RETENTION OF THE HEALTH WORKFORCE IN RURAL AND REMOTE AREAS: A SYSTEMATIC REVIEW

Human Resources for Health Observer Series No. 25
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Abbreviations

CBL case-based learning
CHW community health worker
CME continuing medical education
ECHO Extension for Community Healthcare Options
FM family medicine
GRADE Grading of Recommendations Assessment, Development and Evaluation
LTRP long-term rural practice
MB metropolitan background
MD medical degree
RB rural background
RCS rural clinical school
RCT randomized controlled trial
RFS return for service
ROS return of service
WHO World Health Organization
Executive summary

This systematic review update builds on the work previously undertaken to develop WHO’s *Increasing access to health workers in remote and rural areas through improved retention: global policy recommendations* (1) published in 2010. The context has changed significantly in the last 10 years. The number of people living in rural and remote areas of the world has dropped to 44.7% of the global population (2018) (7), however, health worker shortages are more than twice as high in rural areas than urban areas (8). Prior to WHO’s 2010 recommendations, relatively little research was available on retention alone, with the main focus being on the recruitment of health workers in rural and remote areas.

This review of the literature, reporting on evaluations of interventions which increase the availability of health practitioners in rural and remote areas across the world, was conducted for studies between January 2010 and December 2019 (see Method). The review uses the same categories of retention interventions: educational; regulatory; financial; and support (professional and personal), as the 2010 guidelines. Nevertheless, it draws on a much larger number of evaluation studies reported in the research literature, covering a wider range of health worker occupations, countries and actors involved, providing evidence of positive outcomes as well as unintended consequences. This executive summary provides a brief overview of the key findings.

A notable difference in this literature review compared with that conducted for the 2010 guidelines is in the category of health professional education interventions, with the development of new methods, timing and place of learning across more health worker occupations around the world. For some there has been a long enough time period to see the longer term impact in improved numbers of health workers and local health outcomes. More emphasis in the recent retention initiatives is placed on community and family engagement, generational differences, health services reform and services redesign. The research shows that, as isolated interventions, financial systems and incentives focused on incentivization alone rarely have the desired effect; other non-monetary incentives, such as job aids and logistics, are reported as important element of success. Sustainable health services and supportive communities are reported as key factors for success.

Although progress in the body of research is notable, many challenges continue: many provisions are not adhered to by governments, despite signed agreements, or are temporary arrangements only. Changes in the political direction of a country may result in amendments to programmes, such as the designation of “underserved areas” and the reach of programmes, with the result that retention interventions are not in place long enough to make a difference.

Fundamental issues limiting the research include lack of baseline data, lack of agreed terms and definitions, a plethora of frameworks being used so that comparative research cannot be done, and the limitations of the studies rarely being discussed. Lack of funding in rural and remote areas dedicated to health, human resources and health outcomes data collection and analysis is a further impediment to research in these hard-to-retain areas.

This review highlights the fact that the WHO global recommendations are not being used routinely. Special consideration for promoting implementation and evaluation, with communication tools and plans for dissemination to the people and populations affected, more than simply to policy- or decision-makers, is a critical factor. Use of a logic model, such as that developed by Huicho et al. (57), is important for evaluation and will facilitate further research.

The key message is that retention interventions sourced from all four categories, based on a comprehensive situational analysis, need to be bundled into a comprehensive package, targeting the individual health worker in an individual community, with their changing needs addressed over time.
1 Introduction

The World Health Organization’s (WHO) 2010 *Increasing access to health workers in remote and rural areas through improved retention: global policy recommendations* (1) included a recommendation to review in 2013; as well as commissioning three reports on the: impact of compulsory service (2); role of outreach support (3); and realistic evaluation of interventions (4). This literature review builds on the original systematic review which covered literature published from 1995–2009. The aim of this report is to gain insights from “what the evidence tells us” about the impact of the guidelines, and to inform an update of the 2010 WHO global policy recommendations.

This review, undertaken during 2017 and completed in 2020, used the same conceptual framework as the original review of the logic of attractiveness leading to retention and increased availability of health workers in rural and remote areas. The review update repeated the original literature review methodology used by Dolea et al. (5) in 2010.

The early findings of the review update were presented at the Fourth Global Human Resources for Health Conference Dublin, Ireland (6).

Background

This review builds on the work previously undertaken to develop WHO’s *Increasing access to health workers in remote and rural areas through improved retention: global policy recommendations* (1) published in 2010. The context has changed significantly in the last 10 years. The number of people living in rural and remote areas of the world has dropped to 44.7% of the global population (2018) (7), however, health worker shortages are more than twice as high in rural areas than urban areas (8).

Prior to WHO’s 2010 recommendations, relatively little research was available on retention alone, with the main focus being on recruitment. However, retention is often considered the greater challenge, with the potential to yield a bigger return on investment (9). Data from the World Bank show that, if the current rural health workforce was more productive, and was persuaded to stay in rural areas for a longer period of time, it is more likely to have a stronger impact on rural health outcomes when compared with recruitment with multiple incentives (10, 11). The World Bank data complement the research findings from Macinko et al. (12) on the importance of “comprehensive primary health care over time” in improving health for all people as most effective, in particular, in rural and remote areas of the world. The data are consistent with the underpinning principle of retention, i.e. the push for universal health coverage and the attainment of the United Nations Sustainable Development Goals by 2030 (13). A significant portion of the safety and quality measures discussed in the literature recommends a more comprehensive focus on retention. Challenges include the notion of city dwellers, most often the decision-makers, “that the country is a nice place to visit, but I wouldn’t want to live there” and the assumption that what works in the city will work in rural and remote areas (14, 15). In addition, the full benefits of retention strategies are often difficult to quantify within a defined time period; and considered costly to assess – going beyond the typical funding and implementation cycles of many programmes. Retention strategies, and evaluation research on them, particularly in rural and remote communities, require a significant and continuing effort to ensure they are sustainable and realize their full impact.
A review of the literature reporting on evaluations of interventions which increase the availability of health practitioners in rural and remote areas across the world, was conducted. Electronic database searching was undertaken in June 2017, February 2018 and November 2019, and publication dates were limited to January 2010 to the end of November 2019. 35 international volunteers reviewed the publications over an extended period until January 2020, to complete the decade since the original review. Electronic database searching was completed in November 2019.

Search strategy

To identify potentially relevant documents, the following databases were searched: the Cochrane Database of Systematic Reviews, PubMed, EMBASE, LILACS, Web of Science and Scopus. These were initially searched on 28 June 2017, and the search was updated on 21 February 2018 and 4 November 2019. In addition, Google and Google Scholar were searched to identify government reports and other grey literature. Further snowballing of reference lists for any additional eligible records supplemented the search strategy. The final search results were exported into EndNote, and duplicates were removed by a librarian.

