

## ORIGINAL ARTICLE

# Training Needs for Rural Primary Care Practice: A Scoping Review of Resident Physician Preparation

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## ABSTRACT

**Background and Objectives:** Some graduate medical education programs focus on the preparation of physicians for rural primary care practice. More exploration is needed to understand what is taught and how medical educators prepare resident and fellow physicians for rural practice. The purpose of this scoping review was to identify the primary dimensions of the concept of graduate medical education competencies for rural practice settings and describe the related evidence and gaps in the literature.

**Methods:** In 2024, we used a modified PRISMA–ScR approach to identify studies that addressed the unique training needs and competencies of residents intending practice in a rural area of the United States. For our study, we gathered peer-reviewed materials from a 10 year period (2013–2023) using PubMed as our data source.

**Results:** A total of 423 articles were identified. We screened abstracts and manuscripts, and included 22 articles. Eleven articles (50%) described training in preparation for rural practice, including two concerning fellowship-level graduate medical education. Five (23%) articles described residency or fellowship training occurring in rural areas. Six (27%) articles described studies involving focused training occurring in rural versus nonrural locations.

**Conclusions:** Limited literature exists to systematically define the graduate medical education competencies required for eventual rural practice. This gap necessitates a clearer framework for training and preparing physicians for these settings.

## INTRODUCTION

The training, recruitment, and retention of primary care physicians providing care in rural practice settings are frequently the subject of peer-reviewed research articles.<sup>1,2</sup> Primary care physicians provide essential access to medical care in US rural and underserved settings, which often present distinct resource limitations<sup>3</sup> and challenges. Some graduate medical education (GME) programs aim to provide resident and fellow physicians specific educational curricular opportunities to prepare them for the demands of rural practice.

Graduates from rurally located GME programs practice in rural settings at a higher rate than their urban-trained

counterparts.<sup>4</sup> Still, the majority of rurally located practicing physicians are identified to have been trained in urban places.<sup>5,6</sup> Medical educators and policymakers may seek to promote the preparation of a competent rural primary physician workforce through both curricular and environmental learning designs. We sought to identify the primary dimensions of the concept of graduate medical education competencies for rural practice settings to better understand the current evidence available to address these educational and workforce needs.

For our study, we conducted a scoping review of the available literature to address this research question: What are the graduate medical education competencies

and training needs for primary care residents who will practice in rural areas of the United States?

## METHODS

### Literature Search

In January 2024, we conducted a scoping review following a modified Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) approach with the database PubMed as the information source. The search strategy was developed by a team of researchers with experience in rural health care and graduate medical education research. The search strategy was established to identify studies that addressed the unique training needs and competencies (eg, curriculum, clinical competence, competency-based education) for residents and fellows (eg, internship and residency, medical residents, residency program, fellowships) who will practice in a rural area (eg, rural health services, rural population, rural health, rural hospitals) of the United States. Rural United States was defined as regions of the United States designated by the Census Bureau as rural (nonurban).

### Eligibility Criteria

Articles were included if they met the criteria for studies involving medical residents in primary care settings within rural areas of the United States. To meet criteria for GME in primary care, articles had to explicitly reference terms related to clinical competence, competency-based education, curriculum, or residency, as defined by relevant MeSH (medical subject headings) terms and text words (eg, “clinical competence”[MeSH], “internship and residency”[MeSH], “graduate medical education”[tiab, restrictive field code]). To address competencies or curriculum for rural practice, articles had to include terms associated with rural health, rural populations, or rural hospitals (eg, “rural health services”[MeSH], “rural population”[MeSH], “rural”[tiab]). Consistent with guidance from the JBI Manual for Evidence Synthesis,<sup>7</sup> we limited our search to articles published in English within the last 10 years to ensure feasibility and capture the most current evidence. Articles were excluded if they involved undergraduate medical students, practicing physicians, or nonprimary care inpatient settings, or if they focused on urban, suburban, or nonrural areas or non-US contexts.

