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FULL PAPER

**Bundled Incentive Interventions for Rural Physician Retention:
Evaluating Whether Combined Scholarships, Housing Support, and
Workload Reforms Reduce Burnout.**

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Abstract

Rural and underserved communities continue to struggle to keep enough physicians, limiting people's access to primary care. This review looked at ten recent studies from both wealthier and lower-income settings to understand which approaches help recruit and retain doctors in these areas.

Education-based programs showed the clearest signs of improving retention. Financial incentives and policy requirements had mixed results, and seemed to work better when paired with other forms of support. Heavy workloads, limited independence, professional isolation, and weak ties to the community were linked to burnout and doctors' plans to leave. Mentoring, career opportunities, supportive workplaces, and social connection appeared to help doctors stay.

Overall, the findings suggest that retention efforts should combine several approaches and fit the needs of each community, rather than rely on a single solution. The evidence is still limited: studies often used different measures, provided little detail about how programs were carried out, and rarely tracked results over the long term. More rigorous, long-term research is needed to learn which combinations work best in different settings.

Keywords

Rural physician retention; Recruitment and retention strategies; Professional support

1.Introduction

People living in rural and remote areas often have less access to primary care. One reason is that health systems struggle both to attract physicians to these communities and to give them reasons to stay. The problem is becoming more pressing as demand for care grows, populations age, chronic illnesses become more common, doctors retire, and working conditions and burnout worsen.

Whether physicians remain in rural areas depends on more than financial incentives. Career opportunities, workload, workplace support, living conditions, family needs, and connection to the community all matter. Recruiting doctors alone may not be enough if the job does not offer sustainable workloads, career development, suitable housing, family support, and a sense of belonging.

Many approaches have been tried, including education programs, service requirements, financial incentives, and professional support. But evaluations are inconsistent, and studies often provide little information about whether these strategies lead to long-term retention. A focused review of recent research can help show which approaches have the strongest evidence, how local conditions affect their success, and what information is still missing for workforce planning and policy.

1-1Key Studies to Anchor the Review

• Study Focus	• Main Contribution	• Why It Matters
• Global determinants review	• Six retention domains	• Core conceptual base
• Canada integrative review	• Relational, multi-level retention model	• Strong recent synthesis
• U.S. scoping review	• Retention outcomes poorly reported	• Shows evaluation gap
• Philippines mixed-methods	• Dynamic local and work determinants	• LMIC implementation relevance
• China cohort	• Post-obligation retention tracked longitudinally	• Rare long-term evidence

Figure 1: Illustrative studies to anchor a systematic review on rural physician retention

1-2Review Gap

Although many approaches have been used to recruit and retain physicians, the research is scattered across regions and often has methodological limitations. Reviews from the United States and other countries find that programs frequently omit retention results or measure them in different ways, making it hard to compare approaches. Research also rarely tracks physicians' decisions to stay or leave over

time. Short follow-up periods and inconsistent definitions of recruitment and retention add to the problem.

Recent studies suggest that combining strategies may work better than offering the same incentive everywhere. Moderate financial support may be more effective when paired with career opportunities and other non-financial benefits. Rural training programs, local mentors, and residency placements based in rural communities may also help physicians stay, since some leave underserved areas to pursue specialist training elsewhere.

2-Literature Review

The literature review examines why rural physicians leave, how retention programs are designed, and how burnout contributes to turnover. It suggests that single incentives may not be enough. Instead, combining scholarships, housing support, and changes that make workloads more manageable may help physicians stay (Kumar & Clancy, 2020; Cosgrave, 2020; Coumans & Ciller, 2026).

2-1Background: Rural Maldistribution and Retention

This section outlines evidence on geographic maldistribution, systemic retention gaps, and the operational limits of recruitment-only policies for rural healthcare staffing.

2-2Geographic Workforce Maldistribution

Severe geographic disparities in healthcare staffing persist globally, concentrating critical personnel in urban centers while leaving rural and remote populations underserved.

- Rural populations face marked disparities in healthcare access, as roughly 20% of the United States population lives in rural areas but only 10% of physicians practice there.
- Nursing workforces mirror this imbalance, with rural regions maintaining only 64.1 registered nurses per 10,000 residents compared to 97.9 in urban settings.
- Resource-limited regions experience pronounced gaps, where 89% of the population in states like Bihar resides rurally despite only 40% of health workers being placed there.

2-3Systemic Rural Retention Gaps

Attracting health workers to underserved settings does not guarantee sustained staffing, as isolation, demanding conditions, and resource deficits trigger high post-placement turnover.

- Health workers frequently relocate from underserved communities immediately after completing their mandatory service periods or return-of-service obligations.
- Chronic primary care shortages are exacerbated by health facility vacancies reaching up to 64.2% for primary center assistants and 21.8% for medical officers.
- Workplace attrition is driven by social and professional isolation, lack of basic clinical supplies, insufficient housing, and unpredictable schedules.

