings associated with recruitment and/or retention
			and factors associated with retention for NHSC clinicians	MDs, NPs, PAs, dentists, etc.	program or leaving but working in other underserved practices	<ul style="list-style-type: none"> <li>Retention is associated with: practice in a community where participant lived/trained; fit with professional, personal, and family needs; reported motivation to work in underserved areas; busy practice settings; older age; satisfaction with administration relationship, clinician support, and working at full scope of practice</li> </ul>
Ryan et al. (1986)	Program Report/Evaluation	Descriptive statistics	Describe and evaluate Georgia Southern College's program to prepare NP students for rural practice	28 NP graduates from Georgia Southern College's rural NP program	Employment in rural area	<ul style="list-style-type: none"> <li>The college's NP program that recruited students based on ties to rural community and focused on rural practice training have success in placing students in underserved practices (22/28 or 79% graduates are working in underserved rural areas)</li> </ul>
Scarborough et al. (2016)	Cross-sectional	Descriptive statistics and bivariate analysis	Assess NHSC clinicians' preference for retention strategies	66 NHSC clinicians in Texas	Preference for retention strategies by NHSC clinicians	<ul style="list-style-type: none"> <li>Clinicians' ranked preference for retention strategies were: 1) competitive salary, 2) professional development, 3) knowledgeable/competent support staff, 4) professional support</li> </ul>
Sinclair-Lian et al. (2008)	Cross-sectional	Descriptive statistics and bivariate analysis	Examine the association between membership in a PBRN and clinician employment time	95 clinicians (incl. MDs, NPs, PAs) in New Mexico	Quantitative: Mean employment time in underserved practices	<ul style="list-style-type: none"> <li>Clinicians who are members of PBRN have longer employment time compared to non-members (7yrs vs 4yrs)</li> </ul>
Spetz et al. (2017)	Cross-sectional	Descriptive statistics and bivariate analysis	Compare urban and rural primary care NPs and examine factors that may influence their supply in rural regions	13,000 NPs from the 2012 National Sample Survey of Nurse Practitioners	Plan to leave position within 1–2 years	<ul style="list-style-type: none"> <li>NPs in small and isolated rural areas reported less intention to leave their position compared to NPs in urban areas</li> <li>Rural NPs more often reported that</li> </ul>

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Author (year)	Study design	Analysis method	Purpose of study	Sample and setting	Measure of recruitment and/or retention	Key findings associated with recruitment and/or retention
						they bill for their own services, have their own patient panels and hospital admitting privileges, and that they practice to the fullest extent of state SOP
Sullivan et al. (1978)	Cross-sectional	Descriptive statistics and bivariate analysis	Examine the characteristic of rural NPs, their practice characteristics, motivation to practice in rural areas, and satisfaction with the NP role	525 NP graduates across the U.S.	Selection of rural practice setting	<ul style="list-style-type: none"> <li>“Creative approach to healthcare delivery” and role autonomy were the top reasons why rural NPs in this sample chose to work in rural practices</li> </ul>

*Note.* NP = nurse practitioner; MD = physician; PA = physician assistant; CHC = community health center; NHSC = National Health Service Corp; SOP = scope of practice; FQHC = federally qualified health center; HPSA = Health Professional Shortage Area; PBRN = practice-based research network.