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

Web Annex A. GRADE evidence profiles
1. Doctors, Thailand  
Cohort study  
Rural background 
students (RMBD) were 
allocated their region of origin 
while the control group had no 
choice of where to work.  
None identified  
Workplace utilization 
rate of control group and rural 
background group were not equal.  
Not suspected  
Magnitude of effect  
Moderate  
10 038 graduates  
Yes  
Overall 57.6% retention rate. RMBD retained 72.1% versus normal track 53.8% (+0.001). Graduate entry 
associated with higher retention. RMBD doctors worked rarely 62% compared with 49% normal track 
students. Recognition 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 CBL 
during the degree was associated with greater retention OR 1.175 (1.030-1.341) p=0.015.

2. Medical graduates, 
Australia  
Cross-sectional cohort 
study  
Prior intention to 
practise in rural areas not 
known.  
None identified  
None identified  
None identified  
None identified  
Magnitude of effect  
Moderate  
729 medical 
graduates of the 
University of 
Queensland 2002- 
2011  
Yes  
Recruitment of students combined with a rural-focussed curriculum yielded positive outcomes related 
to primary care practice and decisions regarding practice location. NOSM graduates were considerably 
more likely than non-NOSM graduates to choose family medicine, a primary care specialty and be 
currently practising in a rural location. NOSM graduates were 2.4 times more likely than non-NOSM 
graduates to choose family medicine, 4.7 times more likely to choose a primary care practice specialty, 
17.2 times more likely to currently practising in a rural location and 12.8 times more likely to be practising 
in a primary care specialty age code.

3. Doctors, United 
States of America  
Serial, quantitative 
analysis of university and 
medical based location of 
practice  
Time span may have 
been short. Practice 
locations prior to 1997 
was not assessed in this 
study.  
None identified  
None identified  
None identified  
None identified  
Magnitude of effect  
Moderate  
2820 over 11 years 
summary of participants/sample  
size  
Yes  
Recruited according to rural background and community connections into a flexible study 
practice. Post-programme, 87.5% of registered nurses (RN) were employed in community health services, with 
93.4% retention rate; after 20 years 80% were still there (reduced turnover). 80% undertook further 
study; 2% also completed full-time studies after the DNE programme.

4. Nursing students, 
Norway  
Quantitative cross-
sectional survey  
Small sample size, not 
generalizable  
None identified  
None identified  
Unclear  
None identified  
Low  
233 (73% 95% rural)  
Recruited according to rural background and community connections into a flexible study 
practice. Post-programme, 87.5% of registered nurses (RN) were employed in community health services, with 
93.4% retention rate; after 20 years 80% were still there (reduced turnover). 80% undertook further 
study; 2% also completed full-time studies after the DNE programme.

5. Doctors, 
Philippines  
Retrospective case 
study  
None identified  
None identified  
None identified  
None identified  
Magnitude of effect  
Moderate  
1044 graduates  
No  
80% (1044) of graduates practising in local underserved rural/remote areas. Very positive impact of a 
rurally based medical school.

6. Doctors, 
Philippines  
Retrospective case 
study  
None identified  
None identified  
None identified  
None identified  
Magnitude of effect  
Moderate  
12 000 applicants, 
346 admissions to 
medical course, 230 
Northern Ontario 
School of Medicine (NOSM) graduates 2009-2012  
Yes  
65% from Northern Ontario, 5% from other rural/remote areas of Canada. 45% NOSM students from 
rural or remote communities unlike the rest of Canada with 10% rural students. GPA comparable with 
other Canadian medical schools. 63% choose family medicine programmes, mainly rural 63% general 
specialties; 6% subspecialities. Rest of Canada 30%, 40% and 30% respectively. Medical Council of Canada 
Part 1 Examination - NOSM students performed above national average. In Part 2 Examination in 2008 and 
2010, NOSM trainees' scores placed NOSM 1st of the 17 Canadian medical schools.

7. Medical 
students, Canada  
Serial, quantitative 
analysis of university and 
medical based location of 
practice  
None identified  
None identified  
None identified  
None identified  
Magnitude of effect  
Moderate  
2820 over 11 years 
summary of participants/sample  
size  
Yes  
Recruited according to rural background and community connections into a flexible study 
practice. Post-programme, 87.5% of registered nurses (RN) were employed in community health services, with 
93.4% retention rate; after 20 years 80% were still there (reduced turnover). 80% undertook further 
study; 2% also completed full-time studies after the DNE programme.

8. Doctors, 
Philippines  
Retrospective case 
study  
None identified  
None identified  
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Moderate  
12 000 applicants, 
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2010, NOSM trainees' scores placed NOSM 1st of the 17 Canadian medical schools.

References:
1. Doctors and dental residents, United States of America

Mixed methods: lessons learned/identified in programme management and evaluation of programme

No serious limitations. Expanding programme.