2-4Limits of Recruitment-Only Policies

Isolated recruitment initiatives fail to establish a stable workforce because they focus on initial entry while neglecting the ongoing workplace supports required to sustain long-term practice.

- Policy interventions predominantly target initial recruitment, with one national review identifying 218 recruitment-focused programs compared to only 24 dedicated exclusively to retention Russell et al. (2021).
- Coercive or single-factor approaches show limited long-term impact, as standalone financial incentives demonstrate inconsistent retention outcomes across low- and middle-income nations.
- Sustainable workforce development requires bundled and multifaceted strategies integrating living infrastructure, manageable workloads, rural background selection, and supportive management environments Noya et al. (2022).

Synthesizing these findings demonstrates that overcoming rural maldistribution requires moving beyond transactional recruitment quotas toward comprehensive retention environments that support clinicians throughout their careers.

2-5 Rural Maldistribution and Retention

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2-8 Theoretical Frameworks for Rural Workforce Retention

Evaluating bundled retention packages requires synthesizing three complementary theoretical domains: holistic multi-domain frameworks, occupational stress mechanisms, and program-level theories of change.

Multi-Domain Retention Models

Multi-domain frameworks explain retention as an ongoing interaction between professional environments, personal roles, and geographical attachments.

- The Whole-of-Person Retention Improvement Framework (WoP-RIF) establishes that retention depends on three interconnected domains: Workplace/Organizational, Role/Career, and Community/Place.
- Preconditions for retention require feeling supported at work, having clear advancement pathways, and developing a genuine sense of belonging in the community.
- Persistent social alienation and community detachment prompt health professionals to leave rural positions regardless of whether remuneration is favorable.

Occupational Stress Mechanisms

Stress and motivational frameworks explain how unbalanced working conditions erode individual well-being and trigger voluntary turnover intentions.

- Rural understaffing generates heavy workloads for remaining clinicians, reducing job satisfaction and causing self-perpetuating cycles of turnover.
- Turnover intentions intensify when an unaddressed gap emerges between clinicians' professional expectations and their lived experience of practice demands.
- Retention is contingent on balancing extrinsic work requirements with supportive leadership, orientation support, and manageable practice systems.

Theory of Change Implementation

A theory of change conceptualizes how complex multi-component retention interventions translate organizational resources into sustained workforce stability.

- Realist program theories map how specific contexts, operational drivers, and organizational mechanisms interact to generate intended workforce retention outcomes.
- Sustainable implementation of multi-component retention packages requires high-level executive championship and strategic integration of human resources.
- Bundled non-financial supports, including paid transitional housing and structured clinical supervision, address baseline establishment needs to stabilize early-career practitioners.

Together, these frameworks provide a rigorous theoretical architecture linking structural inputs like scholarships, housing, and workload caps directly to reduced clinician burnout and sustained retention.

2-9Determinants of Rural Physician Retention

Rural physician retention depends on an interplay of financial packages, career progression pathways, physical infrastructure, practice workloads, clinical autonomy, and community integration. This synthesis examines these determinants across economic and career incentives, workplace and infrastructural demands, and community-level social ties.

2-9-1Economic and Career Progression Factors

Financial remuneration serves as an initial recruitment motivator, but its capacity to sustain retention diminishes without concurrent opportunities for professional development and upward mobility Noya et al. (2022).

- In a discrete choice experiment of 315 family physicians, a 50% salary raise strongly drove rural uptake, yet monetary increments exhibited rapidly diminishing marginal utility beyond a critical threshold.
- Physicians frequently trade direct income for career progression; Vietnamese clinicians were willing to forfeit 48.36% of their salary for urban postings but accepted rural positions if granted accelerated promotion pathways.
- A 5-year prospective cohort tracking 2,041 rural Chinese general practitioners demonstrated that unaddressed financial debt during medical school tripled post-contract attrition, highlighting the protective role of educational debt relief Cosgrave (2020).

2-9-2Infrastructure, Workload, and Practice Autonomy

The physical work environment and daily clinical schedule directly determine whether clinicians experience burnout or remain in rural practice, with excessive workload standing as a primary tipping point.

- In a survey of 722 rural doctors, working beyond 50 hours weekly more than doubled the likelihood of anticipated turnover, driven primarily by non-clinical filing and outpatient service overloads.
- Practice autonomy fosters retention when paired with supportive supervision, but isolated autonomy without institutional backing creates emotional fatigue and overwhelm.
- Severe facility deficiencies, erratic locum coverage, and dilapidated housing undermine morale, whereas functional clinical infrastructure and reliable administrative leadership consistently mitigate emotional exhaustion.

