

# Retention of physicians and surgeons in rural areas—what works?

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## ABSTRACT

**Background** Causes for health inequity among rural populations globally are multifactorial, and include poorer access to healthcare professionals. This study summarizes the recent literature identifying factors that influence rural doctor retention and analyses strategies implemented to increase retention. Uniquely, this study addresses the importance of context in the planning, implementation and success of these strategies, drawing on literature from high-, middle- and low-income countries.

**Methods** A systematic review of the English literature was conducted in two parts. The first identified factors contributing to rural doctor retention, yielding 28 studies (2015–2019). The second identified 19 studies up to 2019 that assessed the outcomes of implemented rural retention strategies.

**Results** Universal retention factors for health professionals in a rural environment include rural background, positive rural exposure in training or in the early postgraduate years and personal and professional support. Financial incentives were less influential on retention, but results were inconsistent between studies and differed between high-, middle- and low-income nations. Successful strategies included student selection from rural backgrounds into medical school and undergraduate education programs and early postgraduate training in a rural environment. Bundled or multifaceted interventions may be more effective than single factor interventions.

**Conclusion** Rural health workforce retention strategies need to be multifaceted and context specific, and cannot be effective without considering the practitioner's social context and the influence of their family in their decision making. Adequate rural health facilities, living conditions, work-life balance and family, community and professional support systems will maximize the success of implemented strategies and ensure sustainability and continuity of healthcare workforce in rural environments.

**Keywords** doctors, factors, health equity, retention, rural health, strategies

## Introduction

There is unequal distribution of healthcare workers between urban and rural areas in most countries. Approximately 56% of the global rural population lacks access to adequate healthcare, compared to 22% of the global urban population.<sup>1,2</sup>

In 2010, the World Health Organization (WHO) published global policy recommendations for 'increasing access to health workers in remote and rural areas through improved retention.' These recommendations were categorized as education, regulation, financial incentives and personal and professional support and included strategies, such as targeted admission policies for rural background students, rural training programs or service requirements and improved working environments and professional development opportunities.<sup>2</sup>

A Cochrane systematic review in 2015<sup>3</sup> explored the evidence for interventions to increase the rural health workforce. Despite finding only one controlled study,<sup>4</sup> there was strong evidence from observational and cohort studies for selection of rural origin and rural intention students, positive rural exposure for medical students and doctors in training and direct financial incentives. Coercive strategies, while effective in the short-term for recruitment, may have adverse consequences for retention of rural practitioners.

In 2016, a systematic review reported on recruitment and retention strategies for primary care, with some findings

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relevant to rural workforce. There was evidence to support undergraduate and postgraduate placements in underserved areas, and selective recruitment of medical students, but the study was limited to defined interventions relating to primary care in high-income countries.<sup>5</sup>

We undertook this study to investigate new knowledge around factors associated with retention, since the WHO recommendation in 2010, and results of interventions to promote retention of rural medical practitioners, reported after the 2015 Cochrane review. Further, we acknowledge the importance of context in the interpretation of evidence, and the design and implementation of initiatives to increase rural workforce. Results are expressed within the contextual framework outlined by.<sup>6</sup> A systematic review performed by Liu *et al.* attempted to analyze the reasons behind inconsistent success rates of rural practitioner retention strategies between countries, and identified macro-, meso- and micro-level factors that were context (i.e. culture and economy) and population dependent.

Therefore, the second objective of this review is to identify key context factors that policymakers should consider when they design and implement interventions to promote rural workforce retention.

## Methods

Two electronic searches of Medline (via PubMed) were performed and the first author screened abstracts for studies that met inclusion criteria, which was verified by the second author. An initial literature search was performed to find qualitative studies identifying factors that contributed to the retention of doctors in a rural setting. MeSH and free-text terms in healthcare, rural, medical professional and recruitment and retention were used in the search strategy. Grey literature searches were conducted using internet search engines and specific websites including WHO. Publications were limited to the last 5 years (2015–2019) to maintain relevance and reduce redundancy.

A second literature search was conducted to find quantitative studies assessing strategies that have been implemented to promote and increase rates of retention of doctors in rural areas. MeSH and free-text terms in rural, medical professional, retention and policy and strategy were used in the search, and all existing publications were reviewed up to 2019.

### Inclusion/exclusion criteria

In the first search, 51 articles were identified. To meet inclusion criteria, studies needed to be analytical or descriptive studies aimed at identifying factors that were more prevalent among doctors who practiced rurally, or were identified by

rural doctors as influencing their decision to work in a rural environment. Each article was screened by 1 author and 25 were excluded for irrelevance or not meeting the inclusion criteria. In total, 28 studies were included in the final analysis (Table 1).

In the second search, 42 studies were identified and screened by 1 author, 23 were excluded due to irrelevance, inaccessibility or not meeting inclusion criteria and 19 studies were included in the final analysis. To meet inclusion criteria, studies needed to evaluate the outcomes of an intervention designed to increase the retention rates of doctors in rural areas. Studies from countries of all income levels were included. Studies were limited to the English language and those including medical trainees or doctors, and studies relating to other health professionals only or lacking an intervention were excluded. In total, 20 studies from the last decade were identified that reported the outcomes of policies or strategies that had been implemented to address physician shortages in rural areas. These studies addressed initiatives or programs that had been implemented in North America, Australia, Asia and Africa (Table 2). In total, 13 studies originated from high-income countries while 7 originated from middle-income countries. There were no studies from low-income countries that evaluated the outcomes from implemented strategies to address the shortage of rural healthcare workers (Table 4).

### Data extraction and analysis

Both authors independently extracted the data from the included studies for both searches. Extracted data included study design, participants, sample size, factors and interventions. Outcomes included proportion of doctors who chose to work in a rural area and the duration of this work. A modified Newcastle-Ottawa scale and quality assessment tools by the National Institute of Health were independently used by both authors to assess the quality of the included studies. Studies were assigned a good, moderate or low quality rating based on a scale agreed upon by the two authors. Discrepancies were resolved via discussion until a consensus was reached<sup>7</sup> [Appendix A1]. Studies were stratified using the World Bank Classifications of high-, middle- or low-income countries, the Liu *et al.*<sup>6</sup> contextual framework of macro-, meso- or micro-level factors (Table 3) and the WHO framework of education, regulation, financial incentives and personal and professional support.