None identified

None identified

None identified

Magnitude of effects

Moderate

Very low

Very low

12

1

20%

1. Postgraduate trained doctors in Iowa, United States of America

Longitudinal quantitative; 3-year after graduation and every 2 years thereafter, plus survey

Long period of study: 1977-2010 over which dramatic changes occurred in scale and scope of practice, single-residency programme.

Non-confounders identified for selection into programme.

None identified

None identified

None identified

Non-community based comparison group

Increased retention of family medicine graduates 5 years post rural training (Iowa Family Medicine Training Network, IFMTN). International graduates and women were less likely to practice rurally. There were some variations from decade to decade amongst cohort choices. Location of EM training was not a strong predictor of rural practice. Location of undergraduate medical education was a strong predictor for practice within state.


1. Doctors, Thailand

Cohort study

Limited by administrative database not built as a research database. Lack of reported individual characteristics of doctors.

None identified

None identified

None identified

None identified

Moderate

6064 that graduated 1977-2014 over which some variations from decade to decade amongst cohort choices. Location of undergraduate medical education was a strong predictor for practice within state.


1. Medical graduates, Australia

Medical graduate data analysed

Majority of graduates were at early career stage. No measure of rural connection or intention to return to specific region was available.

None identified

None identified

None identified

None identified

Moderate

4931 graduates

Medical graduates practicing rurally in their early career [1-9 years post graduation] are likely to have rural connections to the region, through either their basic medical training, their secondary school, or both. 33% of the graduates returned to work in rural areas. 24% of them had trained in the same area.


1. Medical students, Australia

Tracking study of 7 cohorts (cross-sectional)

Time constraints

None identified

None identified

None identified

None identified

Low

560

No

Primary practice location at time of study: 85% undertook internship in non-metropolitan location; metropolitan-origin students more likely to work in major cities.


1. Doctors, Australia

Retrospective cross-sectional study; survey of programme participants

No management of confounders

None identified

None identified

None identified

Very low

21

No

81% of Remote Vocational Training/ Scheme programme participants practised in Rural and Remote Medical Area Classification (RRMA) 3 or higher settings from 3-8 years after participation.

Wayne S, Goldberg P, McLanen C, Gargan C. Where are they now? The career paths of the Remote Vocational Training/ Scheme programme participants practised in Rural and Remote Medical Area Classification (RRMA) 3 or higher settings from 3-8 years after participation. J Rural Health. 2018;16:56.

1. Doctors- medical students, United States of America

Non-randomized interventions, comparing the Rural Medical Scholars (RMS) programme with regional campuses and usual medical education, pre/post intervention quantitative study

No management of confounders

None identified

None identified

None identified

Moderate

RMS n=45, regional n=152, main campus n=458

Yes, RMS was compared with regional and main campuses.

There was a dose-response effect for rural exposure in undergraduate medical education, with OR at 6.0 for producing a rural doctor for RMS, 2.5 for regional campus, and 1 for main campus.


12. Medical students attending Rural Clinical Schools (RCS), Australia

Cross-sectional, quantitative data analysis

No serious limitation

None identified

None identified

None identified

None identified

Moderate

400 students from 12 RCS

None

RCS have a significant effect that show positive outcomes for the regional medical workforce at 5 years post graduation, 1.5 times more likely to remain rural if they attend RCS, for extended placement in RCS > 1 year. 2.6 times more likely.


1. Medical graduates of University of New South Wales who spent 1-3 years at RCS between 2001-2010, Australia

Observational study; online survey

None identified

None identified

None identified

None identified

Very low

214 (60% response rate n=355)

No

Graduates with 3 years of previous RCS training were more likely to indicate rural areas as their preferred current work location, than their colleagues who spent 1 year at an RCS campus (OR = 3.0, 95% CI 1.2-7.4, P = 0.014). Also RCS graduates who spent 3 years on an RCS were more likely to intend to take up rural medical practice after completion of training compared with graduates with 1 year of rural placement (OR = 5.1, 95% CI 1.8-16.3, P = 0.004). Non-rural medicine-training graduates who spent 3 years on rural campuses were more likely to take up rural practice compared with those who spent just 1 year at a rural campus (OR = 8.4, 95% CI 2.2-31.3, P = 0.002).

1 Nurses, United States of America

Dissertational perspective

Longitudinal qualitative study

None identified

None identified

None identified

None identified

None identified

Moderate

High total (two groups)

Yes, use of immigration nursing residency programme

Rural-based nursing residency programme is associated with increased job satisfaction and decreased job stress in rural nurses.