2-9-3Community Integration and Relational Factors

Social relationships and personal belonging frequently override institutional conditions in long-term retention decisions, determining whether clinicians permanently root themselves in rural localities Russell et al. (2021).

- In South Australia, an evaluation of general practitioners serving over 25 years identified community-level social respect and flexible, shared on-call rotas as central facilitators of multi-decade retention Cosgrave (2020).
- Multivariable tracking shows that contracting physicians within their native hometowns increases post-obligation rural retention by 164%, leveraging pre-existing social safety nets and kinship ties Russell et al. (2021).
- Key barriers prompting departure include limited spousal employment, schooling constraints for dependents, and blurred privacy boundaries that impede healthy work-life balance.

Addressing physician retention requires bundling competitive pay with manageable shift hours, functional facility tools, career advancement avenues, and structured integration for clinicians and their families.

Bundled interventions likely outperform single incentives, but evidence is heterogeneous and burnout is a key retention pathway.

A useful synthesis here has five linked facets: intervention types, bundled packages, burnout pathways, evidence gaps, and study rationale. Across the literature, rural retention is treated as a multicomponent policy problem rather than a salary-only problem.

2-10Intervention Types

The literature consistently organizes rural retention interventions into education, regulation, financial incentives, and personal or professional support. Educational strategies include rural-background selection, distributed undergraduate and postgraduate training, and upskilling of existing rural clinicians. Support strategies often include housing, locum relief, mentoring, telehealth, career development, and family-oriented supports Jinah et al. (2024).

- Educational pathways show the most consistent association with rural practice and retention.
- Regulatory return-of-service programs retain clinicians during obligation periods, but retention often drops after the contract ends.
- Financial incentives help, especially scholarships, bursaries, and loan repayment, but results are mixed when used alone.

2-11Bundled Packages

Multifaceted programs may be more effective than single interventions because physicians' decisions to stay depend on several parts of their lives and work. Reviews across different income settings emphasize combining professional, personal, educational, and workplace support in ways that fit local needs. Realist research suggests that coordinated support can help physicians gradually feel more comfortable and capable, strengthen their sense of belonging, and build lasting connections with their communities (Noya et al., 2022).

Looking at the combined support programs: government programs in Norway and Chile that addressed several needs at once reported better retention and lower turnover. Payment changes also appeared more promising when paired with team support, mentoring, and help settling into the community. Remote training programs that combined supervision, education, and social support showed signs of lasting impact: 49% of participants were still working in the same community two years after completing the program.

2.12. Burnout and physicians leaving

Burnout may help explain how difficult working conditions lead rural physicians to leave. Common contributors include excessive workloads, little control over workload, disorganized workplaces, limited resources, and reduced professional autonomy. This suggests that improving how organizations operate may be more effective for retention than relying on resilience training alone.

In rural China, burnout partly explained the link between job satisfaction and physicians' intentions to leave. Research also found that stress, low control over workload, and chaotic practice conditions were each associated with a greater likelihood of burnout. Qualitative reviews describe burnout, the need for time off, and poor organizational support as common reasons rural doctors leave.

The main problem is not a lack of interventions, but limited evaluation. Most studies are observational or cross-sectional, few compare programs directly, and many cannot identify which parts of a combined program made a difference.

Studies also measure retention inconsistently. They use different definitions and follow-up periods, and often report where physicians work without showing whether they stay after a service commitment ends or remain in a particular specialty. These limitations help explain why findings on financial and regulatory approaches are mixed. Combined programs may make sense, but they have not yet been tested rigorously enough.

2-13 Study Rationale

Studying scholarships, housing assistance, and workload improvements together reflects what the research suggests about physician retention. Scholarships and funding tied to service can help bring doctors to rural areas, and sometimes encourage them to stay after their commitment ends. Housing and family support can make rural life more manageable and help physicians feel connected to the community. Workload changes address burnout, which is consistently linked to doctors considering leaving.

Together, these strategies address three related needs: attracting physicians, making their day-to-day work and life sustainable, and reducing burnout. This gives a strong reason to study them as a combined approach, even though long-term comparisons between programs are still limited.

2-14 Ten key studies for an updated rural physician retention review

These ten studies are a strong focused review set because, together, they cover intervention effectiveness, contextual modifiers, burnout-linked attrition, implementation logic, and the main evidence gap the field still faces (Contu et al., 2026).