### Article Review Process

A subset of 30 titles and abstracts were independently screened and discussed by two reviewers (C.C. and A.K.). The remaining titles and abstracts were screened by one reviewer (C.C.), with questions and discrepancies resolved via discussion with a second reviewer (A.K.). All full text reviews were conducted by both reviewers independently, followed by discussion to resolve discrepancies and select final articles for inclusion. The article review process proceeded as per

Figure 1 for a final set of 22 studies to be analyzed in our scoping review.

### Data Analysis

We abstracted and charted data using codes based on themes identified in the existing literature regarding GME training for primary care and rural practice settings. Coding included GME programs providing intentional training for rural practice settings regardless of training location, GME programs located in rural places, and focused GME training occurring in rural settings. Studies regarding focused GME training occurring in rural settings contrasted with urban settings were included. Studies charted included research conducted with both learners and/or medical educators as respondents. We all reviewed the results until consensus was reached on themes to be included in our final analysis. Here we provide an overview of the articles identified, levels of GME training (eg, residency or fellowship), specialty of GME training program, area(s) of focused skill training, and location of training (ie, rural vs urban).

## RESULTS

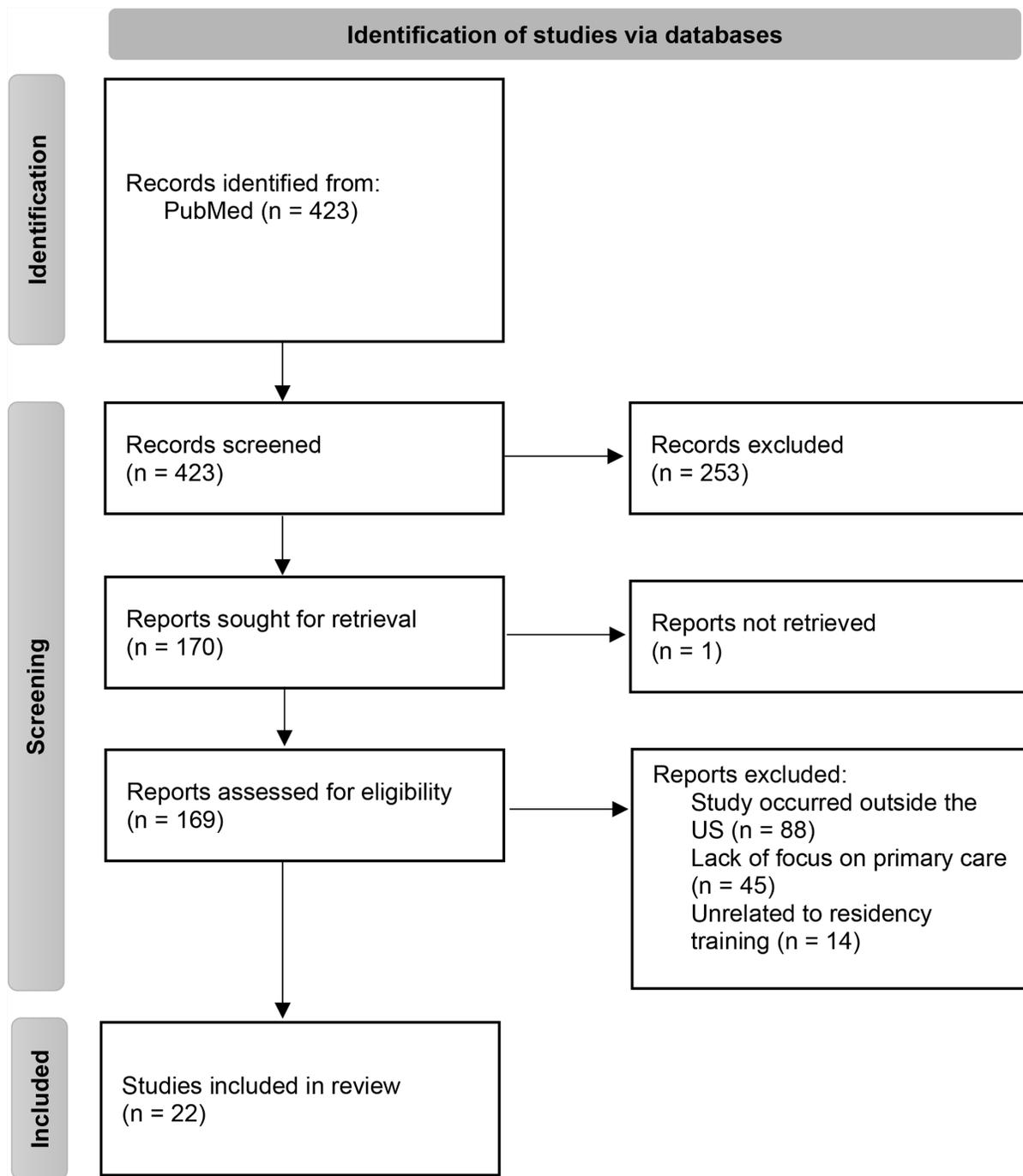
A total of 22 articles met criteria for inclusion. Characteristics of included articles are noted in Table 1.