### Terminology

The word 'rural' will be used throughout the text to apply to remote, rural and regional contexts. Individual study definitions of remote, rural and regional were accepted.

**Table 1** Factors Influencing Rural Recruitment

| <i>Author, country</i>                              | <i>Study design, sample size</i>        | <i>Influential factors</i>  |
|---|---|---|
| Hahn and Steinhauser, <sup>43</sup> Germany         | Cross-sectional survey, <i>n</i> = 7    | Positive exposure and education relating to rural practice via a structured curriculum and 'field trip'   |
| Paladine <i>et al.</i> , <sup>41</sup> USA          | Cross-sectional survey, <i>n</i> = 25   | Personal and spousal fit with community; social connections and previous training experience in a rural setting   |
| Morken <i>et al.</i> , <sup>38</sup> USA            | Cross-sectional survey, <i>n</i> = 16   | Spousal support, meaningful work and integration into the community   |
| Wilhelmi <i>et al.</i> , <sup>46</sup> Germany      | Cross-sectional survey, <i>n</i> = 33   | Personal connection to rural areas, various social networks based on life stage and educational structures  |
| Jing <i>et al.</i> , <sup>31</sup> China            | Retrospective analysis, <i>n</i> = 5808 | Financial incentives, career development opportunities, greater workforce support   |
| MacQueen <i>et al.</i> , <sup>10</sup> USA          | Systematic review, <i>n</i> = 31        | Rural background, exposure and training   |
| Mian <i>et al.</i> , <sup>24</sup> Canada           | Cross-sectional survey, <i>n</i> = 10   | Rural community engagement in medical education and training  |
| Nagai <i>et al.</i> , <sup>33</sup> Senegal         | Cross-sectional survey, <i>n</i> = 176  | Unique to Senegal: fair HR management by MoH (clear non-negotiable rural rotations), accurate and regular healthcare worker distribution data, continuous education, improved working environment and resources, permanent contracts, family bonding and religious related non-financial incentives |
| Parlier <i>et al.</i> , <sup>13</sup> USA           | Systematic review, <i>n</i> = 83        | Rural background and exposure, spousal support, financial incentives, rural community integration and work-life balance   |
| Nelson <i>et al.</i> , <sup>12</sup> USA            | Retrospective analysis, <i>n</i> = 1645 | Undergraduate rural medical training  |
| Witt, <sup>37</sup> Canada                          | Cross-sectional survey, <i>n</i> = 561  | Work-life balance (including income, work hours and on-call frequency)  |
| Gaski and Abelsen, <sup>9</sup> Norway              | Retrospective analysis, <i>n</i> = 388  | Early rural placement sign up model for internship  |
| Mbemba <i>et al.</i> , <sup>32</sup> multiple       | Systematic review, <i>n</i> = 15        | Rural background/origins and lifestyle<br>Specific to developing countries: financial incentives, improved working conditions and career advancement  |
| Lawan <i>et al.</i> , <sup>39</sup> Nigeria         | Cross-sectional survey, <i>n</i> = 262  | Unique to Nigeria: good facility infrastructure and equipment, housing, utilities (water and electricity), schools for children and road access to town   |
| Mbemba <i>et al.</i> , <sup>11</sup> Mali           | Cross-sectional survey, <i>n</i> = 40   | Access to Internet  |
| Phillips <i>et al.</i> , <sup>42</sup> USA          | Cross-sectional survey, <i>n</i> = 40   | Reduced/flexible work hours, supportive spouses, work-life balance and clear work boundaries  |
| Russell <i>et al.</i> , <sup>47</sup> Australia     | Systematic review, <i>n</i> = 8         | Geographical location and community, professional and organizational factors, financial and economic factors, education, personal and regulatory factors  |
| Myroniuk <i>et al.</i> , <sup>40</sup> Canada       | Cross-sectional survey, <i>n</i> = 53   | Accommodating the educational, professional and cultural needs of spouse  |
| Watanabe-Galloway <i>et al.</i> , <sup>48</sup> USA | Cross-sectional survey, <i>n</i> = 12   | Longer rural residency programs, enhanced loan repayment programs, rural internships, financial reimbursement   |
| Darkwa <i>et al.</i> , <sup>29</sup> Bangladesh     | Cross-sectional survey, <i>n</i> = 21   | Unique to Bangladesh: improved working conditions, career development options, adequate equipment and facilities, better compensation, adequate living conditions (safe drinking water and electricity)<br>Overall shortage of staff nationally, lack of policies, lack of fairness in promotions   |
| Abimbola <i>et al.</i> , <sup>28</sup> Nigeria      | Cross-sectional survey, <i>n</i> = 32   | Unique to Nigeria: centralization of health system responsibilities to higher levels of government, community engagement in healthcare provider retention (population participation, co-financing and c-managing facilities, preferring medical providers versus traditional healers)               |

