



# Rural Healthcare Workforce: A Systematic Review

December 2015

## Prepared for:

Department of Veterans Affairs  
Veterans Health Administration  
Quality Enhancement Research Initiative  
Health Services Research & Development Service  
Washington, DC 20420

## Prepared by:

Evidence-based Synthesis Program (ESP)  
West Los Angeles VA Medical Center  
Los Angeles, CA  
Paul G. Shekelle, MD, PhD, Director

## Investigators:

### Principal Investigator:

Susanne Hempel, PhD  
Paul Shekelle, MD, PhD

### Co-investigators:

Melinda Maggard Gibbons, MD, MSHS  
Jesus G. Ulloa, MD, MBA  
Ian T. Macqueen, MD

### Research Associates:

Isomi M. Miake-Lye, PhD  
Jessica M. Beroes, BS  
Roberta Shanman, MLS



## PREFACE

The VA Evidence-based Synthesis Program (ESP) was established in 2007 to provide timely and accurate syntheses of targeted healthcare topics of particular importance to clinicians, managers, and policymakers as they work to improve the health and healthcare of Veterans. QUERI provides funding for four ESP Centers, and each Center has an active University affiliation. Center Directors are recognized leaders in the field of evidence synthesis with close ties to the AHRQ Evidence-based Practice Centers. The ESP is governed by a Steering Committee comprised of participants from VHA Policy, Program, and Operations Offices, VISN leadership, field-based investigators, and others as designated appropriate by QUERI/HSR&D.

The ESP Centers generate evidence syntheses on important clinical practice topics. These reports help:

- Develop clinical policies informed by evidence;
- Implement effective services to improve patient outcomes and to support VA clinical practice guidelines and performance measures; and
- Set the direction for future research to address gaps in clinical knowledge.

The ESP disseminates these reports throughout VA and in the published literature; some evidence syntheses have informed the clinical guidelines of large professional organizations.

The ESP Coordinating Center (ESP CC), located in Portland, Oregon, was created in 2009 to expand the capacity of QUERI/HSR&D and is charged with oversight of national ESP program operations, program development and evaluation, and dissemination efforts. The ESP CC establishes standard operating procedures for the production of evidence synthesis reports; facilitates a national topic nomination, prioritization, and selection process; manages the research portfolio of each Center; facilitates editorial review processes; ensures methodological consistency and quality of products; produces “rapid response evidence briefs” at the request of VHA senior leadership; collaborates with HSR&D Center for Information Dissemination and Education Resources (CIDER) to develop a national dissemination strategy for all ESP products; and interfaces with stakeholders to effectively engage the program.

Comments on this evidence report are welcome and can be sent to Nicole Floyd, ESP CC Program Manager, at [Nicole.Floyd@va.gov](mailto:Nicole.Floyd@va.gov).

**Recommended citation:** Hempel S, Maggard Gibbons M, Ulloa JG, Macqueen I, Miake-Lye I, Beroes J, Shekelle P. Rural Healthcare Workforce: A Systematic Review. VA ESP Project #05-226; 2015.

This report is based on research conducted by the Evidence-based Synthesis Program (ESP) Center located at the **West Los Angeles VA Medical Center, Los Angeles, CA**, funded by the Department of Veterans Affairs, Veterans Health Administration, Office of Research and Development, Quality Enhancement Research Initiative. The findings and conclusions in this document are those of the author(s) who are responsible for its contents; the findings and conclusions do not necessarily represent the views of the Department of Veterans Affairs or the United States government. Therefore, no statement in this article should be construed as an official position of the Department of Veterans Affairs. No investigators have any affiliations or financial involvement (eg, employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties) that conflict with material presented in the report.

## EXECUTIVE SUMMARY

### INTRODUCTION

Approximately 20 percent of the US total population lives in rural areas. Patients living in rural areas are often underserved with regard to healthcare access. The complexity of rural healthcare provision requires careful and systematic evaluation of individual contributing factors. The purpose of this review is to examine the current literature quantifying current and projected health provider need, to explore geographic provider choices, to synthesize evidence on interventions to increase rural provider recruitment and provider retention, and to document the efficacy of student training for current rural healthcare in the US.

This topic was developed in response to a nomination by the Office of Rural Health (ORH).

The Key Questions (KQ) are:

1. What are the current versus projected healthcare provider needs by numbers and disciplines in the next 20 years in rural areas?
2. What factors influence healthcare providers' geographic choices for practice?
3. What interventions have been shown to increase rural healthcare provider recruitment?
4. What interventions have been shown to increase rural healthcare provider retention?
5. What is the efficacy of current rural-specific resident and healthcare profession student training and education efforts?

### METHODS

The review is registered in PROSPERO: CRD42015025403.

#### Data Sources and Searches

We searched the electronic databases PubMed, CIN/AHL, Web of Science, SCOPUS, PsycINFO, ERIC, WorldCat, and Grey Literature Report for English-language research published in the last 10 years (2005-February 2015). In addition, we reference-mined pertinent reviews, accessed targeted online resources ([www.raconline.org](http://www.raconline.org), <http://bhpr.hrsa.gov/healthworkforce>, [www.ruralhealthresearch.org](http://www.ruralhealthresearch.org)), and consulted with topic experts.