The initial search strategy was drafted based on the search terms used in the original review by Dolea et al. (5) and further refined through team discussion. The primary search was devised for PubMed and modified accordingly for other databases.

Search strategy for PubMed

Search (((“Health Personnel”[Mesh]) OR (((((((((doctors) OR nurses) OR midwives) OR mid-level health workers) OR community health workers) OR health managers) OR lab technicians) OR health worker) OR health professional) OR human resources for health) OR health workforce) OR health technician) OR clinical engineer) OR health teams) OR physician)))) AND (((“Rural Population”[Mesh]) OR “Medically Underserved Area”[Mesh]) OR “Rural Health Services”[Mesh]) OR ((((((rural) OR remote) OR underserved) OR rural urban imbalances) OR mal-distribution) OR maldistribution)))) AND (((“Personnel Selection”[Mesh]) OR “Employee Incentive Plans”[Mesh]) OR “Education, Continuing”[Mesh]) OR “Reimbursement, Incentive”[Mesh]) OR “Mentoring”[Mesh]))) OR (((((((((((retention) OR recruitment) OR retention strategy) OR retention strategies) OR retention scheme) OR financial incentive) OR financial incentive) OR non-financial incentive) OR non-monetary incentive) OR non-financial incentive) OR non-monetary incentive) OR non-monetary incentive) OR allowances) OR salaries) OR benefits) OR compulsory service) OR bonding scheme) OR rural pipeline) OR professional development) OR professional support) OR telemedicine))) AND (“Program Evaluation”[Mesh]) OR (((((((((vacancy rates) OR motivation) OR patient satisfaction) OR utilization of services) OR duration of service) OR evaluation) OR impact) OR programme result) OR program result))).

Eligibility (inclusion/exclusion)

Articles published from the beginning of January 2010 until the end of November 2019 were included in the review update. Publications discussing all types of health workers, both professional (paid) and volunteer (unpaid), were included. No language limits were applied.

The review update excluded:

- news, editorials, policy briefs, conference abstracts, commentaries and letters;
- studies that described the issue of distribution imbalance;
- studies reporting on influential factors of choice of practice without direct linkage to a targeted intervention;
- systematic reviews reporting on published research during the time period covered by the original review; and
- studies that only described potential interventions.
Selection process

Studies were eligible for inclusion if they:

• reported on the evaluation of a health workforce retention strategy intervention;
• had a focus on rural or remote areas;
• had a clear description of the study design and methods used; and
• addressed the following outcomes of interest (see Table 2.1).

Data abstraction

Only “retention interventions with an evaluation” were used to complete Web Annex A, showing level of evidence using GRADE (Grading of Recommendations Assessment, Development and Evaluation). Web Annex B presents a broader range of descriptive evidence. Interventions were categorized as in the original review: educational; support (personal and professional); financial; regulatory; and “bundled”.

Data synthesis

Globally, 35 reviewers with expertise in the rural health workforce, either as practitioners or researchers, were recruited. Each reviewer undertook to review 5–20 articles within a 2- to 4-week period. If a reviewer could not complete the task within the timeframe, another reviewed the remaining abstracts. Each reviewer was asked to select eligible studies which included an intervention with an evaluation and to then abstract the data to complete Web Annex A evidence profiles. Each of the 106 articles was reviewed separately by two different reviewers and the completed Web Annex A GRADE evidence profiles and Web Annex B descriptive evidence profiles were used to synthesize this report. All reviewers consented to be recognized as authors.

“Bundled” incentives were identified as a package of intervention strategies in Web Annex A (in the original review these were listed in the descriptive evidence table, i.e. Web Annex B).

For the purpose of the review of the WHO global recommendations, the evidence synthesis involved integrating results from the original and updated reviews.

Table 2.1 Outcomes of interest

<table>
<thead>
<tr>
<th>Outcome of interest</th>
<th>Indicator</th>
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| Attractiveness: improved rural health worker attraction | • Increase preference for rural and remote areas.  
• Increase in total number of new graduates entering rural practice. |
| Recruitment: improved rural health worker recruitment | • Increase in total number of health workers recruited.  
• Decrease in vacancy rates.  
• Increase in the number of disciplines and types of health workers. |
| Retention: improved rural health worker retention | • Increase in the total number of health workers in rural areas over time.  
• Increase in the density of health workers.  
• Decrease in the attrition rate of health workers.  
• Report of improved availability and access to health workers in rural and remote areas by the population they serve.  
• Reduction in turnover and unstable staffing. |
| Impact                                  | • Improved health outcomes/community impact.                               |
3 Results

Figure 3.1 Flowchart showing selection process for studies included in the review update

Annex Results

• Table A1.1 Countries represented

• Table A1.2 Health worker occupations

• Table A1.3 PICO tables: study examples for each PICO outcome

• Table A1.4 Huicho et al. outcomes evaluation

• Web Annex A GRADE evidence profiles (Excel)

• Web Annex B Descriptive evidence profiles (Excel)

There were 106 studies which met the inclusion criteria and were included in the final analysis. The review captured 7286 citations, out of which 357 were identified as potentially eligible; 106 were confirmed and included in the review update. All studies were published between 2010–2019. For the purpose of the review of the WHO global recommendations this review was then merged with the original review to provide a comprehensive data collection since 1995; reporting on studies over a 25-year time period.

The literature review found an expansion in health worker occupations covered and an increased number and wider range of countries, in particular, low-income countries, in both individual country studies and multiple country studies.

Evaluations related to 29 countries with individual studies and 5 multi-country studies which included up to 114 countries (these studies did not list all of the countries). In the original literature review, there were only 16 individual countries listed. Both literature reviews showed the majority of studies came from Australia, Canada and the United States of America, with the number of studies in the updated review being 24, 10 and 15 respectively; followed by Ghana with 4 studies and Thailand with 4 (see Annex Table A1.1).

A comprehensive range of health professional and community health worker (CHW) occupations (volunteer and paid) were identified. These included students (at different stages), recent graduates, senior practitioners and sub-specialist varieties or different qualification groups of the same profession (e.g. enrolled and registered nurses) (see Annex Table A1.2). As in the original literature review, doctors and nurses predominated. This review broadened the scope in terms of other health occupations, in particular, adding CHWs, both volunteer and paid, who are more common since 2009 (see Annex Table A1.2).