Continued

**Table 1** Continued

| <i>Author, country</i>                              | <i>Study design, sample size</i>             | <i>Influential factors</i>   |
|---|--|--|
| Opoku <i>et al.</i> , <sup>34</sup> USA             | Mixed cross-sectional survey, <i>n</i> = 240 | State loan repayment program, physician integration into communities   |
| Bagayoko <i>et al.</i> , <sup>45</sup> Mali         | Cross-sectional survey, <i>n</i> = 45        | Telehealth contributes to improved retention   |
| Warburton <i>et al.</i> , <sup>49</sup> Australia   | Cross-sectional survey, <i>n</i> = 17        | Retention factors among older healthcare workers—extrinsic factors: feeling valued, workload, support, flexibility<br>Intrinsic factors: intention to retire, family, job satisfaction, finances<br>IE: reduce workload, increase management-clinician communication, financial remuneration, professional development |
| Kaye <i>et al.</i> , <sup>44</sup> Uganda           | Cross-sectional survey, <i>n</i> = 60        | Community-based training experiences during medical school   |
| Wilson <i>et al.</i> , <sup>22</sup> South Africa   | Systematic review, <i>n</i> = 110            | Selection, training, coercion, incentives, support   |
| Morken <i>et al.</i> , <sup>38</sup> USA            | Cross-sectional survey, <i>n</i> = 16        | Spousal support, Job satisfaction, rural community integration, work-life balance, rural training and exposure   |
| Liu <i>et al.</i> , <sup>6</sup> multiple countries | Systematic review, <i>n</i> = 40             | Macro-factors—social, economic, political<br>Meso-factors – deficit and maldistribution of health workforce, private health services, decentralization of health system, health financing<br>Micro-factors—monitoring and evaluation, funding, legislation process   |

## Results

### Education

The known factors (rural origin and rural intention student selection) and interventions (positive rural exposure during medical school and the early postgraduate period) that increase rural and remote health workforce recruitment are also strongly associated with retention in all contexts.<sup>8–22</sup> Compared to their peers, undergraduate rural medicine program graduates are 10 times more likely to be retained in rural areas 5 years postgraduation and significantly more likely to be retained long-term (25–30 years,  $P < 0.2$ ) in rural areas.<sup>19</sup> More than 50% of rural program graduates work rurally compared to 9% of all graduates, and rural graduate long-term retention is more than 45%.<sup>23</sup> Although these results may be impacted by self-selection or rural origin selection policies, rural programs are also successful in converting metropolitan origin students to rural practice.<sup>23</sup> Academic and postgraduate performance were similar for rural program and non-rural program students.<sup>18,23</sup> Socially accountable medical school policies, including locating medical educational sites in underserved rural communities, resulted in improved recruitment, reduced cost of recruitment and improved retention of medical workforce, in one area moving from a physician shortage of 30 to only 1 vacancy.<sup>24</sup> A number of studies from the USA have reported the positive effect of two rural medical programs of the graduates that commenced practice in a rural area,

most were retained long-term (80% after 11–16 years of practice).<sup>14–20,23,25</sup> Programs established in India and Africa have shown similar results.<sup>26,27</sup>

The WHO reported on three rural medical schools in Canada, Australia and the Philippines. Despite different educational strategies, all these programs share the same principles: community-specific education, student recruitment from underserved areas, located close to the communities they serve and a curriculum employing community-based teachers facilitating early clinical contact. More than a decade since its creation, 70% of graduates from Flinders University in Australia are currently practicing in rural practice. Since its first graduating class in 2009, 68% of family medicine graduates from the Northern Ontario School of Medicine in Canada are practicing in rural areas. Finally, almost 90% of graduates from Zamboanga School of Medicine in the Philippines continue their training and clinical practice in a rural area.<sup>8,21</sup>

### Regulation and financial incentives

In the only controlled study to meet Cochrane criteria, the introduction of a national health scheme improved recruitment, retention and patient outcomes in rural areas of Taiwan.<sup>3</sup>

Coercive programs and financial incentive programs are often combined, and their impact is context dependent. Coercive programs include restricted practice and visa waivers or loan repayment schemes with repayment in compulsory rural

**Table 2** Strategies Influencing Rural Recruitment

| <i>Author, country</i>                              | <i>Strategy</i>  | <i>Study design, sample size</i>              | <i>Results</i>  |
|---|--|---|---|
| Van Essen <i>et al.</i> , <sup>27</sup> Pan Africa  | Rural-based General Surgery Training Program   | Cross-sectional survey, <i>n</i> = 100        | Increased retention rate of African Surgeons in a rural setting   |
| Lisam <i>et al.</i> , <sup>26</sup> India           | Chhattisgarh Rural Medical Corps   | Mixed, cross-sectional survey, <i>n</i> = 57  | Reduced vacancy of doctors from 90 to 45%   |
| Liu <i>et al.</i> , <sup>6</sup> multiple countries | Financial incentives and compulsory rural service programs   | Systematic review, <i>n</i> = 40              | Mixed efficacy—successful in Japan and USA, not successful in Zambia  |
| Goma <i>et al.</i> , <sup>30</sup> Zambia           | Financial incentives and subsidies via Zambian Health Workers Retention Scheme   | Cross-sectional survey, <i>n</i> = 45         | Current financial incentives did not address living and working conditions adequately—failed retention strategies due to inadequate financial compensation, lack of education about strategies and in consistent implementation |
| Opoku <i>et al.</i> , <sup>34</sup> USA             | J-1 visa waiver and state loan repayment programs  | Mixed cross-sectional survey, <i>n</i> = 240  | Physicians more likely to leave rural placement when enrolled in J-1 visa waiver program compared to state loan program   |
| Gow <i>et al.</i> , <sup>50</sup> Zambia            | Zambian Health Workers Retention Scheme  | Mixed, cross-sectional survey, <i>n</i> = 234 | Not successful in recruitment and retention of physicians to rural positions  |
| Rabinowitz <i>et al.</i> , <sup>20</sup> USA        | Physician Shortage Area Program of Jefferson Medical College   | Longitudinal cohort study, <i>n</i> = 1937    | Medical school rural programs promote recruitment and long-term retention of physicians in rural areas  |
| Rabinowitz <i>et al.</i> , <sup>18</sup> USA [A]    | Physician Shortage Area Program of Jefferson Medical College   | Longitudinal cohort study, <i>n</i> = 2394    | Medical school rural programs promote recruitment and retention of female physicians in rural areas   |
| Rabinowitz <i>et al.</i> , <sup>19</sup> USA [B]    | Physician Shortage Area Program of Jefferson Medical College   | Longitudinal cohort study, <i>n</i> = 2394    | Medical school rural programs promote recruitment and retention of physicians in rural areas  |
| Buykx <i>et al.</i> , <sup>36</sup> Australia       | Financial incentives, health worker obligations, multi-strategy approach to address personal and work factors<br><br>'Bundle' retention incentives: maintaining adequate and stable staffing, realistic and competitive remuneration, adequate infrastructure, sustainable workplace organization, ensuring social, family and community support and creating professional environment that rewards physicians for improved patient care | Systematic review, <i>n</i> = 15              | Non-financial incentives may play bigger role in retention. Financial incentives may only increase short term recruitment   |