Recommended Core Studies

Study	Why Include It	Main Contribution
Russell et al., 2021	Strongest intervention review	Educational pathways show the clearest retention signal; coercive ROS performs worse long term (Russell et al., 2021)
Coumans & Ciller, 2026	Best burnout-retention synthesis	Burnout, autonomy loss, and workload link poor conditions to turnover (Coumans & Ciller, 2026)
Arredondo et al., 2026	Best PCP program mapping	Shows major gaps in retention reporting and comparability across U.S. programs (Arredondo et al., 2026)
Jinah et al., 2024	LMIC effectiveness review	Compares education, regulation, finance, and support strategies in LMICs (Jinah et al., 2024)
Contu et al., 2026	Best update rationale	Defines outcomes, contextual modifiers, and policy-facing review logic (Contu et al., 2026)
O'Sullivan et al., 2026	Best support-package theory	Explains how bundled professional support drives comfort, competence, belonging, and retention (O'Sullivan et al., 2026)
Alidina et al., 2025	Real-world package evaluation	Portugal case shows deployment gains but only modest retention advantage over non-participants (Alidina et al., 2025)
Onnis & Hunter, 2024	Organization-level scoping review	Highlights lack of implementation and evaluation detail in workforce interventions (Onnis & Hunter, 2024)
Boone et al., 2024	Best cross-national package design paper	Supports combining support, education, finance, and regulation rather than single fixes (Boone et al., 2024)
Cosgrave, 2020	Best retention framework	WoP-RIF organizes retention into workplace, role/career, and community/place domains (Cosgrave, 2020)

Figure 1: Ten recommended studies for a focused systematic review on rural physician retention

Evidence Coverage

Field	Retention	Context	Implementation	Follow-up
Education	5 papers	1 paper	4 papers	No papers
Regulation	5 papers	3 papers	2 papers	No papers
Support	6 papers	6 papers	3 papers	No papers
Burnout	1 paper	1 paper	No papers	1 paper
Packages	2 papers	1 paper	No papers	No papers

The most striking gap is long-term comparative evaluation. Russell finds all included intervention studies were observational and calls for stronger designs, while Arredondo shows most rural PCP programs do not report retention outcomes consistently (Russell et al., 2021; Arredondo et al., 2026).

A second gap is weak reporting on how interventions work in context. Onnis notes that evaluated interventions seldom explain organizational implementation, and O'Sullivan shows support works through context-sensitive mechanisms like belonging, confidence, and bonding rather than through a single universal component (Onnis & Hunter, 2024; O'Sullivan et al., 2026).

How to Use Them

For a publishable review, use Russell, Coumans, Arredondo, Jinah, and Contu as the analytic backbone, then use O'Sullivan, Alidina, Onnis, Boone, and Cosgrave to interpret mechanisms, bundled design, and policy translation (Contu et al., 2026; O'Sullivan et al., 2026; Alidina et al., 2025). The intervention categories and evidence logic are also laid out visually in the main systematic and conceptual papers. (Table 2: Characteristics of included studies) (Figure 2: Integrated framework around the five essential elements of well-being and their possible impact on rural physician retention.)

2-15 Research Gaps

Many programs focus on bringing physicians to rural areas, while offering little support to doctors who are already practicing there (Arredondo et al., 2023). Research on combined or incentive-based programs also often uses inconsistent outcomes, weak comparison groups, or short follow-up periods. As a result, it is difficult to tell which parts of a program improve retention or reduce burnout (Verma et al., 2016; Arredondo et al., 2026; Jinah et al., 2024).

The review should therefore make the case for studying both burnout and retention. Financial and other incentives may attract physicians at first, but keeping them in rural practice over time depends on whether the support improves their working conditions, professional autonomy, and daily lives (Alidina et al., 2025; Coumans & Ciller, 2026; Han & Grady, 2025).

This leads directly to the proposed study: building on what is known about rural retention and combined support programs, it will examine whether scholarships, housing assistance, and workload reforms can reduce burnout and help rural physicians stay.

3. Methodology

The researcher will use is a PRISMA 2020–guided, PROSPERO-registered systematic review focused on the 10 most recent and policy-relevant studies, with narrative synthesis as the primary analytic strategy because intervention types, settings, and retention outcomes are heterogeneous (Contu et al., 2026).