#### Study Selection

Two independent reviewers screened retrieved publications against the eligibility criteria; any disagreements were resolved by discussion in the review team.

**Population(s):** Studies in healthcare providers relevant to rural Community-Based Outpatient Clinics, Rural Health Clinics, and Critical Access Hospitals (family medicine, internal medicine, emergency medicine, and obstetrics/gynecology physicians; general surgeons; pediatricians; geriatricians; psychiatrists; nurse practitioners; and physician assistants) were eligible for inclusion for KQ2-4, providers and patients could provide data on KQ1, and providers in training were eligible for inclusion for KQ5.

**Intervention(s):** Interventions aiming to increase provider recruitment and retention were eligible for KQ3-5; studies addressing recruitment and retention regardless of the aim of the intervention were eligible for KQ3 and KQ4.

**Comparator(s):** Comparative studies documenting current needs and studies using statistical modeling techniques to predict future needs were eligible for KQ1, and no comparator was required for KQ2-5.

**Outcome(s):** Studies reporting on current and projected needs of healthcare providers and patient healthcare access measures were eligible for KQ1; provider-reported and otherwise analytically provided factors potentially associated with geographic practice choices were eligible for KQ2; recruitment and retention measures were eligible for KQ3-5.

**Timing:** Studies reporting on demand, provider choices, and effects of provider interventions and training in 2005 to 2015 were eligible. Studies making predictions for 2015 and beyond were also eligible for KQ1.

**Setting:** Studies addressing US rural healthcare settings were eligible for KQ1, KQ2, and KQ4, and US healthcare training sites were eligible for KQ5.

### Data Abstraction and Quality Assessment

For KQ1, we extracted the geographic region, provider groups covered, the predictive timeframe, data source, definition of “rural,” analytic method, results for rural healthcare, and the authors’ conclusion. The quality assessment concentrated on the data source reporting (detection bias) and whether predictions exceed the sample (external validity).

For KQ2, we extracted the geographic region; targeted provider groups; number of participants; study design; definition of “rural”; results for provider and setting characteristics, financial aspects and other predictors; and the authors’ conclusion. The quality assessment targeted the risk of bias due to response rate limitations (selection bias) and confounding variables (detection bias).

For KQ3 and KQ4, we extracted the geographic region, targeted provider groups, number of participants, intervention category and description, study design and comparator, recruitment and retention results, and the authors’ conclusion. The quality assessment considered selection, performance, attrition, detection, and reporting bias.

For KQ5, we extracted the geographic region of the school and the rural placement, the provider groups in training, number of trainees, training content, school capacity, study design and comparator, definition of “rural,” data source for outcome elicitation, recruitment and retention results, and the authors’ conclusion. The quality assessment focused on the completeness of follow-up (attrition bias).

### Data Synthesis and Analysis

Each key question was summarized in a narrative synthesis. KQ1 differentiated current and future need. The synthesis of KQ2 determined the evaluated factors and the associated strength of evidence. KQ3 summarized all interventions that aim to increase provider recruitment. KQ4

summarized all interventions that target provider retention. KQ5 summarized programs aimed at providers in training. The summary of findings tables were organized by outcome and the quality of evidence assessment followed the GRADE approach. VA provider samples were a preplanned subgroup analysis.

## RESULTS

### Results of Literature Search

The literature review identified 5,756 citations. In total, 446 publications were obtained as full text. Of these, 59 publications met inclusion criteria, contributing to one or more key question.

### Summary of Results for Key Questions

#### *KQ1: Rural Healthcare Provider Needs*

We identified a small number of studies quantifying current healthcare provider needs for rural areas. Estimates were for specific geographic regions and time periods, and studies operationalized provider need differently. Hence it is difficult to make concrete or generalizable evidence statements regarding the number of healthcare providers needed across studies. However, all included studies reported current unmet healthcare provider needs that worsen with increasing rurality. There is a healthcare provider shortage in particular for primary care providers, mental health professionals, and general surgeons.

We also identified a very small number of published studies estimating future provider needs in rural healthcare. The 3 studies made predictions for primary care physicians, emergency physicians, and surgeons. We did not identify more than one study reporting on the same provider group or studies reporting on other provider groups of interest. All studies concluded that the supply is not likely to meet demand.

#### *KQ2: Healthcare Providers' Geographic Choices for Practice*

A large number of studies exploring the determinants of practicing in rural care has been published. Growing up in a rural community was the most consistent factor associated with practice location choice across the 24 identified studies. Education efforts for physicians, such as rural tracks, also seem to increase the likelihood of practicing in a rural community. Associations were also shown for the family of providers, exposure to rural communities, a primary care and family medicine focus, osteopathic education, recreation activities, and rural lifestyle; however, the evidence base is very limited. Although a large number of studies explored potential factors associated with practicing in a rural setting, studies are needed to determine the relative importance of the predictor variables.