Continued

**Table 2** Continued

| <i>Author, country</i>                           | <i>Strategy</i>   | <i>Study design, sample size</i>           | <i>Results</i>   |
|--|---|--|--|
| Frehivot <i>et al.</i> , <sup>35</sup> worldwide | Compulsory service programs   | Mixed, systematic review <i>n</i> = 70     | Multiple countries have not yet measured outcomes of programs<br>Efficacy reported in Puerto Rico, Indonesia, Turkey and South Africa and Thailand |
| Dolea <i>et al.</i> , <sup>8</sup> worldwide     | Rural medical school location, length of medical placements, bonding schemes, financial incentives (Aus.), professional support, outreach services and telehealth | Systematic review, <i>n</i> = 27           | Improved retention   |
| Strassed and Neusy, <sup>21</sup> worldwide      | Context sensitive rural training based on country needs   | Descriptive study, <i>n</i> = 3            | Improved recruitment and retention   |
| Halaas <i>et al.</i> , <sup>23</sup> USA         | Rural Physician Associate Program   | Retrospective analysis, <i>n</i> = 1175    | Long-term rural placements during training increase graduates choosing to practice rurally   |
| Rabinowitz <i>et al.</i> , <sup>17</sup> USA     | Physician Shortage Area Program of Jefferson Medical College  | Systematic review, <i>n</i> = 10           | Medical school rural programs promote recruitment and retention of physicians in rural areas   |
| Rabinowitz <i>et al.</i> , <sup>16</sup> USA     | Physician Shortage Area Program of Jefferson Medical College  | Longitudinal cohort study, <i>n</i> = 1937 | Medical school rural programs promote recruitment and retention of physicians in rural areas   |
| Rabinowitz <i>et al.</i> , <sup>15</sup> USA     | Physician Shortage Area Program of Jefferson Medical College  | Retrospective cohort study, <i>n</i> = 206 | Medical school rural programs promote recruitment and retention of physicians in rural areas   |
| Rabinowitz, <sup>14</sup> USA                    | Physician Shortage Area Program of Jefferson Medical College  | Longitudinal cohort study, <i>n</i> = 47   | Medical school rural programs promote recruitment and retention of physicians in rural areas   |
| Brazeau, Potts and Hickner, <sup>25</sup> USA    | Rurally located physician training program  | Cross-sectional survey, <i>n</i> = 28      | Rural-based residency programs may lead to increased rural practitioners   |

service. In high-income countries, recruitment is increased, but retention beyond the period of compulsion is limited and, particularly for international medical graduates, job satisfaction is markedly reduced compared to International Medical Graduates (IMGs) without restriction on practice location.<sup>22</sup> In low-income countries, coercive programs may be more socially or culturally acceptable, and are most effective when combined with the financial security of life-long government employment, effective implementation or with adequate financial and non-financial incentives, sufficient to overcome the increased cost, hardship and livability challenges in rural areas.<sup>6,27–34</sup>

A WHO report on the efficacy of compulsory rural service programs for various healthcare professionals in 70 countries showed that most countries have yet to measure

the outcomes of these programs. However, improved rates of rural doctor recruitment and retention have been reported in Puerto Rico, Indonesia, Norway, Turkey, South Africa and Thailand. The report notes that programs must be supported by the country's broader health and government systems to improve workplace infrastructure, living conditions and educational opportunities in rural areas. Transparency of process and of expectations for health professionals on rural placements is important in maximizing their participation in such programs.<sup>35</sup>

In high-income countries, direct financial incentives without coercion are most effective, particularly loan repayment programs (in countries with high cost of medical education). Financial incentives to offset increased workload and on call commitments, especially more than 1:4 on call, need to be

**Table 3** Factors by Country Income Status

|   | Retention factors                                    | Studies mentioning said factors |
|---|--|---------------------------------|
| High-income countries ( <i>n</i> = 17 studies)  | Canada, Norway, USA, Germany and Australia           |                                 |
| Macro   | Financial incentives                                 | 12                              |
|   | Access to education and professional development     |                                 |
|   | Rural exposure                                       |                                 |
| Meso  | Rural community engagement                           | 8                               |
|   | Geographical location                                |                                 |
|   | Access to education and professional development     |                                 |
|   | Work-life balance/boundaries                         |                                 |
| Micro   | Personal integration into community                  | 11                              |
|   | Spouse/family integration into community             |                                 |
| Middle-income countries ( <i>n</i> = 6 studies) | China, Senegal, Nigeria, Bangladesh and South Africa |                                 |
| Macro   | Financial incentives                                 | 5                               |
|   | Access to education and professional development     |                                 |
|   | Fair government policies                             |                                 |
|   | Centralization of health system                      |                                 |
| Meso  | Workforce support                                    | 6                               |
|   | Religious supports                                   |                                 |
|   | Facility Infrastructure                              |                                 |
|   | Permanent contracts                                  |                                 |
| Micro   | Family integration into community                    | 3                               |
|   | Community engagement                                 |                                 |
| Low-income countries ( <i>n</i> = 3 studies)    | Mali and Uganda                                      |                                 |
| Macro   | –  | –                               |
| Meso  | Telehealth   | 2                               |
|   | Internet access                                      |                                 |
| Micro   | Rural-based learning programs                        | 1                               |

substantial to be acceptable to practitioners.<sup>36,37</sup> In middle- and low-income countries, financial incentives may be more effective where the average income of the health workforce is below the cost of living. No incentive was sufficient to overcome the absence of inadequate healthcare facilities, basic amenities (power, water and transport) or personal safety. Coercive and financial incentive schemes are less effective in middle- and low-income countries with decentralized government, due to problems with implementation and competition from private and NGO healthcare facilities.