In terms of study design and methods, some study authors used research terms such as “cohort” and “longitudinal”, yet the detail of the study provided evidence that they were referring to either different groups over the same time period (serial cross-sectional) or the same group for a period of time (longitudinal/cohort). Therefore, the design has been described in the review update as either retrospective or prospective; quantitative, qualitative or mixed methods; cross-sectional (including serial, i.e. multiple over time, including pre/post intervention) or as longitudinal/cohort studies.

Mixed methods were employed by 28 studies. These studies included comparative group studies (16); pre-post studies (17); and interrupted time series (18–20) or were based on interviews or surveys, with a thematic analysis to obtain data, or observational and descriptive studies. Systematic reviews were searched for potentially eligible studies. Many systematic reviews have been undertaken in the period 2010–2019, with their own strict eligibility criteria. For example, from one systematic review only one report out of 8945 was included (21). Most systematic reviews were excluded from this current study as they included studies not within the review update timeframe; some of these were included in the supporting evidence for the different categories (see Web Annex A GRADE evidence profiles). Of particular note is the systematic review by Blacklock (22), which is the only randomized control trials (RCT) review, which covers both the periods of the original review and this update.
Both the original literature review and this report show that most interventions had multiple effects on the continuum from attraction through to recruitment and retention: and sufficient time has passed for there to be a significant reporting of improved health workforce and health outcomes. The mapping of the interventions against the impact dimensions and reported indicators in the original review still applies. There has been an increase in “bundled” packages being offered over the last decade (n=20) compared with the original review (n=7).

Educational

There has been a marked increase in the number of eligible studies since the original literature review (27 : 106 in total with 12 : 40 in education), and sufficient time has elapsed for longitudinal studies of cohorts (n=15) with reports tracking student and postgraduate cohorts through to settlement, and studies which show positive impact on communities (n=18). Examples are given in the PICO tables (Annex Table A1.3a–d) and study examples for each PICO outcome (see Web Annexes A and B). The evidence supports the importance of “place” and “family” on retention of health workers in rural and remote areas, and what has been described as the “dose effect”, i.e. many exposures, regularly and often, as well as over longer periods of time. It is apparent that there is much overlap of criteria for each category of intervention, for example, if there is a rurally located medical school, then it will have rural clinical rotations by nature of the patients and the rural clinical teachers. However, metropolitan-based medical schools can relocate to regional-rural areas with little change to the curriculum itself and not necessarily include the differential aspects of health care delivery in rural and remote areas, patient perceptions and the way of life in rural contexts (and the differences between rural-rural and rural-remote communities), and, in particular, community engagement in both formal curricula and extracurricular activities. From a rural research perspective this may be assumed; however, from a metropolitan research perspective this will not necessarily be obvious and may not be described appropriately.

Changes to the provision of education over the decade (i.e. new methodologies) influence retention, with simulation, Extension for Community Healthcare Options (ECHO) (video-conference educative consultations), academic detailing, clinical programme roll out with education as well as training, and new undergraduate and postgraduate education and training programmes now occurring, and increasingly located, where health professionals intend to practice (i.e. timing and place) (18).

Support and sustainability

Research into the broadening scope of attractors and detractors, including the influence of other stakeholders, for example, colleagues, administrators, managers, community, media, politicians, has increased since 2010. In addition, studies have identified unintended consequences, such as the use of financial incentives, which lead to increases in cost and administrative burden, resulting in reduced time for clinical work (23, 24). Another example of unintended consequences can include greater use of telehealth capabilities leading to increased referrals to larger hospitals, bypassing the local health services or general practitioners. This may cause greater fragmentation of care, with increased costs to the receiving hospital and patients, while at the rural local hospital there is loss of local skills and, ultimately, loss of local services, facilities and employment (25). The use of new technologies may cause a loss of visiting services, the impact of which results in a lack of support and awareness of the practitioner’s work context and local challenges. This absence of “continuity of care” or institutional knowledge of health professionals in rural and remote settings results in a dearth of advocacy for programmes, roles, and quality health services in remote and rural communities (23, 26-28). It reinforces the notion that decision-making
is separate and done to rural communities by others who reside in the cities.

Newer retention initiatives include community and family engagement, with intrinsic and extrinsic motivators, influencing the decision to remain (26, 29). De-motivators include: lack of resources; inadequate leadership and management; programmes being undermined by new policies and short-term strategies or legislation and legal implications; non-availability of mobile phone networks or internet access, available bandwidth and speed; fragmentation of care and workload; all of which can lead to exhaustion, burn out and attrition (30-32). Attractors are found to work differently for different generations of health professionals. For example, “working hard but working differently” is seen between generations of old and new practitioners and is associated with different attractors. The younger generation values work-life balance and working in areas of global health (29). Other attractors include status within the community, mentorship, good relationships with colleagues, scope of practice and sense of accomplishment. In addition, automation/technology improvements can provide breaks from the monotony of work, and job security and professional development in situ are considered to add value (33-36).

Health system reform and services redesign also influence retention (37). These initiatives include group treatment; improved access to digital health technologies, including text messaging and internet use for support. Such support can be for monitoring, decision support, tele-rounding (post-operation), task sharing with information and communications technology, quick access to specialists, cloud computing, “continuing medical education (CME) on a stick” and telehealth treatment and therapies — “just in time treatment”, “dermatology same-day review” and video consultations (25, 38). New roles, such as CHW, and some re-invented roles and processes, e.g. dispensing doctors and multidisciplinary teams, as well as working differently and taking into account generational and gender differences, interprofessional collaborative behaviour, task sharing, workforce designation, and increased percentage of minority groups represented in the health workforce, are all cited as having an impact on retention of staff, individually and cumulatively (29, 39-41). The impact of changes to other services which have direct or indirect knock-on effects to delivery of the health service, community attitudes or perceptions (supportive or hostile), scope of practice (e.g. emergency department closures leading to increased inter-facility transfers), lack of caesarean section facilities (obstetric services) and reduced number of generalists with or without increased number of subspecialists, may impact retention for health professionals at every level in rural and remote communities. Provision, or lack of, medical liability cover is another attractor or detractor. Frequently these changes are brought about by a central policy to be risk averse, (with a focus on high volume assumed to be cost effective, efficient and safer) without reference to the rural context and unintended consequences. Additionally, it may be that frequent, multiple reforms impact health professionals’ choice to stay or leave. Working with families and communities is seen as an attractor, as is good administrative support and the sense of being valued.