A3. Exposure undergraduate students of various health disciplines to rural community experiences and clinical rotations as these can have a positive influence on attracting and recruiting health workers to rural areas

| Quality assessment | No. of studies | Health worker occupation(s) | Design | Limitations | Incorregularly | Indirectness | Impression | Other considerations | Quality of evidence | Summary of findings | No. of participants/sample size | Win there a control group | Reported effects/outcomes | Reference |
|--------------------|----------------|--------------------------------|--------|-------------|---------------|--------------|-----------|--------------------|------------------|-----------------|------------------|------------------|----------------|---------------------|----------------|------------------|
| 1 Young doctors, Interns, Norway | Quantitative cohort study | The data might include some incorrect information regarding registration of the doctors’ workplace in April 2014. Methodological challenges in measuring the rural background effect. Confounding not adequately controlled for. | None identified | None identified | The data from the health authorities, which give information on the doctors’ interests, do not include indications of their geographical affiliations with the study area. The use of a network to map geographical affiliations brings in the possibility of error in the registrations. | The greatest benefit of the medical internship was for the most densely populated municipalities in the study area. Very low | 388 conditions, of whom 59 signed up early in the study area, 148 were regular interns in the study area and 181 were interns in the comparison area. | No | Rural clinical placement programme participation was significantly associated with an increased likelihood of working rurally (PR = 2.36). | 

2 Continental, Australia | Pre-post design, quantitative, longitudinal study for 3 classes up to 8 years postgraduation | Self-selected participants in the programme. Bias from self-selection mitigated by previous study control. Prior rural experience needs to be assessed separately from rural background. Missing data not well explained. | None identified | None identified | None identified | None identified | None identified | None identified | Low | 215 pre- and 213 post design graduates | No | Rural clinical placement programme participation was significantly associated with an increased likelihood of working rurally (PR = 2.36). | 

3 Medical students, Australia | Retrospective quantitative cross-sectional survey | None identified | None identified | None identified | None identified | None identified | None identified | Moderate | 84 from rural group, 540 from urban group. Response rates were 52% and 56% respectively. | Increase in intent to practice in a rural setting following undergraduate medical education that includes rural clinical placements. In particular, evidence of intent for urban background students suggests that internship and vocational training need to provide sufficient rural clinical experiences to ensure continued interest in rural practice. Extra-curricular activities (rural student club, mentor, rural conference attendees) had positive influence on the intentions of practice location. | 

4 Allied health students, Australia | Longitudinal, qualitative data from semi-structured interviews | Size of cohort | None identified | None identified | Yes No specific recommendations due to size | Lack of measures of all data in working withdroped people | Very low | 7 participants | No | Influence of undergraduate training continues: 5 living in regional or rural towns | Thamford RD, Thompson SC. Learning from follow-up of student placements in a remote community: a qualitative study highlights personal and workplace benefits and opportunities. BMC Med Educ. 2010;10(1):31. | 

5 Occupational therapists, physiotherapists, speech-language pathologists, audiologists, Canada | Retrospective cross-sectional study of 2002-2010 programme participants; self-administered questionnaire in June 2011 | None identified | None identified | None identified | None identified | None identified | None identified | Moderate | 280 | 33.9% of 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. “Job satisfaction, professional networking opportunities and rural/remote lifestyle options were identified as factors for retention in rural/remote practice areas.” | Winn CS, Dickson BA, Hamelkramer JA, Trysreena J, Kandall LS. Impact of the Northern Studies Stream and Rehabilitation Studies programs on recruitment and retention to rural and remote practice: 2002-2010. Rural Remote Health. 2010;10(2):226. | 

6 Doctors, Australia | Cross-sectional study, survey | None identified | None identified | Serious | None identified | None identified | None identified | Low | 102 | An expectation gap during the rural placement during medical school was associated with lower rural practice self-efficacy. Lower self-efficacy was associated with lower intention to practice rurally. Ensuring good support during student placements may prevent this negative expectation gap, which may have an impact on intention to practice rurally. Most doctors chose their location of practice after graduation. Doctors were happy where they were, whether it was rural or metropolitan, suggesting low incentive to move away from urban areas to rural ones. Doctors with high confidence in their ability to practice rurally were the ones working rurally. | Bentley M, Gemmell N, Isaac V, Hodge H, Watters L. Doctors’ rural practice self-efficacy is associated with current and intended small rural locations of practice. Aust J Rural Health. 2019;27(2):146-152. https://doi.org/10.1111/ajr.13466 | 

7 Comparability (measured as perception of administrators of the effect of quality of care and knowledge on Seeking) | Hospital based clinical nursing (nursing and medical), Australia | Qualitative cross-sectional survey to discover the impact of supernumerary responsibility | None identified | None identified | None identified | None identified | None identified | None identified | Indirect increased retention | None identified | Low | 125 | None | Three themes were identified from the data: impacts on supervisors, change in hospital learning culture and student usefulness. The impact on supervisors was positive and led to improved personal satisfaction. | Connolly M, Sweet J, Campbell D. What is the impact of longitudinal rural medical student clerkships on clinical supervisors and hospitals? Aust J Rural Health. 2014;22(1):179-188. |
1. Health science students and recent graduates, Australia
   - Qualitative structured interviews (formal and informal) and interviews
   - Availability (measured as the reported importance of ongoing education and training to retention of primary health workers practising in rural communities)
   - Competence (ability to perform job)