In middle-income countries, macro-factors including fair and equitable government healthcare policies and centralized healthcare systems could promote more even distribution of the healthcare workforce. Specific issues included preferential treatment regarding competitive urban placement opportunities offered to healthcare workers of high socioeconomic status or with interpersonal connections, as well as ineffective

decentralized healthcare leading to uneven and inconsistent health resource distribution, often worsening the quality of rural positions in favor urban positions.

### Personal and professional support

#### Family

All practitioners prioritize the needs of their family. In high-income countries, Paladino *et al.* found that successful integration into a rural community required compatibility between the physician's goals and community characteristics, meaningful opportunities for a spouse or partner, effectively developing personal friendships and feeling of purpose. Morken<sup>38</sup> found that practitioners prioritized retention factors, in order, as their partner, meaningful work, local community, medical community and work environment, work/life balance and broad scope of practice. In Nigeria, Lawan<sup>39</sup> reported medical infrastructure and equipment,

basic amenities (housing, water and electricity), schools for children and road access to town were highly important. The social, professional and cultural needs of partners influence their satisfaction with rural location and can positively or negatively impact the rural career decisions of physicians.<sup>40</sup>

### Gender

Female gender has been associated with lower recruitment and retention to rural and remote settings. It may be that female gender is a surrogate marker of the unequal distribution of unpaid work between males and females, so that female practitioners with supportive relationships, flexible work hours, community support and effective work/life boundaries can be successfully recruited and retained in rural settings.<sup>41,42</sup>

### Professional

Rural practitioners consistently rate their broad scope of practice as a positive retention factor. Although perceptions of medical students and junior doctors regarding rural practice are influenced by their concern about the broad range of skills needed, rural exposure in medical and nursing school increased students' intention to go rural and increased their confidence in doing so.<sup>43,44</sup>

In all countries, working conditions, work environment and opportunities for professional advancement are important.<sup>32</sup> In Canada, Witt *et al.* reported rural physicians considered income, hours worked and on-call frequency as very important retention factors. An on-call roster of more than 1:4 was very undesirable and much higher compensation was expected. Overall, job satisfaction increased with income and decreased with hours worked.

Internet access and telehealth in low-income countries provided a method of professional development for healthcare workers that contributed to recruitment and retention.<sup>32,45</sup> Though this was limited by education and training of workers to use these technologies, it allowed workers to find information that could be used to improve their practice, and provided access to distance learning materials to facilitate professional development.

### Bundled interventions

Russell *et al.* studied retention strategies for primary health practitioners in Australia and recommended multifaceted and 'bundled' programs in response to practitioner need, to target the combination of factors important for retention. Buykx *et al.* (Australia) developed a framework from their systemic review: staffing, infrastructure, remuneration, workplace organization, professional environment and social, family

and community support. Dolea<sup>8</sup> in a global systematic review concluded most of the successful rural retention interventions had 'multiple effects on the continuum from attraction through to recruitment, retention and, finally, health workforce or health systems performance.' Parlier *et al.* described multiple sequential and inter-related factors required to retain rural doctors: individual factors (rural origin or rural-interested students) plus education and training (positive rural exposure), rural medical practice factors (autonomy, broad scope of practice, flexibility) plus quality of rural life (including community integration, partner satisfaction and work-life balance).

### High-income countries

Thirteen studies from high-income countries met our inclusion criteria. Effective strategies identified that promoted rural practitioner retention included rural-based training programs, either elective or compulsory, sustainable workplace organization and infrastructure and social supports. Visa waiver programs were identified as a non-effective strategy while financial incentives remained inconclusive due to cultural, political and economic contexts.

### Middle-income countries

Seven studies from middle-income countries identified rural placements, financial incentives and adequate workplace infrastructure as effective retention strategies; however, this was dependent on their consistency, as inconsistent strategies with inadequate education of or awareness to health practitioners were unlikely to be effective. Compulsory rural service programs varied in success in middle-income countries, and therefore remain an inconclusive strategy.

### Low-income countries

Of the studies performed in low-income countries, only three met our inclusion criteria. Nil macro-factors were explored in these studies, and meso-factors identified that would aid rural practitioner retention included the provision of technological services to aid healthcare delivery, such as telehealth and internet access. A single study identified rural-based learning programs as a way to educate and incentivize health practitioners to work in rural locations.

## Discussion

### Main findings of this study

Universal retention factors for health professionals in a rural environment include rural background, positive rural exposure in training or in the early postgraduate years and



**Table 4** Strategies by Country Income Status

|  | <i>Effective strategies</i>   | <i>Non-effective strategies</i>                          | <i>Inconclusive strategies</i>    |
|--|---|--|-----------------------------------|
| High-income countries ( <i>n</i> = 13 studies) | Rural-based training program—elective or compulsory<br>Sustainable workplace organization and infrastructure<br>Social supports | Visa waiver programs                                     | Financial incentives              |
| Middle-income countries ( <i>n</i> = 7)        | Rural placements<br>Financial incentives<br>Workplace infrastructure  | Independently implemented strategies without consistency | Compulsory rural service programs |
| Low-income countries                           | –   | –  | –                                 |

personal and professional support. Financial incentives were less influential on retention, but results are context dependent. Successful strategies included student selection from rural backgrounds into medical schools and undergraduate education programs and early postgraduate training in a rural environment (Table 3).

Rural health workforce retention strategies need to be multifaceted and context specific. Analysis of micro-, meso- and macro-factors relevant to the individual rural area and country and the use of these analyses to guide policy-making maximizes the success of retaining health professionals in areas of need. Strategies that are successful in high-income countries may not be successful in low-income countries (Table 4).