Financial and regulatory

The research shows that financial systems and incentives should be bundled with other policies. Incentives based on productivity/ functionality need to consider the collaterals of access and support, such as other services and resources available locally, including drug supplies and necessary logistics. Gratuities and/or retention bonuses on completion of 2, 4 or 5 years’ service as a return for service (RFS) may lead to internal migration. However, after completion of an agreed contract, eligibility to enter postgraduate programmes, civil service or CME, as credit for a master’s programme, are shown to improve retention. Retention/performance-based bonuses packaged with other retention interventions, such as on completion of a specified number of years RFS, or following return of service (ROS, i.e. after receipt of support such as a medical student place or scholarship/bursary), receiving additional financial benefits to continue in the setting along with initiatives such as housing, locums, access to upskilling, children’s education, general medical insurance, (including against Maoist attacks), have all been shown to assist in retention (42-44). Issues of lack of transparency and awareness of eligibility for schemes, payment delays (up to 20 months), lack of fairness and backlash from colleagues and community are shown to be detractors (41, 45).

Other non-monetary incentives, such as job aids and improved logistics – bicycles, wellington boots, smart phones – can be attractors. New ways of looking at retention including initiatives such as partnership with donors (where donors arrange such things as recruitment, employment contracts, salary subsidies, staff deployments) are reported to advance retention (28, 46).

Many provisions are not adhered to by governments, despite signed agreements, or are temporary arrangements only. Changes in the political direction of a country may result in amendments to programmes, such as designation of “underserved areas” and reach of programmes, with the result that retention interventions are not in place long enough to make a difference. Financial incentives only work for as long as they are available. A common problem, although theoretically beneficial, is with ROS obligations in exchange for funding a student, which may result in, under-skilled graduates being located in rural sites (47-50).
5 Outcomes of interest

Attraction

Interventions that have attracted students to work in rural and remote areas were reported by 14 studies. These studies looked at the rural background of students, rural location of programmes and schools, clinical rotations in rural communities, exposure to community experiences and ensuring students receive appropriate training reflective of rural practice, and that this relevance is maintained in continuing professional development. These characteristics remain the key criteria reported to attract students, junior doctors (interns, residents, trainees or registrars) and colleagues to working in rural and remote areas, as in the original review. A new emphasis is seen with community engagement and extracurricular activities having an impact on medical student recruitment and retention.

Intentions to leave or stay in rural communities were described in greater depth in 17 studies, with many more factors described as influencing choice than identified in the original review.

Recruitment

41 studies reported on the effects of interventions on the number of health professional students (undergraduates) and health workers who were actually recruited into rural and remote areas following implementation. Over the last 10 years, health workers recruited, with new or extended scopes of practice for rural and remote areas, were reported in 12 studies. In particular, these included, CHWs (volunteer and paid positions) covering both general aspects of health in the community and a variety of specific tasks as part of community-based programmes. The latter category normally requires specific topic training with reference to rural practice (e.g. TB health workers, community medicine distributors and community-based midwives), which acts as targeted recruitment and or a retention intervention (23, 51). In particular, targeted topic or task training facilitated a RCT for review of retention by Blacklock (22), which is listed as supporting evidence under the support category.

Retention

The same indicators were used to measure retention: length of service, proportion of health workers staying in rural areas, survival rates, turnover rates and settlement rates. A key difference between the original review and this update is that some studies reported effects of interventions for up to 20 years and even at 40 years following implementation, so that, not only, are there more studies (n=79), but also more longitudinal or cohort studies (n=15) reporting evidence of retention. Examples include: Van Essen et al. (52) reporting on 20 years of training and retaining surgeons in Africa; and Nithiapinyasakul et al. (53) providing an overview of the impact from the last 20 years of an intervention in Thailand.

Impact

Eight studies reported the effects of rural retention interventions on the performance of health workers or on health services and 18 studies showed evidence of impact at the community level. As with retention strategies, the additional 10 years provides a timeframe during which the impact can more readily be identified and measured (see Annex Table A1.3 PICO tables).
Since the publication of the WHO global recommendations in 2010, there has been increased research on retention interventions and a greater number of interventions implemented with an evaluation (even if some are poorly defined). More retention interventions in more countries are reported, in particular in low-income countries \((39, 54)\); and there is more collaborative research \((42)\) and comparisons between countries \((2, 55)\), across more health occupation types and numbers \((25, 39, 56)\). The research evidence is more robust by the end of 2019. The evidence derived from the review update reinforces the complexity of achieving retention of health practitioners, particularly in remote and rural areas worldwide, as well as the challenges of implementation, spread and evaluation.

Establishment of both a “sustainable health system” and an “engaged community”, considered as a reflection of the local context, were identified as important preliminary steps from the evidence from evaluations in the review update. As well as the positive findings, in six interventions when sustainability was not evident, the retention intervention was more likely to fail and be evaluated as having an unintended effect in the relevant category. “Sustainable health system” and “engaged community” were considered broader than the identified intervention category of professional and personal support in the original review and applied to all of the intervention categories. Lack of a sustainable health system was experienced when there was a lack of staff, resulting in increased workload without compensation; inadequate resources and systems in place (e.g. being added to the payroll and ensuring timely payment); poor feedback from submitted reports, to the extent that reporting was considered a waste of time; and a lack of opportunity for health workers to speak up about their concerns. Lack of an engaged community was described as inadequate support for health workers within the community, shown by lack of respect and trust, differing expectations of health workers’ roles, and/or lack of providing help “in the home” or “on the farm” when needed to enable health workers to focus on their work duties. In contrast, when the health service was sustainable and the community engaged, the evaluations of retention strategies provided evidence of efficiency and effectiveness, with health professionals contributing positively to a well-functioning health system and community, realizing their full potential. These factors were more evident in the review update than the original review.

### Directness, relevance and levels of confidence

The Web Annexes A and B tables were difficult to complete. For many studies, there was a lack of detail, as well as a lack of clarity as to the purpose or intended audience (e.g. policy-makers, administrators). The Web Annexes A and B tables indicate “quality of evidence” in the majority of studies was at a “low” level \((n=42)\) or “very low” level \((n=33)\), with only a few at “moderate” level \((n=31)\), assessed as such because of the magnitude of effect \((30–33)\). None of the studies were considered to be at a high confidence level.

Although more than half of the world’s population no longer resides in rural areas, at the individual level, in particular for low- and middle-income countries, this is not the case. In these countries more than half of the population still resides in rural and remote areas where the lack of access to health services is felt more acutely, and health outcomes are still disproportionately impacted. The shortage of different health worker occupations varies within each country and interventions for one occupation are often not considered generalizable to other occupations or transferrable to other rural and remote areas, as seen in the Web Annex A GRADE evidence profiles report on study limitations.

The limitations of individual studies were only occasionally acknowledged and discussed in the studies themselves.