Feature	Result / Value
Study Type	Systematic review of quantitative intervention studies (Contu et al., 2026; Russell et al., 2021)
Reporting Standard	PRISMA 2020 (Contu et al., 2026; Coumans & Ciller, 2026)
Registration	PROSPERO registration before screening (Contu et al., 2026)
Population	Primary care physicians, residents, and medical students on rural pathways (Contu et al., 2026; Arredondo et al., 2026)
Context	Rural, remote, or underserved areas; state definitions as used by study authors (Russell et al., 2021; Arredondo et al., 2026; Cosgrave, 2020)
Eligible Designs	RCTs, quasi-experimental, CBA, ITS, cohort, case-control, cross-sectional (Contu et al., 2026; Arredondo et al., 2026)
Core Interventions	Education, regulation, financial incentives, personal/professional support, and bundled packages (Contu et al., 2026; Jinah et al., 2024; Onnis & Hunter, 2024)
Primary Outcomes	Number retained, retention duration, post-obligation rural practice (Contu et al., 2026; Arredondo et al., 2026)
Secondary Outcomes	Recruitment, career intention, burnout, satisfaction, well-being, workforce stability, cost-effectiveness (Contu et al., 2026; Coumans & Ciller, 2026; Russell et al., 2021)
Quality Appraisal	Use design-specific NIH or JBI tools; consider QuADS only if mixed-method evidence is retained (Contu et al., 2026; Russell et al., 2021; Coumans & Ciller, 2026)
Synthesis	Narrative thematic synthesis; meta-analysis only for closely comparable studies (Contu et al., 2026; Russell et al., 2021)

Figure 1: Recommended methodology for the planned systematic review

3-1 Core Design

Set the review question to identify which rural physician retention interventions show the strongest evidence, which contextual modifiers shape effectiveness, and where evidence gaps remain (Contu et al., 2026; Onnis & Hunter, 2024; Coumans & Ciller, 2026). Restrict inclusion to studies published in roughly the last 5–10 years to keep the review current, but justify the window because shorter windows can miss pre-COVID foundations while longer windows dilute policy relevance (Contu et al., 2026; Coumans & Ciller, 2026; Arredondo et al., 2026).

Use the WHO intervention typology as the organizing framework: education, regulation, financial incentives, and personal/professional support, with an added cross-cutting category for bundled or multifaceted packages (Contu et al., 2026; Jinah et al., 2024; Boone et al., 2024). Frame interpretation with WoP-RIF and realist logic so results can be grouped not only by intervention type but also by workplace, role/career, and community/place mechanisms (Cosgrave, 2020; O'Sullivan et al., 2026).

3-2 Eligibility Criteria

- Include quantitative studies evaluating retention or recruitment interventions for rural physicians, residents, or medical students (Contu et al., 2026).
- Accept experimental, quasi-experimental, and observational designs because stronger designs are rare in this field (Contu et al., 2026; Russell et al., 2021; Arredondo et al., 2026).
- Exclude editorials, opinion pieces, conference abstracts without full text, and qualitative-only studies if they lack extractable quantitative outcomes (Contu et al., 2026; Arredondo et al., 2026).
- Require measurable outcomes on retention, duration of stay, turnover, or post-program rural practice location (Contu et al., 2026; Jinah et al., 2024; Cosgrave, 2020).

3-3 Search and Appraisal

Search at minimum MEDLINE, Embase, and CENTRAL, and consider Web of Science plus targeted grey literature searching because program evaluations are often poorly represented in indexed journals (Contu et al., 2026; Russell et al., 2021; Onnis & Hunter, 2024; Arredondo et al., 2026). Use two independent reviewers for screening, extraction, and bias assessment, with a third reviewer resolving disagreements (Contu et al., 2026; Russell et al., 2021; Arredondo et al., 2026; Jinah et al., 2024).

Extract author, year, country, rurality definition, population, career stage, intervention components, comparator, follow-up length, outcome definition, and effect estimate (Contu et al., 2026; Coumans & Ciller, 2026; Arredondo et al., 2026). Add implementation fields such as maturity, tailoring, and organizational context because recent reviews identify these as major blind spots (O'Sullivan et al., 2026; Onnis & Hunter, 2024).

3-4 Analysis Plan

Because this literature has inconsistent rural definitions, weak comparators, and heterogeneous outcomes, make narrative synthesis the primary analysis (Russell et al., 2021; Arredondo et al., 2026). Conduct

random-effects meta-analysis only when at least two studies share sufficiently similar population, intervention, and outcome definitions, and report heterogeneity with I^2 (Contu et al., 2026).

A strong review should also prespecify subgroup synthesis by country income setting, physician career stage, intervention category, and whether the intervention is single-component or bundled (Contu et al., 2026; Jinah et al., 2024; O'Sullivan et al., 2026; Alidina et al., 2025). Include a separate synthesis of burnout-related pathways and contextual mechanisms, since workload, autonomy, and under-resourcing repeatedly link poor conditions to attrition (Coumans & Ciller, 2026; O'Sullivan et al., 2026; Boone et al., 2024).

4. Results

Educational pathways are the strongest retention signal, while bundled, context-sensitive packages are more plausible than single incentives.

The ten studies answer three linked questions: which interventions show the clearest retention signal, why bundled packages may work better, and why the evidence still limits firm causal ranking. The strongest comparative signal favors rural-background selection, distributed rural training, and career-development support, while financial and regulatory approaches show more variable durability (Russell et al., 2021; Contu et al., 2026).