#### *KQ3: Rural Healthcare Provider Recruitment Interventions*

We only identified 5 evaluations aimed at practicing providers. Studies assessed the J-1 visa waiver program and loan forgiveness programs. A J-1 visa evaluation reported that 53% of physicians did not complete their obligations, but of the respondents who had completed their commitment, 84% remained a median of 23 months longer than required. A state-wide evaluation of various recruiting programs reported that 80% of placed providers have remained at their initial placement site upon completion of their obligation. The loan repayment programs

reported on different outcomes and success measures. One study reported that 86% of surveyed rural physicians indicated that they continued medical practice at their sponsoring Minnesota healthcare facility after completing their service obligation. One evaluation reported that of those recipients whose obligated practice location was rural, 84% were practicing in rural areas and 28% of program completers were practicing in rural areas. One evaluation highlighted that 74% of recipients were already working in or intended to work in an eligible community when they were made aware of the program.

#### *KQ4: Rural Healthcare Provider Retention Interventions*

We did not identify any study evaluating an intervention specifically aimed at improving retention for healthcare providers in US rural healthcare facilities.

#### *KQ5: Rural Student and Resident Training Programs*

We identified 23 program evaluations focusing on providers in training. All reported on medical students and residents. Programs varied in their approach and recruitment success estimates. Results varied across datasets and programs but most estimates ranged between 35 and 65%. We did not identify factors that appeared to systematically affect success rates. Across approaches, studies reported a median success rate for rural healthcare recruitment of 53%.

## **DISCUSSION**

The review demonstrates rural healthcare workforce needs, determinants of providers' geographic choices, the lack of intervention studies aimed at US providers, and a multitude of recent provider in training efforts.

The included studies quantified current and predicted shortages for rural areas for specific provider groups and for a defined period of time. The identified estimates of unmet needs underpin the perceived shortage of healthcare providers for rural areas as highlighted in numerous publications on the topic. However, the variability in the metrics used to define unmet need illustrate the difficulty in quantifying provider needs and comparing unmet needs across geographic regions and provider disciplines.

A large number of studies has addressed determinants of providers' geographic choices and showed growing up in a rural community as the most consistent factor associated with rural practice. This factor has also been identified in earlier datasets and it continues to play an important role in the current healthcare system. A second key variable that emerged in the literature was education efforts such as rural tracks for physicians. Although the choice of selecting a rural track may be in part determined by a personal affinity preceding the choice of school, multivariate analyses suggest that the effect cannot be entirely explained by the variable of growing up in a rural community. However, there is a lack of studies helping to differentiate the relative importance of a personal affinity for rural communities, motivation through rural training, and effects of interventions attracting trained healthcare providers into rural care settings on provider choices.

We only identified a very small number of studies aimed at the recruitment of healthcare providers for rural communities. This is consistent with existing reviews on the topic, indicating a need for more evaluations to support policy makers in adopting effective interventions to

increase the availability of healthcare providers in underserved areas. Programs such as the J-1 visa program need to be evaluated carefully. While half of physicians did not complete their obligations, of the respondents who had completed their commitments, over 80 percent remain longer than required. Research on loan forgiveness programs is sparse and the identified evaluations assessed different outcomes and results. Careful evaluation is needed given that existing research highlighted that a large proportion of participants were working in or intended to work in an eligible community when they were made aware of the program. Hence, programs may influence retention but may not necessarily be key to entering rural healthcare.

We did not identify any recent study specifically aimed at improving retention for fully trained healthcare providers in US rural healthcare facilities. The international literature on this topic also highlights that more research is needed to empirically evaluate suggested strategies. Our review focused on specific empirical evidence (*ie*, recruitment success), leaving out studies that concentrated on provider satisfaction with programs or other outcomes.

In the last 10 years a large number of studies has been published that evaluates programs for healthcare providers in training; however, the literature is dominated by studies focusing on medical students and residents. Across all approaches, about half the students trained for rural healthcare enter rural settings. Individual training programs vary widely in format and duration. More research is needed to parse out the specific aspects of the training experience that influence success and to determine the comparative effectiveness of different training programs.

We did not identify published studies reporting on VA settings, and the definition of “rural” was operationalized differently across identified evaluations which added heterogeneity across studies. Future research should in particular concentrate on evaluating strategies to improve healthcare provider recruitment and retention.

## Conclusions

- All included studies reported current unmet healthcare provider needs that worsen with increasing rurality. The small number of studies estimating future need also predicted unmet provider needs for rural healthcare.
- Growing up in a rural community is the most consistent factor associated with practice location. Education efforts for physicians, such as rural tracks, also seem to increase the likelihood of practicing in a rural community. More research on the relative importance of factors is needed.
- More research is needed to evaluate existing healthcare provider recruitment interventions for rural healthcare.
- There is a lack of evidence regarding interventions to support healthcare provider retention in rural healthcare.
- Current evaluations of rural training programs for medical students and residents suggest a median success rate of 53%.