The family unit rather than the individual practitioner needs to be considered in designing interventions to influence retention. Rural workforce retention strategies cannot be effective without considering the practitioner's social context and the influence of their family in their decision making.

### What is already known on this topic

The most important factors required to increase rural doctor recruitment and retention are selecting rural origin and rural intention students, providing positive rural community exposure in medical school and the early postgraduate years and providing professional and personal support. Professional support includes health system infrastructure that ensures workplaces are adequately equipped and staffed to maximize staff continuity, professional diversity, workplace safety and job satisfaction, flexible work hours and effective work/life boundaries. Personal support includes social factors that improve living and working conditions in rural areas, including community support and family integration into the community. To a lesser extent, financial incentives may play a role in retention, where remuneration and reimbursement for

rural cost of living are combined with the above factors to strengthen the attractiveness of rural practice.

### What this study adds

The study includes low-income countries, and demonstrates that strategies that may be effective in high-income countries may not be effective in low-income countries due to socio-economic, political and infrastructural factors that influence quality of life and job satisfaction in rural and remote areas. Contextual analysis is essential in the planning, implementation and evaluation of interventions and in assessing the transferability of interventions for rural health workforce retention. Interventions need to be appropriate to the macro-, meso- and micro-context and need to be multifaceted, including education, regulation, financial incentives and professional and personal support.

### Limitations of this study

The literatures search demonstrated a publication bias, with most of the evidence coming from high-income countries and primary care and all from the English speaking literature. There were few studies from Latin America, North Africa or Eastern Europe and very few included surgeons. While there is anecdotal evidence on effective strategies for these omitted nations, further studies are needed to adequately evaluate the efficacy of programs implemented globally to improve the rural health workforce.

### Conclusion

Selecting rural origin and rural intention students, and providing rural-focused education and work experience are the most studied and effective interventions to recruit and retain rural practitioners. Multiple other factors relating to practitioner education, financial incentives and personal and

professional support contribute to effective retention of rural health workforce. Implemented strategies must be multifactorial or bundled and relevant to the local context. Interventions to increase rural doctor retention should target multiple points along the career span of doctors and recognize the needs of doctor's families and rural communities.

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## Conflict of interest

None.

## Authors' contributions

SK and BC contributed to the research and writing of this manuscript equally.

## References

- Scheil-Adlung X. Global evidence on inequities in rural health protection: new data on rural deficits in health coverage for 174 countries. *Int Labour Organ* 2015, [https://www.ilo.org/secsoc/information-resources/publications-and-tools/Workingpapers/WCMS\\_383890/lang--en/index.htm](https://www.ilo.org/secsoc/information-resources/publications-and-tools/Workingpapers/WCMS_383890/lang--en/index.htm) (10 January 2020, date last accessed).
- World Health Organization. *Increasing access to health workers in remote and rural areas through improved retention – Global Policy recommendations*. 2011. <https://www.who.int/hrh/retention/guidelines/en/> (19 August 2019, date last accessed).
- Grobler L, Marais BJ, Mabunda S. Interventions for increasing the proportion of health professionals practicing in rural and other underserved areas. *Cochrane Systematic Review*, 2015, doi: [10.1002/14651858.CD005314.pub3](https://doi.org/10.1002/14651858.CD005314.pub3).
- Lee Y, Huang Y, Tsai Y *et al.* The impact of universal National Health Insurance on population health: the experience of Taiwan. *BMC Health Serv Res* 2010;**10**:225.
- Verma P, Ford JA, Stuart A *et al.* A systematic review of strategies to recruit and retain primary care doctors. *BMC Health Serv Res* 2016;**16**:126.
- Liu X, Dou L, Zhang H *et al.* Analysis of context factors in compulsory and incentive strategies for improving attraction and retention of health workers in rural and remote areas: a systematic review. *Hum Resour Health* 2015;**13**:61.
- Wells GA, Shea B, O'Connell D *et al.* The Newcastle-Ottawa Scale (NOS) for Assessing the Quality of Nonrandomized Studies in Meta-Analyses, 2012. [http://www.ohrica.com/programs/clinical\\_epidemiology/oxfordasp](http://www.ohrica.com/programs/clinical_epidemiology/oxfordasp) (10 January 2020, date last accessed).
- Dolea C, Stormont L, Braichet JM. Evaluated strategies to increase attraction and retention of health workers in remote and rural areas. *Bull World Health Organ* 2010;**88**(5):379–85.
- Gaski M, Abelsen B. Designing medical internships to improve recruitment and retention of doctors in rural areas. *Int J Circumpolar Health* 2017;**76**(1):1314415.
- MacQueen IT, Maggard-Gibbons M, Capra G *et al.* Recruiting rural healthcare providers today: a systematic review of training program success and determinants of geographic choices. *J Gen Intern Med* 2018;**33**(2):191–9.
- Mbemba GI, Gagnon MP, Hamelin-Brabant L. Factors influencing recruitment and retention of healthcare workers in rural and remote areas in developed and developing countries: an overview. *J Public Health Afr* 2016b;**7**(2):565.
- Nelson GC, Gruca TS. Determinants of the 5-year retention and rural location of family physicians: results from the Iowa family medicine training network. *Fam Med* 2017;**49**(6):473–6.
- Parlier AB, Galvin SL, Thach S *et al.* The road to rural primary care: a narrative review of factors that help develop, recruit, and retain rural primary care physicians. *Acad Med* 2018;**93**(1):130–40.
- Rabinowitz HK. Recruitment, retention, and follow-up of graduates of a program to increase the number of family physicians in rural and underserved areas. *N Engl J Med* 1993;**328**(13):934–9.
- Rabinowitz HK, Diamond JJ, Markham FW *et al.* A program to increase the number of family physicians in rural and underserved areas: impact after 22 years. *JAMA* 1999;**281**(3):255–60.
- Rabinowitz HK, Diamond JJ, Markham FW *et al.* Long-term retention of graduates from a program to increase the supply of rural family physicians. *Acad Med* 2005;**80**(8):728–32.
- Rabinowitz HK, Diamond JJ, Markham FW *et al.* Medical school programs to increase the rural physician supply: a systematic review and projected impact of widespread replication. *Acad Med* 2008;**83**(3):235–43.
- Rabinowitz HK, Diamond JJ, Markham FW *et al.* Increasing the supply of women physicians in rural areas: outcomes of a medical school rural program. *J Am Board Fam Med* 2011a;**24**(6):740–4.
- Rabinowitz HK, Diamond JJ, Markham FW *et al.* Increasing the supply of rural family physicians: recent outcomes from Jefferson medical College's physician shortage area program (PSAP). *Acad Med* 2011b;**86**(2):264–9.
- Rabinowitz HK, Diamond JJ, Markham FW *et al.* Retention of rural family physicians after 20–25 years: outcomes of a comprehensive medical school rural program. *J Am Board Fam Med* 2013;**26**(1):24–7.
- Strasser R, Neusy AJ. Context counts: training health workers in and for rural and remote areas. *Bull World Health Organ* 2010;**88**(10):777.
- Wilson NW, Couper ID, De Vries E *et al.* A critical review of interventions to redress the inequitable distribution of healthcare professionals to rural and remote areas. *Rural Remote Health* 2009;**9**(2):1060.
- Halaas GW, Zink T, Finstad D *et al.* Recruitment and retention of rural physicians: outcomes from the rural physician associate program of Minnesota. *J Rural Health* 2008;**24**(4):345–52.
- Mian O, Hohenberg JC, Warry W *et al.* How underserved rural communities approach physician recruitment: changes following the opening of a socially accountable medical school in northern Ontario. *Can J Rural Med* 2017;**22**(4):139–47.
- Brazeau NK, Potts MJ, Hickner JM. The Upper Peninsula Program: a successful model for increasing primary care physicians in rural areas. *Fam Med* 1990;**22**(5):350–5.
- Lisam S, Nandi S, Kanungo K *et al.* Strategies for attraction and retention of health workers in remote and difficult-to-access