Eleven articles (50%) described training programs specifically designed to prepare physicians for rural practice. Two of these concerned fellowship-level graduate medical education, and one did not specify a level of training. Five of these related to pediatricians: three comparing the practice behaviors of rurally located pediatricians with residency training requirements (each: descriptive, cross-sectional) and two describing curricula designed to train pediatricians for rural practice (each: descriptive, case report). Family medicine training was the subject of five of the remaining six articles focused on preparation for rural practice, while one article also did include internal medicine residents. Each of the two fellowship-level training articles related specifically to maternity care fellowship training. The remaining article addressing preparation for rural practice did not specify level of training or specialty. That article also was the only article of all those in the review to describe competence for rural training specifically.<sup>25</sup>

Five (23%) articles described residency or fellowship training occurring in rural areas. While these articles did not specifically address training for rural practice, each was identified as a study conducted with training programs located in a rural location. Four of these involved behavioral, gender, and/or developmental health in family medicine residency training programs, while the fifth was in regard to health equity training in a family medicine fellowship program.

Six (27%) articles described studies involving study cohorts with training occurring in rural versus nonrural locations. Some articles in this group intentionally contrasted the data of rural versus nonrural located residents in specific curricular areas such as diabetes care, telemedicine,

FIGURE 1. PRISMA-ScR Flow Diagram with Number of Articles



PRISMA-ScR, Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews

and HIV preexposure prophylaxis. One article<sup>26</sup> contrasted the academic achievement of rural and nonrural located trainees; and while providing an analysis of ACGME competencies, the article did not seek to describe competence unique to rural practice.

## DISCUSSION

This scoping review revealed a limited number of recent peer-reviewed articles addressing specific training and competency needs of graduate medical education for primary care in rural practice settings. A majority of those studies focused on general training preparation, and a few addressed unique skills utilized in rural practice. This scoping review