4-1 Comparative Findings

Russell provides the strongest intervention-level evidence in this set, concluding from 34 observational studies that educational interventions have the clearest association with longer rural retention (Russell et al., 2021). That signal is specific: selecting rural-background students, training them in rural settings, and removing barriers to further skills development were each linked to better medium- and long-term retention (Russell et al., 2021). By contrast, strongly coercive return-of-service schemes performed worse after the obligation ended, although loan-repayment-linked obligations appeared more favorable than visa- or license-linked coercion (Russell et al., 2021).

Jinah extends this pattern to LMICs, where education, regulation, finance, and support all showed some positive results, but no single strategy dominated across settings (Jinah et al., 2024). About 77% of included LMIC studies reported positive outcomes, and both single-strategy and combined-strategy approaches could succeed, especially when education or regulatory measures were paired with effective administration and context fit (Jinah et al., 2024).

- **Educational pathways** showed the most consistent retention signal across the ten-study corpus (Russell et al., 2021).
- **Financial incentives** helped recruitment and sometimes retention, but durability and comparability were mixed (Arredondo et al., 2026; Alidina et al., 2025).
- **Regulatory approaches** retained doctors during service periods more reliably than after them (Russell et al., 2021; Jinah et al., 2024).

4-2 Mechanisms and Packages

The analytic logic across these studies is that retention is not a single decision about pay; it is the cumulative outcome of workplace, career, and community conditions (Contu et al., 2026; Cosgrave, 2020;

Boone et al., 2024). Cosgrave's WoP-RIF is useful here because it organizes retention into **Workplace/Organisational, Role/Career, and Community/Place** domains and explicitly aims to translate complexity into action (Cosgrave, 2020). The framework and its three domains are laid out visually in a practical form for synthesis and policy translation. (Figure 2: Integrated framework around the five essential elements of well-being and their possible impact on rural physician retention.)

O'Sullivan sharpens that logic by showing how professional support works when delivered as a bundle rather than as isolated activities (O'Sullivan et al., 2026). Lifelong career support, sustainable practice support, and healthcare and social support appear to act through comfort, confidence, competence, belonging, and bonding, which helps explain why mentorship alone or housing alone often underperforms (O'Sullivan et al., 2026). Boone reaches a similar conclusion from cross-national co-creation work: organizations emphasized interprofessional teamwork, leadership, onboarding, mentorship, workload monitoring, competitive conditions, and supportive infrastructure, and explicitly rejected a one-size-fits-all solution (Boone et al., 2024).

Study	Main Analytic Contribution	Discussion Implication
Russell	Education outperforms coercion	Build rural pipelines first (Russell et al., 2021)
O'Sullivan	Support works through mechanisms	Bundle career, practice, social support (O'Sullivan et al., 2026)
Boone	Retention needs multiple levers	Tailor packages to local attrition drivers (Boone et al., 2024)
Cosgrave	Actionable retention framework	Align interventions across three domains (Cosgrave, 2020)
Portugal case	Package improved deployment more than comparative retention	Tailor incentives and reassess uptake (Alidina et al., 2025)

Figure 1: Analytic contribution of five intervention-focused studies

4-3 Burnout and Attrition

Coumans adds an important mediating pathway that earlier retention reviews treated less explicitly: poor rural conditions appear to translate into attrition partly through **burnout and stress** (Coumans & Ciller, 2026). Across 11,130 rural physicians, burnout was the most prevalent outcome, driven by excessive workload, diminished autonomy, blurred boundaries, and under-resourcing (Coumans & Ciller, 2026). The proposed five-domain framework links fair conditions, belonging, mastery, purpose, and mental health support to commitment, making burnout reduction a retention intervention rather than a separate wellness issue (Coumans & Ciller, 2026). The causal pathway from stressors to workforce outcomes is shown clearly in the conceptual model. (Figure 1: Conceptual framework illustrating pathways from multi-level stressors to workforce outcomes, informed by Carol Weiss' theory of change.)

Onnis complements this by showing that organization-level evaluations remain thin even when interventions around remuneration, education-to-employment pathways, and working or living conditions are implemented (Onnis & Hunter, 2024). Arredondo makes the same point in U.S. rural primary care: most programs still do not report standardized long-term retention outcomes, so apparent success often reflects incomplete measurement rather than robust comparative evidence (Arredondo et al., 2026).

- **Burnout** emerged as the most prevalent adverse outcome in rural physicians (Coumans & Ciller, 2026).
- **Workload and autonomy loss** were recurrent drivers of turnover intention (Coumans & Ciller, 2026).
- **Implementation evidence** remains weaker than intervention theory (Onnis & Hunter, 2024; Arredondo et al., 2026).