2. Medical students, Australia
   - Mix of qualitative, ethnographic methods
   - Retrospective, cohort, cross-sectional study of rural workforce distribution
   - Student perception not utilized

3. Mixed methods, cross-sectional evaluation study
   - No. of studies
   - Controlled trial

4. No.
   - Summary of findings
   - Reference

Availability

- No. of studies
- Health worker occupation(s)
- Design
- Limitations
- Inconsistency
- Indirectness
- Imprecision
- Other considerations
- Quality of evidence
- Win there is a control group?
- Reported effects/outcomes

1. Nurses, United States of America
   - Qualitative study, data analysis of programme outcomes
   - No clear outline of process for gathering data
   - Very low
   - Low
   - Moderate

2. Medical students, doctors, Canada
   - Retrospective, cohort, cross-sectional study of rural workforce distribution
   - No serious limitation
   - Difficulty to isolate the effect of exposure
   - No
   - Favorable short-term outcomes in preparing students for interprofessional practice in a rural setting

3. Medical students, Doctors, Canada
   - Longitudinal cohort prospective
   - Only mean scores were available and no statistical test was reported for their exam measure
   - No
   - No graduates in practice as of date of publication
   - Very low
   - Yes, comparison with regular track students

4. No.
   - Summary of findings
   - Reference

Competence (ability to perform job)

- unrealistic norms

AG: Design continuing education and development programmes that meet the needs of rural health workers, which are accessible from where they live and work, so as to support their retention

- No. of studies
- Health worker occupation(s)
- Design
- Limitations
- Inconsistency
- Indirectness
- Imprecision
- Other considerations
- Quality of evidence
- Win there is a control group?
- Reported effects/outcomes

Availability (measured as the reported importance of ongoing education and training to retention of primary health workers practising in rural communities)

- No. of studies
- Health worker occupation(s)
- Design
- Limitations
- Inconsistency
- Indirectness
- Imprecision
- Other considerations
- Quality of evidence
- Win there is a control group?
- Reported effects/outcomes

References

1. QF doctors, United Kingdom

Cross-sectional survey

Unlikely as to whether the fellowship confirms a greater intention to work in rural practice, or whether it provides a new opportunity through protected exposure.

None identified

None identified

Lacks detail

None identified

Very low

66

No

Approximately 75% of graduates are in important roles in Scotland: 43% working currently in general practice, 53% of whom were doing so in Scotland. 46 fellows (73%) in the period surveyed were working in rural areas or accessible small towns in Scotland, 31 in substantial general practice roles (60%).


2. Community midwives and facility, Afghanistan

Cross-sectional evaluation using mixed-methods: surveys by questionnaire and interviews

Difficultly obtaining data. Despite assurance of confidentiality, lowest responses may have been made, rather than those reflecting reality.

None identified

None identified

Only 11 provinces were assessed

Community factors influencing retention were not included

Low

406 facilities identified, 370 midwives interviewed

N/A

Barriers to service provision were identified with some unique to context, whereas others were similar to those identified as systems in the World Midwifery report. There is no formal system for tracking retention beyond the 3-month period following graduation. Reasons to leave: 46% insecurity (lack of security/boredom), 28.1% family disagreement, 59.9% increased workload without compensation (low remuneration), 7.8% lack of housing.


3. Primary care doctors, Norway

Observational pre- and post-vaccination rate

Limited data, other variables not accounted for

None identified

None identified

None identified

None identified

None identified

267 medical graduates, 53 doctors in programme, with 24 (46%) still working in rural 5 years later

No

Number of 64 retained in remote areas rose from 38% to 65% in 5 years. Postgraduate medical training can be conducted in remote areas and ensures professional development is provided remotely, and is conducive to retention. Rural intern position allows for junior doctor and family to grow roots in rural area while training.


Competence (measured as confidence in practicing in rural area)

1. Paediatric nurses, Canada

Cross-sectional qualitative semi-structured phone interviews after taking the professional development activities

Confounders not adjusted for

None identified

None identified

None identified

None identified

Very low

4000 hours of professional development accessed

No

4000 hours of professional development (PD): 20% paid PD time off increased knowledge, credentials and confidence. Staff retention, quality of care improvement, collaboration and engagement, hospital profiles and professional growth emerged.


1. International medical graduates (IMGs), Australia

Cross-sectional, survey with analysis pre and post-programme evaluations

Low numbers of participants

None identified

None identified

None identified

None identified

None identified

15 IMGs (13 in hospital, 2 in GP)

No

Participants rated the programme highly and reported increased knowledge, skills and professionalism. The website provided learning networks, which were considered essential to sustained professional networks.