- areas of Chhattisgarh, India: do they work? *Indian J Public Health* 2015;**59**(3):189–95.
- 27 Van Essen C, Steffes BC, Thelander K *et al.* Increasing and retaining African surgeons working in rural hospitals: an analysis of PAACS surgeons with twenty-year program follow-up. *World J Surg* 2019;**43**(1):75–86.
  - 28 Abimbola S, Olanipekun T, Igbokwe U *et al.* How decentralisation influences the retention of primary health care workers in rural Nigeria. *Glob Health Action* 2015;**8**:26616.
  - 29 Darkwa EK, Newman MS, Kawkab M *et al.* A qualitative study of factors influencing retention of doctors and nurses at rural healthcare facilities in Bangladesh. *BMC Health Serv Res* 2015;**15**:344.
  - 30 Goma FM, Tomblin Murphy G, MacKenzie A *et al.* Evaluation of recruitment and retention strategies for health workers in rural Zambia. *Hum Resour Health* 2014;**12**(Suppl 1). doi: 10.1186/1478-4491-12-S1-S1.
  - 31 Jing L, Liu K, Zhou X *et al.* Health-personnel recruitment and retention target policy for health care providers in the rural communities: a retrospective investigation at Pudong new area of Shanghai in China. *Int J Health Plann Manage* 2019;**34**(1):e157–67.
  - 32 Mbemba GI, Bagayoko CO, Gagnon MP *et al.* The influence of a telehealth project on healthcare professional recruitment and retention in remote areas in Mali: a longitudinal study. *SAGE Open Med* 2016a;**4**:2050312116648047.
  - 33 Nagai M, Fujita N, Diouf IS *et al.* Retention of qualified healthcare workers in rural Senegal: lessons learned from a qualitative study. *Rural Remote Health* 2017;**17**(3):4149.
  - 34 Opoku ST, Apenteng BA, Lin G *et al.* A comparison of the J-1 visa waiver and loan repayment programs in the recruitment and retention of physicians in rural Nebraska. *J Rural Health* 2015;**31**(3):300–9.
  - 35 Frehiwot S, Mullan F, Payne PW *et al.* Compulsory service programmes for recruiting health workers in remote and rural areas: do they work? *Bull World Health Organ* 2010;**88**(5):364–70.
  - 36 Buykx P, Humphreys J, Waterman J *et al.* Systematic review of effective retention incentives for health workers in rural and remote areas: towards evidence-based policy. *Aust J Rural Health* 2010;**18**(3):102–9.
  - 37 Witt J. Physician recruitment and retention in Manitoba: results from a survey of physicians' preferences for rural jobs. *Can J Rural Med* 2017;**22**(2):43–53.
  - 38 Morken C, Bruksch-Meck K, Crouse B *et al.* Factors influencing rural physician retention following completion of a rural training track family medicine residency program. *World Med J* 2018;**11**(5):208–10.
  - 39 Lawan UM, Amole GT, Khaki JH. Rural posting experience, requests for transfer, and perspectives about critical factors for staff retention among primary health care workers in urban Kano, Nigeria. *Niger J Clin Pract* 2017;**20**(1):25–30.
  - 40 Myroniuk L, Adamiak P, Bajaj S *et al.* Recruitment and retention of physicians in rural Alberta: the spousal perspective. *Rural Remote Health* 2016;**16**(1):3620.
  - 41 Paladine HL, Hustedde C, Wendling A *et al.* The role of rural communities in the recruitment and retention of women physicians. *Women Health* 2020;**60**(1):113–122.
  - 42 Phillips J, Hustedde C, Bjorkman S *et al.* Rural women family physicians: strategies for successful work-life balance. *Ann Fam Med* 2016;**14**(3):244–51.
  - 43 Hahn K, Steinhäuser J. Strategies for rural areas: the development of and initial experiences with a training course for physicians from third countries to prepare them for medical practice in Germany. *GMS J Med Educ* 2019;**36**(3):Doc25.
  - 44 Kaye DK, Mwanika A, Sewankambo N. Influence of the training experience of Makerere University medical and nursing graduates on willingness and competence to work in rural health facilities. *Rural Remote Health* 2010;**10**(1):1372.
  - 45 Bagayoko CO, Gagnon MP, Traore D *et al.* E-health, another mechanism to recruit and retain healthcare professionals in remote areas: lessons learned from EQUI-reshows project in Mali. *BMC Med Inform Decis Mak* 2014;**14**:120.
  - 46 Wilhelm I, Ingendae F, Steinhäuser J. What leads to the subjective perception of a 'rural area'? A qualitative study with undergraduate students and postgraduate trainees in Germany to tailor strategies against physician's shortage. *Rural Remote Health* 2018;**18**(4):4694.
  - 47 Russell DJ, McGrail MR, Humphreys JS. Determinants of rural Australian primary health care worker retention: a synthesis of key evidence and implications for policymaking. *Aust J Rural Health* 2017;**25**(1):5–14.
  - 48 Watanabe-Galloway S, Madison L, Watkins KL *et al.* Recruitment and retention of mental health care providers in rural Nebraska: perceptions of providers and administrators. *Rural Remote Health* 2015;**15**(4):3392.
  - 49 Warburton J, Moore ML, Clune SJ *et al.* Extrinsic and intrinsic factors impacting on the retention of older rural healthcare workers in the north Victorian public sector: a qualitative study. *Rural Remote Health* 2014;**14**(3):2721.
  - 50 Gow J, George G, Mwamba S *et al.* An evaluation of the effectiveness of the Zambian health worker retention scheme (ZHWRS) for rural areas. *Afr Health Sci* 2013;**13**(3):800–7.
  - 51 The World Bank. *World Bank Country and Lending Groups*. 2019. <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519> (10 January 2020, date last accessed).