4-4 Evidence Gaps and Q1-Style Discussion

Contu is valuable not for intervention results, but for structuring a modern Q1 discussion around intervention logic, contextual modifiers, and workforce-relevant outcomes such as retention duration, career intentions, well-being, cost-effectiveness, and service accessibility (Contu et al., 2026). Across the ten studies, three limitations recur: most evidence is observational, outcome definitions are inconsistent, and implementation detail is often too sparse to isolate which component of a package caused benefit (Russell et al., 2021; Arredondo et al., 2026; Jinah et al., 2024; Onnis & Hunter, 2024). Russell notes that all included studies were observational, Jinah highlights weak long-term program evaluation in LMICs, and Coumans notes geographic skew and limited generalizability (Russell et al., 2021; Jinah et al., 2024; Coumans & Ciller, 2026).

The Portugal case usefully illustrates both promise and caution. A national package increased uptake and produced a 59% retention rate in the same underserved institution, but the difference from non-participants was minimal, and some non-financial incentives had limited real-world usability (Alidina et al., 2025). That pattern fits the broader literature: bundled packages are conceptually stronger because they address multiple determinants at once, but their effectiveness still depends on local design, implementation maturity, and transparent follow-up (Contu et al., 2026; O'Sullivan et al., 2026; Alidina et al., 2025; Boone et al., 2024). For a Q1 discussion, the most defensible conclusion is that **rural educational pipelines** have the strongest current evidence, while **multifaceted support packages** are the most policy-plausible strategy for sustainable retention, especially when they target workload, career development, and belonging together.

5- Conclusion

Educational and training-pathway interventions show the most consistent association with **rural physician retention**, especially rural-background selection, distributed rural training, and support for ongoing skills development (Russell et al., 2021). Financial incentives can improve recruitment and sometimes retention, but their effects are less consistent across settings and often depend on program design, follow-up duration, and complementary supports (Contu et al., 2026; Arredondo et al., 2026; Alidina et al., 2025). Strongly coercive return-of-service approaches appear less durable once obligatory

service ends, whereas less coercive and more supportive strategies appear more sustainable (Russell et al., 2021).

Across contexts, retention is shaped by interacting workplace, career, and community factors rather than a single intervention lever (Contu et al., 2026; Cosgrave, 2020). Burnout, workload strain, diminished autonomy, and weak professional or social support are central pathways linking poor conditions to attrition (Coumans & Ciller, 2026). The literature therefore supports **multifaceted, context-sensitive packages** that combine education, professional support, fair working conditions, and tailored financial or regulatory measures, while also showing that the evidence base remains limited by observational designs, inconsistent retention definitions, sparse comparator groups, and weak long-term evaluation (Contu et al., 2026; Jinah et al., 2024; Boone et al., 2024; Russell et al., 2021; Jinah et al., 2024).

6- Recommendations

- Prioritize **rural education pipelines** from student selection through postgraduate rural training (Russell et al., 2021).
- Design retention strategies as **bundled packages**, not single incentives (Contu et al., 2026; Boone et al., 2024; O'Sullivan et al., 2026).
- Target **workload, autonomy, and burnout** directly through organizational reform and professional support (Coumans & Ciller, 2026; Boone et al., 2024).
- Standardize reporting of retention duration, post-obligation practice location, specialty, and workforce outcomes (Contu et al., 2026; Arredondo et al., 2026).

References

1. Alidina, S., Cortes, J., & Fronteira, I. (2025). Effectiveness of an incentives package to attract and retain physicians to underserved areas: a case study from Portugal. *Human Resources for Health*, 23. <https://doi.org/10.1186/s12960-025-00999-0>
2. Arredondo, K., Bay, K., Witte, L., Touchett, H. N., Sonnenfeld, M., Paterson-Roberts, A., Vincenti, M., & Watts, B. V. (2026). Rural Practice Made Attractive: A Scoping Review of Rural Primary Care Physician Recruitment and Retention Incentives. *Journal of General Internal Medicine*, 41, 1367 - 1378. <https://doi.org/10.1007/s11606-026-10218-8>
3. Arredondo, K., Touchett, H. N., Khan, S., Vincenti, M., & Watts, B. V. (2023). Current Programs and Incentives to Overcome Rural Physician Shortages in the United States: A Narrative Review. *Journal of General Internal Medicine*, 38, 916 - 922. <https://doi.org/10.1007/s11606-023-08122-6>
4. Boone, A., Lavreysen, O., De Vries, N., De Winter, P., Mazzucco, W., Matranga, D., Maniscalco, L., Miceli, S., Savatteri, A., Kowalska, M., Szemik, S., Barański, K., & Godderis, L. (2024). Retaining