### Limitations of the review update

This is still an evolving field and key documents may have been missed. Evolution of terminology has occurred within the last 10 years, such as “social accountability” and adding this to the search strategy may have raised additional relevant publications.
It was notable that the 2010 WHO policy recommendations for retention were only occasionally referred to within the studies (n=8). In addition, the Huicho et al. (57) logic model for evaluation of interventions, to report on outputs, outcome and impact, commissioned following the 2010 policy recommendations, was not used.

As in the original literature review by Dolea et al. (5), there are fewer interventions evaluated with personal and professional support strategy categories (n=11), financial (n=12) and regulatory incentives (n=23), than for education (n=40). A number of studies referred to evidence from bundling of interventions to provide an array of more personalized retention initiatives to be evaluated (n=20) (58-60).

As in the original literature review, there is a lack of consistency in the definitions of “rural and remote” across countries, retention interventions, outcomes assessed, evaluation methods and language (47, 61-64). This hampers comparisons between countries and studies. Terminology is a problem between researchers, authors, educators and reviewers. For example: whether “cohort” studies refer to the educational interpretation (each “year cohort” studied serially) or to the research interpretation (“the same group reviewed over years”) as in a longitudinal study, leads to imprecision. Consistent use of a single outcomes’ evaluation table, such as the model recommended in Huicho et al. (57), would make comparison of evaluation of retention interventions easier to describe, disseminate and adopt (Annex Table A1.4).

Newly arising retention issues found in the research literature include: English as a second language and social factors, health services delivered “in language”, primitive living conditions and poverty, lack of funding to obtain high-quality staff, interprofessional communication and its impact on team/work colleagues (65, 66). Corruption as an issue is now emerging in the research, whereas research on the specific impacts of conflict, violence, fragility, safety and security of health workers on retention, is largely absent. Other key areas missing in current studies, regarding retention strategies, include work disability, the impact of migration within and between countries, and critical incidents such as widespread disasters, or personal/professional disaster for individual health workers, which outweigh retention strategies or intentions to stay.
There seems to be a better understanding of the impact of contextual factors on retention, with increased listing of enabling and disabling factors (51). Initiatives such as “embeddedness in the community”, as well as recognition of the health practitioner’s role, and standing within the community, impact positively on retention. These factors are assisted by community engagement; for example, facilitating rural-based medical education (67, 68); in choice of location and retention; the community’s involvement in selection and deployment decisions; help provided at home, when needed, to enable the health professional to continue to work etc. Other family issues, such as assisting in finding employment for partners of health practitioners, may influence retention and acknowledge the importance of considering household decision-making (69). Drilled down contextual factors affecting health worker performance and patient outcomes are seen as critical retention enablers or, when lacking, detractors. Detractors include supply line failures, inadequate supervision by and of managers, failure to follow up training interventions with ongoing support, lack of management of unstable staffing, delayed payment, non-compensated workload, and lack of grievance procedures.

An understanding of the life cycle of rural and remote health workers and their families, as well as the specific contexts of the work environment, community and home, and understanding the phases of employment, from fully engaged, to disillusion and burn out, have an impact on the success of retention initiatives. These issues are increasingly represented in more recent publications (29, 70). It is also apparent from the review update that rural and remote health workers and the communities they serve, are not homogeneous. Variation in the uptake, applicability and effectiveness occurs within a country from one rural area to another. For example, in Israel, in the difference between north and south; and, in Thailand, despite tremendous improvement in retention of health workers, interventions are not evenly spread across the country, with “still more work to be done” (53, 71).

The studies highlight the need for a variety of appropriate interventions for those undertaking different roles. Maturity in role, as well as gender issues, need to be better understood (29). Logistics and performance management issues, such as clarity of expectations and responsibilities, supportive supervision, improved grievance procedures, appropriate job aids and training, resourcing, and mentorship, also need to be considered. In addition, the basic needs of housing, continuity of power and water supply, and internet access are identified as determinants of retention, let alone recruitment (43, 72, 73). An individualized approach to retention is supported and more likely to be successful (53, 68, 73).

The need to ensure sustainable health services and community engagement is increasingly viewed as key to determining the success or failure of retention interventions. Sustainable health services and community engagement are linked to Huicho et al.’s recommendation that, as a baseline requirement for any intervention, a situational analysis be conducted prior to planning and implementing a retention strategy. Sustainable health services and engaged community also relate to social accountability, which is largely missing from this review update. Yet, these aspects have been socialized over the last 10 years, in particular for medical education interventions, with the intention of improving the rural and remote health workforce and health outcomes for the local community. This fits with the doctrine of “context matters” in rural health.

Ongoing issues for measuring retention – countrywide lack of mechanisms to track health workforce data, lack of funding for evaluation beyond normal funding and political cycles – reduce the likelihood of detailed longitudinal studies and the ability to measure the full impact on health outcomes. A notable difference is in Australia, where government funding for rural clinical schools includes a core research requirement for ongoing funding to analyse rural medical education and the rural health workforce (74-76); and, the Rockford Rural Medical Education Program, University of Illinois,
USA (77), which tracks graduates’ practice location and specialty choice outcomes. Lack of transparency and systems supporting communication and information sharing between rural and remote areas and between rural and remote health services with urban planners and decision-makers is an ongoing issue and possibly contributes to the ongoing mal-distribution of health workers in rural and remote areas within countries. The concerns of rural and remote health workers voiced in the research raise common issues across and between countries which remain to be addressed. However, increased local autonomy for rural and remote health services, in particular with regard to human resources for health and opportunities for local communities to be engaged in the selection and deployment of local health workers, is increasingly being reported – with positive impacts on retention and health outcomes. Case studies are considered useful at many levels, ideally collected in an annotated bibliography so that they support spread and implementation of interventions around the world. Key aspects in the case studies include contextual issues, intervention details (categorized) with evaluation, plus confidence levels readily identified, and the opportunity to drill down to the fine details. An example of where this has been done, and the results made readily available, are the “Recruit and Retain” and “Making It Work” projects across Arctic countries (78, 79). These provide practical examples of implementing retention and recruitment interventions with evaluations.
9 Conclusion

This literature review provides an update of the literature on rural attraction, recruitment and retention of health workers. It significantly expands the “on the ground” detail and understanding of what needs to be in place for successful retention interventions, and highlights issues which need to be thoughtfully considered when planning, implementing and evaluating interventions. This literature review builds on the evidence from the original review, whose findings remain valid today.

The importance of promoting implementation of evidence-informed policy recommendations, along with a common systematic evaluation, using a consistently applied logic model, are the major take-home messages from this report.