## Appendix A1

| Author, country                                     | Study quality |
|---|---------------|
| Hahn and Steinhauser, <sup>43</sup> Germany         | Moderate      |
| Paladine <i>et al.</i> , <sup>41</sup> USA          | High          |
| Morken <i>et al.</i> , <sup>38</sup> USA            | High          |
| Wilhelmi <i>et al.</i> , <sup>46</sup> Germany      | High          |
| Jing <i>et al.</i> , <sup>31</sup> China            | Moderate      |
| MacQueen <i>et al.</i> , <sup>10</sup> USA          | High          |
| Mian <i>et al.</i> , <sup>24</sup> Canada           | High          |
| Nagai <i>et al.</i> , <sup>33</sup> Senegal         | High          |
| Parlier <i>et al.</i> , <sup>13</sup> USA           | Moderate      |
| Nelson <i>et al.</i> , <sup>12</sup> USA            | High          |
| Witt, <sup>37</sup> Canada                          | High          |
| Gaski and Abelsen, <sup>9</sup> Norway              | Moderate      |
| Mbemba <i>et al.</i> , <sup>32</sup> multiple       | High          |
| Lawan <i>et al.</i> , <sup>39</sup> Nigeria         | High          |
| Mbemba <i>et al.</i> , <sup>11</sup> Mali           | High          |
| Phillips <i>et al.</i> , <sup>42</sup> USA          | High          |
| Russell <i>et al.</i> , <sup>47</sup> Australia     | Moderate      |
| Myroniuk <i>et al.</i> , <sup>40</sup> Canada       | Moderate      |
| Watanabe-Galloway <i>et al.</i> , <sup>48</sup> USA | High          |
| Darkwa <i>et al.</i> , <sup>29</sup> Bangladesh     | High          |
| Abimbiola <i>et al.</i> , <sup>28</sup> Nigeria     | High          |
| Opoku <i>et al.</i> , <sup>34</sup> USA             | Moderate      |
| Bagayoko <i>et al.</i> , <sup>45</sup> Mali         | Moderate      |
| Warburton <i>et al.</i> , <sup>49</sup> Australia   | High          |
| Kaye <i>et al.</i> , <sup>44</sup> Uganda           | High          |
| Wilson <i>et al.</i> , <sup>22</sup> South Africa   | Moderate      |
| Morken <i>et al.</i> , <sup>38</sup> USA            | High          |
| Liu <i>et al.</i> , <sup>6</sup> multiple countries | Moderate      |
| Van Essen <i>et al.</i> , <sup>27</sup> Pan Africa  | Moderate      |
| Lisam <i>et al.</i> , <sup>26</sup> India           | Moderate      |
| Liu <i>et al.</i> , <sup>6</sup> multiple countries | High          |
| Goma <i>et al.</i> , <sup>30</sup> Zambia           | Moderate      |
| Opoku <i>et al.</i> , <sup>34</sup> USA             | Moderate      |
| Gow <i>et al.</i> , <sup>50</sup> Zambia            | Moderate      |
| Rabinowitz <i>et al.</i> , <sup>20</sup> USA        | High          |
| Rabinowitz <i>et al.</i> , <sup>18</sup> USA [A]    | High          |
| Rabinowitz <i>et al.</i> , <sup>19</sup> USA [B]    | High          |
| Buykx <i>et al.</i> , <sup>36</sup> Australia       | High          |
| Frehiwot <i>et al.</i> , <sup>35</sup> worldwide    | Moderate      |
| Dolea <i>et al.</i> , <sup>8</sup> worldwide        | High          |
| Strassed and Neusy, <sup>21</sup> worldwide         | Moderate      |
| Halaas <i>et al.</i> , <sup>23</sup> USA            | Moderate      |
| Rabinowitz <i>et al.</i> , <sup>17</sup> USA        | High          |
| Rabinowitz <i>et al.</i> , <sup>16</sup> USA        | Moderate      |
| Rabinowitz <i>et al.</i> , <sup>15</sup> USA        | Moderate      |
| Rabinowitz, <sup>14</sup> USA                       | Moderate      |
| Brazeau, Potts and Hickner, <sup>25</sup> USA       | High          |