1. Midwives, Liberia

Descriptive study of continuous professional development (CPD) model using mobile learning and regular mentoring

Implementation challenges impacting effectiveness

None identified

None identified

None identified

None identified

CPD programme was established by regulatory body of midwives in Liberia

Low

24

No

The new CPD programme links maintenance of professional competence through continued training/education and learning and highlights potential and future positive impact to improve capacity, knowledge and skills of midwives. Coordinating role of regulatory body and health authorities.


Supporting evidence

A2. Supporting evidence


A3. Supporting evidence


A4. Supporting evidence


A5. Supporting evidence


### REGULATORY EVIDENCE PROFILES

#### Availability

<table>
<thead>
<tr>
<th>No. of studies</th>
<th>Health worker occupation(s)</th>
<th>Design</th>
<th>Limitations</th>
<th>Inconsistency</th>
<th>Indirectness</th>
<th>Impression</th>
<th>Other considerations</th>
<th>Quality of evidence</th>
<th>No. of participants/sample size</th>
<th>Was there a control group?</th>
<th>Reported effects/outcomes</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Doctors, Canada</td>
<td>Qualitative, collective case study design</td>
<td>Selected by word of mouth, no additional audit for clarification/checking</td>
<td>None identified</td>
<td>None identified</td>
<td>Unclear</td>
<td>None identified</td>
<td>Very low</td>
<td>4 rural communities (cases) in Alberta that retained family doctors for 4 years or longer</td>
<td>No</td>
<td>Doctor's decisions to stay in a particular community were commonly influenced by: supply of doctors, occupational dynamics, scope of practice and practice set-up across all communities, while innovation, management and support emerged from some communities. Rural retention was enhanced by the opportunity to offer rural general practice and the job satisfaction derived from this, as opposed to more constritive positions in family practice offered in cities.</td>
</tr>
<tr>
<td>1</td>
<td>Nurses, Australia</td>
<td>Mixed methods, cross-sectional study, focus group, and survey questionnaires</td>
<td>None identified</td>
<td>None identified</td>
<td>Small sample size</td>
<td>None identified</td>
<td>Very low</td>
<td>12</td>
<td>Created an enhanced scope of practice as advanced rural nursing. Advanced nursing course was perceived by participants to extend their role in patient care, with an increase in job satisfaction, plus self-perceived increase in clinical skills.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Community health aids and community health practitioners (CHA/Ps), United States of America</td>
<td>Qualitative study</td>
<td>Participants interviewed about their scope of practice, interactions with mothers, infants, families, and teens</td>
<td>None identified</td>
<td>None identified</td>
<td>Small sample size</td>
<td>None identified</td>
<td>Very low</td>
<td>6</td>
<td>CHA/Ps are often sole medical workers in their communities providing essential services, including acute, chronic, preventive and emergency care, in addition to administration and medication-related tasks. The CHA/Ps provide &quot;culturally sensitive services&quot; and perpetuate traditional knowledge transmission. Due to their pivotal role in their communities, CHA/Ps often offer their services as the on-the-ground health care expert both day and night. The holistic scope of work that CHA/Ps provide to support mothers is &quot;pretty comprehensive&quot;.</td>
<td></td>
</tr>
<tr>
<td>2B</td>
<td>Rural physician assistants (PAs) and nurse practitioners, United States of America</td>
<td>Systematic review, over period of 35 years: Brazil - 17 surveys, 8 interviews/focus groups and 4 secondary analyses of large databases. A few of the papers overlapped in methodology (i.e. survey and interview). The manuscripts were published in peer-reviewed journals.</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>Very low</td>
<td>28</td>
<td>Yes, comparison group of urban PAs</td>
<td>Due to the higher needs and demands in rural areas, rural PAs spend more time with patients clinically, see more patients on a daily basis, and have more patients for whom they are the principal provider. The most common type of practice for a rural PA is primary care. Recruitment, retention and job satisfaction correlate with a broad scope of practice and moderate degree of autonomy.</td>
<td></td>
</tr>
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</table>

#### Competence

#### Responsiveness

#### Limitations

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<tbody>
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<td>1</td>
<td>Doctors, Canada</td>
<td>Retrospective, quantitative cross-sectional audit</td>
<td>Serious limitations</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>Large magnitude of effect</td>
<td>Low</td>
<td>103 [97%] of 111 were traced</td>
<td>No</td>
<td>West Africa College of Surgeons provided an 18-month diploma course with the aim to train rural mid-level anaesthetists. 80% were still practicing anaesthesia, 9% were in other disciplines. While 65 (22.7%) were abroad: 35 (11.5%) in the United Kingdom, 21 (6.9%) in USA, 4 (1.3%) in Canada. Only 9% of diploma holders remained in rural communities (as originally envisaged), 31% were consultants (as fellows) and 39% were registrars in fellowship training. The programme did not appear to have achieved the objectives of meeting rural middle-level human resources in anaesthesia as envisaged.</td>
</tr>
<tr>
<td>1</td>
<td>Hospitals in small rural hospitals, United States of America</td>
<td>Cross-sectional survey</td>
<td>No serious limitation</td>
<td>None identified</td>
<td>Reference</td>
<td>No hard data of numbers retained</td>
<td>Response from administrators, no response from patients/communities</td>
<td>Low</td>
<td>103 small rural hospitals, high response rate 88.4%</td>
<td>Yes</td>
<td>13.6% reported increased recruitment and retention. Improved quality of care. Patient satisfaction increased with hospitalists living in the community.</td>
</tr>
</tbody>
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### 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