Addendum

At the Guidelines Development Group meeting in Turkey, February 2020, discussion of question PICO 6, category “Regulatory B1: Introduce and regulate enhanced scopes of practice in rural and remote areas to increase the potential for job satisfaction, thereby assisting recruitment and retention” clarified that the definition did not include “task shifting”. In addition, it was confirmed that question PICO 6 was clearly different to question PICO 7, in the same category “Regulatory B2: Introduce different types of health workers with appropriate training and regulations for rural practice in order to increase the number of health workers in rural and remote areas”, which referred to new types of health workers being employed. This led to three papers being excluded from the GRADE evidence profile category Regulatory B1 (Web Annex A). The Guidelines Development Group submitted additional articles for review, nine were deemed to meet the criteria for inclusion in the review update and GRADE evidence profiles (Web Annex A). These changes are reflected in this document.


Annex Results

Table A1.1 Countries represented

| Individual studies | Afghanistan, Australia, Bangladesh, Brazil, Burkino Faso, Cambodia, Canada, Chile, China, France, Germany, Ghana, India, Indonesia, Israel, Kenya, Liberia, Mali, Nepal, Norway, Pakistan, Philippines, South Africa, Thailand, Uganda, United Kingdom of Great Britain and Northern Ireland, United Republic of Tanzania, United States of America, Zambia. |
| Multi-country studies | Three countries: Cambodia, China, Viet Nam (Zhu). Five countries: Bangladesh, Ethiopia, India, Iran (Islamic Republic of), Nepal (Singh et al.). West Africa (16 countries): Benin, Burkino Faso, Cabo Verde, Gambia, Ghana, Guinea, Guinea-Bissau, Côte d’Ivoire, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo, United Kingdom Overseas Territories: St Helena, Ascension, Tristan da Cunha (Bode et al.). Multiple African countries (20) (Van Essen et al.). 70 countries (Frehywot et al.). |

Table A1.2 Health worker occupations

| Doctors/physicians (not otherwise categorized) | Nurses | Midwives | Dentists |
| General practitioners/family physicians | Paediatric nurses | Community midwives | Dental therapists |
| Surgeons | Auxiliary nurses | New born care officers | Laboratory technicians |
| Anaesthetists | Occupational therapists | Paramedics | Technologists |
| Clinical psychiatrists | Physiotherapists | TB health workers | Dieticians |
| Hospitalists | Speech language pathologists | Community health workers (paid/volunteer) | Psychologists |
| Community health officers | Audiologists | Podiatrists | Clinical supervisors |
| Medical assistants/medical aid workers | Pharmacists | Nurse aides | Rural academics |
| Optometrists | Community medicine distributors | Disease control officers | |
Table A1.3 PICO tables: study examples for each PICO outcome (see Web Annexes A and B)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Category and type of intervention</th>
<th>Scheme (reference/author)</th>
<th>Targeted group</th>
<th>Study design/methods</th>
<th>Results reported</th>
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<tbody>
<tr>
<td>Increased preference for rural and remote areas (undergraduate)</td>
<td>Education: of rural background</td>
<td>Collaborative Project to Increase production of Rural Doctors (CPIRD) (Thailand) Boonluksiri</td>
<td>Doctors</td>
<td>Cohort study</td>
<td>Overall 57.6% retention rate. CPIRD retained 72.1% versus normal track 53.8% p &lt; 0.001. Graduate entry associated with higher retention. CPIRD doctors worked rurally 62.3% compared with 49% normal track p &lt; 0.001. Resignation after initial 3 year commitment very common. The specific geographical location had an impact, with the northeast and south having greater retention. Greater contact hours of case-based learning (CBL) during the degree was associated with greater retention OR 1.175 (1.030–1.341) p 0.015.</td>
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<td>McGirr (education, Australia, all health practitioner students)</td>
<td>Education: rural curriculum, rural clinical rotation</td>
<td>Memorial Medical School (Canada) Rourke</td>
<td>Doctors</td>
<td>Quantitative study</td>
<td>Rural-generalist focused university more likely to have impact on local rural medical workforce. Among 391 physicians practising in Newfoundland and Labrador, 257 (65.7%) were Memorial postgraduates and 247 (63.2%) were Memorial medical degree (MD) graduates. Of the 163 family medicine (FM) graduates, 148 (90.8%) were Memorial FM graduates and 118 (72.4%) were Memorial MD graduates. Of the 68 in rural practice, 51 (75.0%) were Memorial postgraduates and 31 (45.6%) were Memorial MD graduates. Of the 41 FM graduates in rural practice, 39 (95.1%) were Memorial FM graduates. Recruitment of students combined with a rural-focused curriculum yielded positive outcomes related to primary care practice and decisions regarding practice location. RMED graduates were considerably more likely than non-RMED graduates to choose family medicine, a primary care specialty and be currently practising in a rural location. RMED graduates were 14.4 times more likely than non-RMED graduates to choose family medicine, 6.7 times more likely to choose a primary care practice specialty, 17.2 times more likely to be currently practising in a rural location and 12.8 times more likely to be practising in a primary care shortage zip code. Analysis of current RMED graduates practice locations indicates that 41.9% were within 90 miles of their 4th year preceptorship community. Among RMED graduates practising in Illinois, 62.1% and 73.3% were located within 60 and 90 miles respectively of their home town.</td>
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<td>Indicator</td>
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<td>Study design/methods</td>
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<tr>
<td>Increased preference for rural and remote areas (postgraduate)</td>
<td>Education: rurally located medical school, clinical rotations</td>
<td>Northern Studies Stream (Canada) Winn</td>
<td>Allied health professionals</td>
<td>Retrospective cohort study, survey</td>
<td>33.9% chose rural or remote practice following graduation. Individuals from rural remote communities were 3.3 times more likely to work in rural/remote areas. Those completing academic studies in addition to clinical components were 3.3 times more likely to move to a rural/remote area after graduation than those not completing the academic semester. Completing more rural clinical placements was associated with greater likelihood of rural practice, independent of rural upbringing. &quot;Job satisfaction, professional networking opportunities and rural lifestyle options were identified as important factors for retention in rural/remote practice areas.&quot;</td>
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<td>Influence of education programme on choices of location</td>
<td>Education: rurally located medical school, clinical rotations</td>
<td>Rural Clinical School (Australia) Kwan</td>
<td>Doctors</td>
<td>Cross-sectional quantitative</td>
<td>Rural background (RB) and attendance at a rural clinical school (RCS) are independent, duration-dependent and additive predictors of long-term rural practice (LRTP). Independent predictors of LRTP (odds ratio [95% CI] were RB 2.10 [1.37–3.20]), RCS-1 (2.85 [1.77–4.58]), RCS-2 (5.38 [3.15–9.20]), general practice, (3.4 [2.13–5.43]) and bonded scholarship (2.11 [1.19–3.76]). Compared with being single, having a metropolitan background (MB) partner was a negative predictor (0.34 [0.21–3.76]). The effects of RB and RCS were additive compared with MB and metro school (reference group) RB and RCS-1 (6.58 [3.32–13.04]), RB and RCS-2 (10.36 [4.89–21.93]).</td>
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Other examples:
- Hatcher (regulatory, doctors and dentists, South Africa)
- Lee J (education, Canada, FM doctors)
- Morken (bundled, USA, doctors)
- Mumtaz (financial, India, midwives)
- Rajbangshi (regulatory, India, doctors allopathic, ayurvedic and homeopathic, medical specialists and nurses)
- Argeus (education, Canada, doctors)
- Johnson (education, dentists, Australia)
- Nelson (education, USA, doctors)
- Snadden (education, doctors, Canada)
<table>
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<tr>
<th>Indicator</th>
<th>Category and type of intervention</th>
<th>Scheme (reference/author)</th>
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<th>Study design/methods</th>
<th>Results reported</th>
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<tbody>
<tr>
<td>Intentions to stay in or leave rural areas</td>
<td>Professional and personal support: post-war initiatives</td>
<td>Health worker effectiveness and retention in rural Cambodia (Cambodia) Chhea</td>
<td>TB health workers</td>
<td>An iterative grounded theory analysis of data from in-depth interviews, meetings, workshops and observational study</td>
<td>Rural health workforce retention was influenced by institutional factors relating to the structure of the health system, capacity building and staffing issues, competition from the private health sector, and medical supplies. Personal factors proved central to individual health workers’ decision-making about working in rural areas. These included work responsibilities, motivation and issues around financial needs; some stayed a long time because of personal rewards, yet job performance was hindered by institutional factors. Undermining systems working in parallel (public and private).</td>
</tr>
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</table>