**TABLE 1.** Characteristics of Included Articles

Author Year	Study design	Data collection tools	Explicitly stated competencies	Identified training needs	Findings	Explanation for inclusion
Hughes, Herrera-Mata, Dunn 2014 <sup>8</sup>	Analytical, experimental, retrospective case control	Medical records review of family medicine residency	Diagnosis and treatment of pediatric mental, physical, and behavioral issues	Incorporation of healthy steps program into well-child visits	Positively impacts the identification of early developmental delays and referral practices	Training occurred in rural location
Peterson, Blackburn, Phillips, et al 2014 <sup>9</sup>	Descriptive, cross-sectional	Survey developed for this project	C-section skills	Skills in providing advanced maternity care	Despite lack of formal accreditation, maternity care fellowships have academic affiliations and internally standardized curricula.	Training designed for rural practice
Vickery rindfleisch, Benson, et al 2015 <sup>10</sup>	Descriptive, cross-sectional	CERA survey developed for this project	Deliver comprehensive primary care while improving population health	Teaching of community medicine and population health in family medicine residency programs	Family medicine is poised to take leadership in the teaching and practice of population health training in rural areas.	Contrasted training occurring in rural and nonrural locations
Evans, Patterson, Andrilla, Schmitz, et al 2016 <sup>30</sup>	Descriptive, cross-sectional	Survey developed for this project	Identified gaps in endoscopy, surgery, trauma, surgical gynecology, operative obstetrics	Rurally relevant skills training	Programs varied substantially in rurally located training and rurally relevant content.	Training designed for rural practice
Skariah, Rasmussen, Hollander-Rodriquez, et al 2017 <sup>11</sup>	Descriptive, case series	Graduate surveys administered 2007–2014	Procedures, an understanding of community-oriented primary care principles	Maternity care, inpatient procedures, behavioral health training	Rural curriculum will need to provide training toward a broad medical scope of practice as well as skills in community medicine and enhanced behavioral health interventions.	Training designed for rural practice
Robohm 2017 <sup>12</sup>	Descriptive, cross-sectional	Survey developed for this project	Stigma reduction, time management, cultural sensitivity	Training in interpersonal and soft skills	Rural training programs are encouraged to emphasize behavioral science training for their family medicine residents.	Training occurred in rural location
Eden, Peterson 2018 <sup>13</sup>	Descriptive, cross-sectional	Semistructured interviews	C-section skills	Skills in providing advanced maternity care	Strategies to support family physicians who want to continue to provide maternity care include enhanced training.	Training designed for rural practice
Longenecker, Wendling, Hollander-Rodriguez, et al 2018 <sup>25</sup>	Descriptive, cross-sectional	Survey developed for this project; snowball survey method	Adaptability, agency and courage, collaboration and community responsiveness, comprehensiveness, integrity, abundance in	Validates and elaborates on domains of competence important in rural practice	Authors propose domains as a common language and framework for addressing the unique challenges and opportunities	Training designed for rural practice

(Continued)

**TABLE 1. Characteristics of Included Articles (Continued)**

Author Year	Study design	Data collection tools	Explicitly stated competencies	Identified training needs	Findings	Explanation for inclusion
			the face of scarcity and limits, reflective practice, resilience		that training and practicing in a rural setting present.	
Pak-Forstein, Batra, Johnston, et al 2018 <sup>14</sup>	Descriptive, case report	Survey developed for this project	Global and domestic public health skills	Global health and community practice in pediatrics	A significant percentage of candidates ranked the pediatric residency more favorably because of its global health education.	Training designed for rural practice
Thach, Hodge, Cox, et al 2018 <sup>28</sup>	Descriptive, cross-sectional	Semistructured interviews	Leading community health, negotiating dual relationships	Leadership in rural settings	Educators should be intentional about including these competencies to prepare learners for rural practice.	Training designed for rural practice
Iyer, Way, Kline, et al 2019 <sup>15</sup>	Descriptive, cross-sectional	Survey developed for this project	ACGME procedures	ACGME procedures for pediatrics	Pediatricians rarely perform most of the recommended procedures and commonly perform procedures not included in current guidelines.	Training designed for rural practice
Peltan, Poll, Sorensen, et al 2019 <sup>16</sup>	Descriptive, cross-sectional	Survey developed for this project	Cardiac arrest resuscitation skills	Cardiac arrest resuscitation skills (and confidence)	Residents who participate in or lead in-hospital cardiac arrest resuscitation events lack confidence or worry about management errors.	Contrasted training occurring in rural and nonrural locations
terry, Terry 2019 <sup>17</sup>	Descriptive, cross-sectional	Survey developed for this project	Behavioral health care skills	Behavioral health issues in primary care	Demonstrated a need to identify potential gaps in training that might address low levels of perceived competency among medical residents	Training occurred in rural location
Iyer, Lo, Stanley 2020 <sup>18</sup>	Descriptive, cross-sectional	Administrative claims database	Specific procedures performed	ACGME procedures for pediatrics	General pediatricians in central ohio do not frequently perform the 13 recommended procedures.	Training designed for rural practice
Healy, Uhrig, Shubrook, et al 2021 <sup>19</sup>	Descriptive, cross-sectional	Survey developed for this project	Comfort with modalities for the treatment of diabetes	Diabetes treatment modalities	Residents reported low confidence in diabetes technology management.	Contrasted training occurring in rural and nonrural locations
Iyer, Way, Schumacher, et al 2021 <sup>20</sup>	Descriptive, cross-sectional	Semistructured interviews	ACGME procedures	ACGME procedures for pediatrics	Customized procedural education should be implemented to ensure relevancy of	Training designed for rural practice