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<td>Very low</td>
<td>12</td>
<td>Created an enhanced scope of practice as advanced rural nursing. Advanced nursing course was perceived by participants to extend their role in patient care, with an increase in job satisfaction, plus self-perceived increase in clinical skills.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Community health aids and community health practitioners (CHA/Ps), United States of America</td>
<td>Qualitative study</td>
<td>Participants interviewed about their scope of practice, interactions with mothers, infants, families, and teens</td>
<td>None identified</td>
<td>None identified</td>
<td>Small sample size</td>
<td>None identified</td>
<td>Very low</td>
<td>6</td>
<td>CHA/Ps are often sole medical workers in their communities providing essential services, including acute, chronic, preventive and emergency care, in addition to administration and medication-related tasks. The CHA/Ps provide &quot;culturally sensitive services&quot; and perpetuate traditional knowledge transmission. Due to their pivotal role in their communities, CHA/Ps often offer their services as the on-the-ground health care expert both day and night. The holistic scope of work that CHA/Ps provide to support mothers is &quot;pretty comprehensive&quot;.</td>
<td></td>
</tr>
<tr>
<td>2B</td>
<td>Rural physician assistants (PAs) and nurse practitioners, United States of America</td>
<td>Systematic review, over period of 35 years: Brazil - 17 surveys, 8 interviews/focus groups and 4 secondary analyses of large databases. A few of the papers overlapped in methodology (i.e. survey and interview). The manuscripts were published in peer-reviewed journals.</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>Very low</td>
<td>28</td>
<td>Yes, comparison group of urban PAs</td>
<td>Due to the higher needs and demands in rural areas, rural PAs spend more time with patients clinically, see more patients on a daily basis, and have more patients for whom they are the principal provider. The most common type of practice for a rural PA is primary care. Recruitment, retention and job satisfaction correlate with a broad scope of practice and moderate degree of autonomy.</td>
<td></td>
</tr>
</tbody>
</table>

#### Competence

#### Responsiveness

#### Limitations

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1</td>
<td>Doctors, Canada</td>
<td>Retrospective, quantitative cross-sectional audit</td>
<td>Serious limitations</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>Large magnitude of effect</td>
<td>Low</td>
<td>103 [97%] of 111 were traced</td>
<td>No</td>
<td>West Africa College of Surgeons provided an 18-month diploma course with the aim to train rural mid-level anaesthetists. 80% were still practicing anaesthesia, 9% were in other disciplines. While 65 (22.7%) were abroad: 35 (11.5%) in the United Kingdom, 21 (6.9%) in USA, 4 (1.3%) in Canada. Only 9% of diploma holders remained in rural communities (as originally envisaged), 31% were consultants (as fellows) and 39% were registrars in fellowship training. The programme did not appear to have achieved the objectives of meeting rural middle-level human resources in anaesthesia as envisaged.</td>
</tr>
<tr>
<td>1</td>
<td>Hospitals in small rural hospitals, United States of America</td>
<td>Cross-sectional survey</td>
<td>No serious limitation</td>
<td>None identified</td>
<td>Reference</td>
<td>No hard data of numbers retained</td>
<td>Response from administrators, no response from patients/communities</td>
<td>Low</td>
<td>103 small rural hospitals, high response rate 88.4%</td>
<td>Yes</td>
<td>13.6% reported increased recruitment and retention. Improved quality of care. Patient satisfaction increased with hospitalists living in the community.</td>
</tr>
</tbody>
</table>
1 Community-based health volunteers (CBHV), Ghana

Cross-sectional interviews None identified None identified None identified None identified None identified Low 12 Yes, interviews from 31

Logistical supplies, incentives, respect and support from community members and recognition and support from health worker supervisors help reduce attrition 44% (31) drop-out rate. CBHV have a variety of roles improving health in communities: promote healthy behaviours, prevent disease, case manage sick children, increase health literacy of community, parenting skills, and targeted programmes, e.g. leprosy, malaria, TB.


1 Community health worker aide (CHA) and community health assistant (CHP), United States of America

Retrospective observational None identified None identified None identified None identified Potential of community health workers in Polar regions Moderate 47 /20 No CHAPs provide a broad range of primary care in remote Alaskan communities whose residents would otherwise be without consistent medical care. Alaska’s CHAP programme could serve as health care delivery model for other remote communities with health care access challenges.