Other examples:
- Afari (bundled, Ghana, community-based volunteers)
- Bayley (regulatory, Australia, GP trainees)
- Devine (regulatory, Australia, allied health students)
- Flum (education, Germany, GP trainees)
- Joarder (regulatory, Bangladesh, doctors)
- Goma (bundled, Zambia, health workers)
- Leonardi (regulatory, Philippines, doctors)
- Levesque (education, Canada, medical educators/doctors)
- Mansoor (education, Afghanistan, midwives)
- Morell (bundled, Australia, health workers)
- Morken (bundled, USA, doctors)
- Pena (bundled, Chile, doctors)
- Rahman (support, Bangladesh, CHWs)
- Renner (regulatory, USA, doctors)
- Straume (education, Norway, primary care doctors)
- Van Essen (bundled, surgeons, Africa)
<table>
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<tr>
<th>Indicator</th>
<th>Category and type of intervention</th>
<th>Scheme (reference/author)</th>
<th>Targeted group</th>
<th>Study design/methods</th>
<th>Results reported</th>
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<tbody>
<tr>
<td>Increase in percentage of graduates entering rural practice (new graduates)</td>
<td>Bundled: all categories</td>
<td>Collaborative Project to Increase Production of Rural Doctors (CPIRD) and One District One Doctor (ODDD) (Thailand) Nithiapinyasakul</td>
<td>Doctors</td>
<td>Observational study</td>
<td>Targeted strategies and policy interventions implemented to achieve recruitment of rural background, medical training (undergraduate and or postgraduate) outside the capital and major cities, and compulsory service requirements in rural and remote areas through two government projects (CPIRD and ODDD). 92% of medical graduates from this programme remained in rural areas and were likely to remain post programme. Graduates had increased clinical competency.</td>
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<td>Other examples: Gaski (education, Norway, intern doctors)</td>
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<td>Indicator</td>
<td>Category and type of intervention</td>
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<td>Study design/methods</td>
<td>Results reported</td>
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<tr>
<td>Increase in percentage or number of health workers recruited to rural locations</td>
<td>Regulatory: scope of practice</td>
<td>Introduction of community volunteers, (Ghana) Chatio</td>
<td>Community volunteers and CHW supervisors</td>
<td>Qualitative in-depth interviews</td>
<td>Study participants reported that the desire to help community members, prestige and recognition as doctors in the community mainly motivated them to work as health volunteers. Lack of incentives and logistical supplies such as raincoats, torch lights, wellington boots and transportation in the form of bicycles to facilitate the movement of health volunteers, affected the work. They suggested that lack of these things discouraged them from working as health volunteers. Most of the dropout volunteers said lack of support and respect from community members made them stop working as health volunteers. They recommended that community support, incentives and logistical supplies such as raincoats, torches, wellington boots, bicycles, awards to hard working volunteers, are mechanisms that can help retain community-based health volunteers and also sustain their activities.</td>
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<tr>
<td>Reduced turnover rates/decreased vacancies</td>
<td>Financial: remuneration for years of service, profession, specialty, location and insurance</td>
<td>Chhattisgarh Rural Medical Corps scheme (CRMC) (India) Lisam</td>
<td>All health professionals</td>
<td>Mixed methods: purposive sampling, semi-structured and open-ended questionnaire, key informant interviews, thematic analysis of documents, comparison group of those receiving CRMC benefits, and those eligible but not receiving</td>
<td>1319 doctors retained during 2010–2011, reducing doctor vacancies from 90% to 45%; increased to 1658 in 2011–2012; 20% increase in staff, increase in uptake of CRMC, 92.5% of facilities &quot;most difficult&quot; reduced to 30.6% in 2011. Majority of staff lacked awareness of CRMC, payment delays, lack of transparency and differentiating benefit from salary reduced motivation, lack of integrated performance management and many provisions not adhered to by governments despite signed agreements.</td>
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</table>
### Table A1.3c Improved rural health worker retention – indicators, methods and results from evaluation studies