- Healing Hands: A Transnational Study on Job Retention Interventions for the Healthcare Workforce. *Qualitative Health Research*, 34, 1351 - 1366. <https://doi.org/10.1177/10497323241254253>
5. Contu, F., Cossu, G., Bitti, B., Primavera, D., Verma, P., Forte, V., Ford, J. A., & Carta, M. (2026). Physicians shortage in primary care: a protocol for updating a systematic review of recruitment and retention strategies. *F1000Research*, 15. <https://doi.org/10.12688/f1000research.174754.1>
 6. Cosgrave, C. (2020). The Whole-of-Person Retention Improvement Framework: A Guide for Addressing Health Workforce Challenges in the Rural Context. *International Journal of Environmental Research and Public Health*, 17. <https://doi.org/10.3390/ijerph17082698>
 7. Coumans, J. V. F., & Ciller, I. (2026). Stress and retention challenges among rural and regional physicians: a mixed-methods systematic review and framework for action. *Journal of Public Health (Oxford, England)*, 48, 572 - 581. <https://doi.org/10.1093/pubmed/fdag011>
 8. Han, H., & Grady, C. (2025). Retaining family physicians in comprehensive primary care. *Canadian Family Physician Médecin de famille canadien*, 71, e223 - e231. <https://doi.org/10.46747/cfp.7109e223>
 9. Ji, X., Dougherty, M., Lee, Y.-N., Poghosyan, L., & Lelutiu-Weinberger, C. T. (2025). Organizational Interventions to Address Primary Care Provider Burnout: A Systematic Review. *Medical care research and review : MCRR*, 83, 167 - 182. <https://doi.org/10.1177/10775587251391520>
 10. Jinah, N., Adnan, I. K., Bakit, P., Sharin, I. A., & Lee, K.-Y. (2024). Retention strategies for medical doctors in low- and middle-income countries (LMICs): are they effective? A scoping review. *BMC Health Services Research*, 24. <https://doi.org/10.1186/s12913-024-12154-x>
 11. Koussa, E. M., Atun, R., Bowser, D., & Kruk, M. (2016). Factors influencing physicians' choice of workplace: systematic review of drivers of attrition and policy interventions to address them. *Journal of Global Health*, 6. <https://doi.org/10.7189/jogh.06.020403>
 12. Kumar, S., & Clancy, B. (2020). Retention of physicians and surgeons in rural areas-what works?. *Journal of public health*. <https://doi.org/10.1093/pubmed/fdaa031>
 13. Noya, F., Carr, S., Freeman, K. J., Thompson, S., Clifford, R., & Playford, D. (2021). Strategies to Facilitate Improved Recruitment, Development, and Retention of the Rural and Remote Medical Workforce: A Scoping Review. *International Journal of Health Policy and Management*, 11, 2022 - 2037. <https://doi.org/10.34172/ijhpm.2021.160>
 14. Onnis, L.-A., & Hunter, T. (2024). Improving rural and remote health workforce retention amid global workforce shortages: a scoping review of evaluated workforce interventions.. *Journal of health organization and management, ahead-of-print ahead-of-print*. <https://doi.org/10.1108/jhom-03-2024-0077>
 15. O'Sullivan, B., Battye, K., & Roczo, D. (2026). Professional support to improve rural medical workforce retention, what works in what context: a realist evaluation. *Human Resources for Health*, 24. <https://doi.org/10.1186/s12960-026-01065-z>
 16. Panagioti, M., Panagopoulou, E., Bower, P., Lewith, G., Kontopantelis, E., Chew-Graham, C., Dawson, S., Van Marwijk, H., Geraghty, K. J., & Esmail, A. (2017). Controlled Interventions to

Reduce Burnout in Physicians: A Systematic Review and Meta-analysis. *JAMA Internal Medicine*, 177, 195–205. <https://doi.org/10.1001/jamainternmed.2016.7674>

17. Russell, D., Mathew, S., Fitts, M., Liddle, Z., Murakami-Gold, L., Campbell, N., Ramjan, M., Zhao, Y.-J., Hines, S., Humphreys, J., & Wakerman, J. (2021). Interventions for health workforce retention in rural and remote areas: a systematic review. *Human Resources for Health*, 19. <https://doi.org/10.1186/s12960-021-00643-7>
18. Shah, S. M., Zaidi, S. A., Ahmed, J., & Réhman, S. (2016). Motivation and Retention of Physicians in Primary Healthcare Facilities: A Qualitative Study From Abbottabad, Pakistan.. *International journal of health policy and management*, 5 8, 467-475. <https://doi.org/10.15171/ijhpm.2016.38>
19. Verma, P., Ford, J., Stuart, A., Howe, A., Everington, S., & Steel, N. (2016). A systematic review of strategies to recruit and retain primary care doctors. *BMC Health Services Research*, 16. <https://doi.org/10.1186/s12913-016-1370-1>