1 Doctors, medical aid workers, Brazil

Observational study Regional inequities and uptake of programme None identified None identified None identified Magnitude of effect Moderate 14.168 (68% of municipalities) No Reduction in shortfall of doctors for areas of need identified in regional areas. An overall increase in access to primary health care for areas in need was seen. No retention data have been reported.

1 Doctors, nurses, auxiliary nurse midwives, in service specialists, India

Qualitative, semi-structured interviews None identified None identified None identified None identified None identified None identified None identified None identified None identified None identified None identified None identified None identified None identified None identified None identified None identified Potential for magnitude of effect Very low 10 focus group, 72 participants None identified

Community midwives are struggling for survival in rural areas as maternal care providers as they are inadequately trained, lack resources to deliver services in their catchment areas and lack facilitation for integration in district health system.


Summary of findings

No. of studies Health worker occupation(s) Design Limitations Inconsistency Indirectness Impression Other considerations Quality of evidence No. of participants/size Was there a control group? Reported effects/outcomes

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<td>1</td>
<td>Doctors, Brazil</td>
<td>Quantitative study</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>The observed reduction of scarcity, and or, intensity, could have been greater if the socioeconomic shortfalls and health needs had been reduced in the period</td>
<td>Moderate</td>
<td>35/62 municipalities</td>
<td>No</td>
<td>A substantial increase in the supply of doctors in primary health care during this period, which helped reduce the number of municipalities with shortages from 1200 (24%) to 777 (6%). Patients reported to administrators: reduced waiting time; increased care during consultation; continuity of treatment; increased diagnosis of problems locally.</td>
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Competence

Unintended effects

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Responsiveness (measured as the variable themes impacting on reasons for recruitment and retention)

Availabilty (measured as retention and doctor density)

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<th>No. of participants/sex/male or female</th>
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<tbody>
<tr>
<td>1</td>
<td>Doctors, Canada</td>
<td>Observational retrospective audit</td>
<td>Serious limitations</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>Magnitude of effect</td>
<td>Low</td>
<td>Part 2: 149 doctors. Part 2: 80 doctors with return for service (RFS) and 67 non-RFS doctors</td>
<td>No</td>
<td>Part 1: proportion of RFS doctors who completed service obligations was 75.6%. Part 2: RFS doctors were 9.2% less likely to leave province than non-RFS doctors. A chi-squared test confirmed that RFS doctors worked longer in the province than non-RFS doctors (chi-squared = 7.678, p = 0.006).</td>
</tr>
<tr>
<td>1</td>
<td>Allied health workers, Australia</td>
<td>Mixed-method quantitative data analysis and qualitative in-depth interviews</td>
<td>Number of respondents</td>
<td>None identified</td>
<td>None identified</td>
<td>Number of respondents</td>
<td>None identified</td>
<td>Low</td>
<td>146, 67 interviewed, 11 managers</td>
<td>No</td>
<td>The study found good general support for the scholarships. The majority of scholarship recipients had completed their bonded service requirement, and most reported they would have gone into rural practice anyway. Several aspects of professional support were identified as necessary for retention.</td>
</tr>
</tbody>
</table>
1 Nurses, Canada  
Retrospective qualitative oral history study  
Serious limitation: None identified  
None identified  
None identified  
None identified  
Law: None identified  
43 nurses interviewed  
The data analysis identified predominant themes and subthemes from the interviews. These were complex and unique to this group of nurses. Travel opportunities and initial salaries were better but in later years this was not a motivating factor. Predominant themes include: finding out about work in NL; the immigration process; incentives; first impressions; adaptation to the work environment; adaptation to the NL culture and lifestyle. Many of the participants opted to stay because they married local men; however, many had also developed strong feelings about NL. Although the immigrant nurses encountered challenges in the workplace and with the lifestyle and culture, they adapted and stayed, in most cases spending their entire career serving the people of NL.


1 Doctors, dentists and other health workers, USA  
Retrospective cohort study  
Serious limitation: None identified  
None identified  
None identified  
None identified  
Low: Different types of loan repayments  
133 Urban comparison group  
Loan repayment programmes (LRPs) only have a limited influence on the recruitment and retention of providers to rural Colorado; they do influence choice of specific rural community. 11 (41%) of rural participants who stayed in rural communities said the LRP was an important factor in staying; however, 21 (66%) of the rural participants said they were planning on practising in a rural area regardless of whether they received loan repayment.


1 Health officials, health workers, including senior county health officials, hospital directors, senior and junior doctors, nurses, service users (patients), China  
In-person interviews  
None identified  
None identified  
None identified  
None identified  
Low: 8 health officials, 80 health workers, 80 service users  
Mandatory rural bonded scholarships are much more likely to influence rural retention in countries where conformity to prescribed behaviour is strong and legal contracts are enforced.


Supporting evidence  
Bhatia S, Punsh B. What motivates government doctors in India to perform better in their job? Health Manage. 2014;16(1):149-159.