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Other examples: Author (category, country, occupation)</th>
<th>Category and type of intervention</th>
<th>Scheme (reference/author)</th>
<th>Targeted group</th>
<th>Study design/methods</th>
<th>Results reported</th>
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</thead>
<tbody>
<tr>
<td>Percentage health workers staying in rural areas and duration of stay</td>
<td>Arora (bundled, Thailand, doctors)</td>
<td>Bundled: categories A and B</td>
<td>Pan-African Academy of Christian Surgeons (PAACS): increasing and retaining African surgeons working in rural hospitals: an analysis of PAACS surgeons with 20-year programme follow-up (Africa) Van Essen</td>
<td>Rural surgeons</td>
<td>Data analysis and survey</td>
<td>100% retention of surgeons in rural African countries and 79% within their home country. PAACS graduates had 51% short-term and 35% long-term (beyond 5 years) rural retention rate after free rural training via faith-based NGO. Training quality appeared good as evidenced by 1:1 supervisor-trainee ratio and good pass rates with College of Surgeons of East Central and Southern Africa (COSECSA) exams.</td>
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<tr>
<td>Survival rates</td>
<td>Ashkenazi (finance, Israel, doctors)</td>
<td>Regulatory: return for service (RFS)</td>
<td>Return for service agreements (South Africa) Hatcher</td>
<td>Doctors and dentists</td>
<td>Cross-sectional quantitative study</td>
<td>Rural placement for compulsory public service before being eligible for postgraduate training was more likely for unmarried, male and black medical officers. Only 25% indicated continuing work in rural areas, however those who undertook their community service placement in rural facilities indicated higher intentions of continuing rural placement location.</td>
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<tr>
<td>Settlement rates</td>
<td>Morken (education, USA, doctors)</td>
<td>Education: multi-faceted programme</td>
<td>Rural nursing programme (Norway) Norbye</td>
<td>Nursing students</td>
<td>Quantitative cross-sectional survey</td>
<td>Recruited according to rural background and community connections into a flexible study programme. Post programme, 87.5% of registered nurses were employed in community health services, with 81.6% retention rate; after 20 years 85% were still there (reduced turnover), 99% undertook further studies, 2% also completed further postgraduate education after the Decentralized Nursing Education Programme.</td>
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</table>
Table A1.3d Impact of rural retention interventions – indicators, methods and results from evaluation studies

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<tr>
<th>Indicator</th>
<th>Other examples: Author (category, country, occupation)</th>
<th>Category and type of intervention</th>
<th>Scheme (reference/author)</th>
<th>Targeted group</th>
<th>Study design/meth-ods</th>
<th>Results reported</th>
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</thead>
<tbody>
<tr>
<td>Improved competencies</td>
<td>Other examples: MacVicar (education, United Kingdom, doctors), Winn (education, Canada, allied health)</td>
<td>Regulatory: B1</td>
<td>Advanced rural nursing (Australia) Cant</td>
<td>Nurses</td>
<td>Cross-sectional mixed methods</td>
<td>Created a new scope of practice as advanced rural nursing. Advanced nursing course was perceived by participants to extend the role with increased knowledge and skills, and to increase job satisfaction.</td>
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<tr>
<td>Improved job satisfaction</td>
<td>Other examples: Connolly (education, nursing and medical clinical supervisors, Australia)</td>
<td>Education; location of programme</td>
<td>Are rural and urban newly licensed nurses different? A longitudinal study of a nurse residency programme (USA) Bratt</td>
<td>Nurses</td>
<td>Observational prospective longitudinal qualitative study</td>
<td>Rural-based nursing residency programme is associated with increased job satisfaction and decreased job stress in rural nurses.</td>
</tr>
<tr>
<td>Length of service (duration of stay/mean duration of service)</td>
<td>Other examples: Matthews (education, Canada, doctors), Yang (financial, China, Western and Chinese physicians and dentists), Winn (education, Canada, allied health professionals)</td>
<td>Sustainable health system: career</td>
<td>Different ideas between early career physicians and the previous generation (Canada) Snadden</td>
<td>Rural generalist physicians</td>
<td>Qualitative, semi-structured interviews</td>
<td>Early career physicians have different ideas about ideal workplace conditions compared with later career doctors and this may influence recruitment and retention. Practices that are adapted to these generational differences reported better recruitment and retention.</td>
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</tbody>
</table>
### Indicator: Impact on communities: increased access and availability, and health worker type

<table>
<thead>
<tr>
<th>Author details</th>
<th>Category and type of intervention</th>
<th>Scheme (reference/author)</th>
<th>Targeted group</th>
<th>Study design/methods</th>
<th>Results reported</th>
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<tbody>
<tr>
<td>Craig (education, Australia, interprofessional education)</td>
<td>Education: multi-faceted education programme</td>
<td>Zamboanga University, (Philippines) Cristobal</td>
<td>Medical students</td>
<td>Retrospective case study</td>
<td>80% (160) of graduates practising in local underserved rural/remote areas. Very positive impact of a rural-based medical school. Medical student research projects benefit the community. Reduced infant mortality to 90%. Increased health knowledge, increased referrals (improved system). Increased volunteer CHWs.</td>
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<td>Healey-Ogden (education, Australia, nurses)</td>
<td>Regulatory: enhanced scope of practice</td>
<td>Rural family physicians (Canada) Cameron</td>
<td>Physicians</td>
<td>Qualitative case study</td>
<td>Physicians' decisions to stay in a particular community from within the professional domain: physician supply, physician dynamics, scope of practice and practice set-up were common across all communities, and innovation, and management and support emerged from some communities. &quot;Why do I stay here? Because I can do the stuff that I’m trained to do here. If I move to [nearest city], they won’t allow me to do [procedures] or look after sick patients … I would be put into family practice, not rural general practice.&quot; The relationship between physicians and the community was perceived as mutually beneficial, with physicians working hard to care for patients and contributing to the community, while community members showed gratitude and respect through community initiatives and continuing support as patients.</td>
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<td>Girardi (regulatory, Brazil, doctors)</td>
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<td>Golnik (regulatory, USA, CHWs)</td>
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<td>Lee (education, USA, doctors and dentists)</td>
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<td>Ludwik (regulatory, Uganda, CHWs)</td>
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<td>Nithiapinyasakul (bundled, Thailand, doctors)</td>
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<td>Okyere (regulatory, Ghana, variety of health workers)</td>
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<td>Rahman (support, Bangladesh, CHW)</td>
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<td>Rajbangshi (regulatory, India, all health workers)</td>
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<td>Reid (sustainable, USA, variety of health practitioners including doctors)</td>
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<td>Ross (sustainable, South Africa, physiotherapists, pharmacists, medical officers)</td>
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<td>Wright (education, Australia, doctors)</td>
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<td>Zimmerman (bundled, Nepal, doctors)</td>
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Table A1.4 Huicho et al. outcomes evaluation

Social determinants, political situation, stakeholders power and interest, economic issues (fiscal space, fiscal decentralization) individual level factors (marital status, gender)

<table>
<thead>
<tr>
<th>Design</th>
<th>Implementation</th>
<th>Outputs</th>
<th>Outcomes</th>
<th>Impact</th>
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<tbody>
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