(Continued)

**TABLE 1. Characteristics of Included Articles (Continued)**

Author Year	Study design	Data collection tools	Explicitly stated competencies	Identified training needs	Findings	Explanation for inclusion
					skills learned for clinical practice.	
Nishiguchi, Kadunc, Lee, et al 2021 <sup>21</sup>	Descriptive, case report	Iterative review of written materials, semistructured interviews, survey	Cultural competence in research skills	ACGME core competencies for global health and community pediatrics	The curricular partnership added value to trainees.	Training designed for rural practice
Jasper, Necker, Myers, et al 2022 <sup>22</sup>	Descriptive, cross-sectional	Survey developed for this project	Comfort with prescribing of HIV pre-exposure prophylaxis	Training in HIV pre-exposure prophylaxis	No rural program reported significant training.	Contrasted training occurring in rural and nonrural locations
Sun, O'Keefe, Tobey 2023 <sup>29</sup>	Descriptive, case report	Survey developed for this project	Understanding a community's priorities, governance structures, trust building	Leadership and community health skills in rural settings	Rural-based fellowship prepared graduates for leadership roles.	Training occurred in rural location
Altschuler, Mann 2023 <sup>23</sup>	Descriptive, case report	Kern's model of curricular development	Cultural competence in care for transgender patients	Care for transgender patients	The resulting training, coupled with the resource guide provided to residents, was valuable.	Training occurred in rural location
Bajra, Frazier, Graves, et al 2023 <sup>24</sup>	Descriptive, case report	Educational evaluation survey	American association of medical colleges telehealth competencies	Use of telemedicine for providing care	Curriculum was broadly acceptable and effective.	Contrasted training occurring in rural and nonrural locations
Peterson, Morgan, Andrilla, et al 2023 <sup>26</sup>	Descriptive, cross-sectional	American Board of family medicine exam scores	Medical knowledge as measured by exam scores	Medical knowledge	Small, but persistent differences in measures of academic performance between rural- and urban-trained family medicine residents	Contrasted training occurring in rural and nonrural locations

Abbreviations: ACGME, Accreditation Council for Graduate Medical Education; CERA, Council of Academic Family Medicine Educational Research Alliance; C-section, cesarean section

did not include articles referencing certain skills that may be considered more relevant to rural practice settings (eg, certain procedural training) and did not utilize the relevant MeSH terms and text words used in this methodology. Such articles may, for example, compare the likelihood of obtaining certain skills when contrasting rural to urban located training.<sup>27</sup>

The studies included in this review highlight various aspects of rural training, from specific curriculum designed for skill development such as leadership<sup>28</sup> and community health<sup>29</sup> to comparative analyses of rural versus nonrural training locations.<sup>30</sup> However, the development of competencies specifically for rural practice remains underexplored. Because rural health care settings present distinct challenges, such as diverse patient needs in a setting of limited resources, the need is critical for GME programs to define

these skills and train residents more explicitly. As reflected in the Longenecker et al article,<sup>25</sup> development of a common language and framework for addressing training of rural physicians should allow graduates to provide optimal care in resource-constrained environments. In rural care settings, the most appropriate care options may differ from nonrural applications of similar medical knowledge. For example, treatment of acute myocardial infarction or trauma occurring remotely from definitive care may require a unique systems-based practice approach. Interpersonal and communication skills become of paramount importance to care coordination, for example in the case of patient transfer to another facility. System-based practice competencies would include a contextual awareness of resource availability, the capacity to develop alternative treatment plans, and communication

skills applied in coordinating both local and distant care of the patient. Additionally, the likelihood of dual relationships is greater in rural settings, requiring professionalism competencies related to the management of patient care and nonprofessional life within the rural community. Competence in rural primary care settings involves not only medical knowledge (eg, procedural skills competency), but also the development of metacognitive adaptive practice skills to achieve technical and applied competencies resulting in care that is contextually appropriate and clinically relevant.

While the Longenecker et al article<sup>25</sup> elaborated dimensions of competence believed to be important for rural practice, further research should be conducted to elucidate how competencies can be measured and applied for both trainee assessments and within programs seeking to prepare physicians for rural practice settings, regardless of program location. Qualitative study of rural medical educators accompanied by a qualitative study of rural practicing primary care physicians could further explore this area of research. Study of rural practicing physicians should ideally occur in the initial years of practice following program completion in order to isolate the GME training outcomes from the effects of rural practice experience on adaptive expertise development.<sup>31</sup>

Recent federal initiatives and investments have resulted in increased numbers of rurally located GME programs.<sup>32</sup> Yet urban-located programs also continue to train and prepare graduates to practice in rural and underserved areas. Long-standing state and federal programs<sup>33</sup> offer loan-repayment and financial incentives for physicians locating in rural and underserved communities. Seeking to address health disparities found in rural locations, ACGME recently defined the Rural Track Program designation<sup>34</sup> in alignment with Section II of its Medically Underserved Areas/Populations framework.<sup>35</sup> The importance of the location of training in addition to the content of training are becoming increasingly recognized in the literature.<sup>36</sup>

Identification of curricular objectives and learner assessments uniquely applicable to preparing graduates for rural practice settings represents a novel and important area for additional research. While evidence exists that GME training in a rural area is associated with subsequent rural practice,<sup>37</sup> whether or not unique competency development occurs differentially in rural settings should be an area of additional study. If competencies related to rural practice could be identified and measured, measuring outcomes both during training and at program completion would then be possible. Comparing training models involving both urban and rurally located training sites to better determine how and where the induction of metacognitive skills, such as adaptive expertise development, is occurring at a programmatic level also may be possible.<sup>31</sup> This understanding also may allow for urban-based training sites to idealize augmentation of training through rural experiences, simulation, mentoring, or other methods to accomplish similar competency goals.

Applying these methods could result in subsequent voluntary adoption of these education strategies by GME programs to better prepare a physician workforce for rural and underserved care.

Better prepared graduates also may experience less stress, reducing the risk of burnout and leading to improved retention rates of the rural physician workforce. Longenecker et al published an article related to resiliency in rural practice<sup>38</sup> in 2010, and additional study in conjunction with measured competencies may be another area for further research, correlating competencies to both burnout and retention rates. Additional training, mentoring, and development for trainees with an identified plan for entering rural practice, such as with participants in the National Health Service Corps,<sup>39</sup> may also benefit from intentional curricular training and support. Additional research in the training needs for rural primary care service could both improve health for patients and improve physician career satisfaction.

### Limitations

This review had several limitations, the first of which was its constraint to a fixed time period (2013–2023) and English language; additional articles may exist in other languages or prior to the period included in the study or since the analysis. Identified studies contained a variety of study methods and interventions, thus limiting a comparison of results. Limiting databases used to peer-reviewed literature may exclude additional gray literature contributions. Furthermore, PubMed was the only database searched; future work could explore additional databases (eg, ERIC, Embase) to capture a broader range of rural training literature. A recent peer-reviewed text not referenced in PubMed does summarize literature prior to 2013, “Training for Rural Practice: Place-Based, Mission-Aligned, and Community-Engaged.”<sup>40</sup> Also, research studies concerning skills or training considered relevant to rural practice settings but not utilizing the relevant MeSH terms and text words used in this methodology would not be included in this scoping review.

### CONCLUSIONS

This review calls attention to the scarcity of literature addressing the specific competencies and training needs of GME programs preparing primary care residents for rural practice in the United States. While some studies explored rural-focused skills training and education occurring in rural environments, most did not explicitly identify competencies unique to rural practice. Chronic primary care workforce shortages in rural communities and the recent investments being made in expanding physician training in these areas underscore the need for medical educational policy and reforms that address specific rural competencies. The existing gap underscores the need for targeted research and curricular development to equip future physicians with the skills required to address the distinct challenges of rural health care. Informing policymakers and accrediting bodies of best

practices in educating physicians for rural practice can help address physician shortages in underserved areas, improving health care access and outcomes in rural communities.

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