Rumphoep J, Wakeeman L, Wells B, Lenthall S, Worley P. The rural and remote health policy impasse - why hasn’t research evidence generated policies to improve rural and remote health services? Colloquium, 6th Rural and Remote Health Scientific Symposium - Outback infront: 20 years of rural and remote health research, 11-12 April, 2018, Canberra.


### FINANCIAL INCENTIVES EVIDENCE PROFILES

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<tbody>
<tr>
<td>1</td>
<td>Doctors in training, Israel</td>
<td>Mixed methods: pre- and post-incentive data analysis with surveys</td>
<td>Contounders from rural background and increased residency training programmes</td>
<td>None identified</td>
<td>Not suspected</td>
<td>None identified</td>
<td>The impact of the incentives could not be calculated precisely. A significant proportion of doctors who did not have an early preference to work in the periphery found the incentives influenced their decision. Intention to continue working peripherally was high.</td>
<td>Moderate</td>
<td>3042 hospital residents - all the residents in peripheral areas in which a grant was given (352 residents) and a random sample of residents in central hospitals (690). Pre-incentive years used as control, but likelihood of choosing peripheral residency was not calculated compared with post-incentives.</td>
<td>Residents in peripheral hospitals constituted 16–20% of the total in 2005–2010, 19% in 2011, 23% in 2012, and 29% in 2013, the increase consisted predominantly of doctors who were graduates of non-Israeli medical schools. Half of all residents in the periphery reported that the incentives contributed to their choice of residency location. About 40% of that group also reported that they had planned already in medical school to practice in the periphery, while 60% of that group (30% of all residents in the periphery) had no such plans prior to medical school. About 70% of the residents in peripheral hospitals grew up in the periphery; for the southern periphery this was 40% and for the northern periphery this was 30%. Incentives targeted to increase supply and demand.</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Health workers, Indonesia</td>
<td>Quantitative policy report</td>
<td>Serious limitations: no management of confounders</td>
<td>None identified</td>
<td>Conclusions in “lessons learned” do not appear to be directly related to evidence presented.</td>
<td>No quantity of outcomes</td>
<td>Magnitude of effect versus policy</td>
<td>Very low</td>
<td>32 978</td>
<td>No</td>
<td>Most of the targeted programmes used financial incentives. Various policies have succeeded in improving unbalanced distribution and shortage of health workers in Indonesia’s remote and very remote areas.</td>
</tr>
<tr>
<td>1</td>
<td>Health workers, India</td>
<td>Mixed methods cross-sectional study: purpose sampling, semi-structured and open-ended questionnaire, key informant interviews, thematic analysis of documents</td>
<td>Lack details</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>Low</td>
<td>32 health facilities, 6 CHCs, 4 PHCs, 2 district hospitals in 3 districts: 57 respondents</td>
<td>Comparison group</td>
<td>1319 health workers, including doctors, retained 2010–11, reducing vacancies of doctors from 50% to 45%; number increased to 1688 in 2011–12; 20% increase in staff; increase in uptake of scheme, 92.5% of facilities classified as “most difficult” reduced to 31.6% in 2011.</td>
</tr>
<tr>
<td>1</td>
<td>Allied health workers, United Kingdom</td>
<td>Mixed methods: semi-structured interviews and survey questionnaire with thematic analysis of managers, recruits and teams</td>
<td>A longitudinal design would have been preferred</td>
<td>None identified</td>
<td>None identified</td>
<td>Unclear</td>
<td>None identified</td>
<td>Very low</td>
<td>66</td>
<td>No</td>
<td>Positive outcome, although 42% claimed the financial allowance had no influence; the secondary benefits did – limited use of funds for what they wanted, e.g. continuing professional development, new equipment, etc. For those that did not stay, promotion was the main reason for leaving. More benefits than just recruitment, few negative impacts.</td>
</tr>
<tr>
<td>1</td>
<td>Doctors, Chinese medicine physicians, dentists, China</td>
<td>This study has employed an interrupted trend analysis with time series observations for 12 years</td>
<td>Although improved distribution across the board, insufficient detail to provide specific improvements/continued redistribution in some rural and remote areas.</td>
<td>None identified</td>
<td>Lack of data on different types of specialists. There are also differences in the types of cases managed by Western and traditional medical practitioners.</td>
<td>None identified</td>
<td>None identified</td>
<td>Moderate</td>
<td>Not specified</td>
<td>No</td>
<td>94% offering universal health coverage to all citizens and proper financial incentives to providers resulted in more equal geographic distributions among all three groups. Mandatory enrolment for all citizens, government run insurer, single payer, comprehensive benefit coverage for all 3 groups, and high rate of registration of health providers.</td>
</tr>
</tbody>
</table>

**Quality assessment**

**Summary of findings**

**Reference**


Solowoj J, Upton P, Upton D. A scheme to support the recruitment and retention of allied health professionals to hard to fill posts in rural areas. Int J Ther Rehabil. 2010;17(10):545-553.
| 1 | Doctors - GPs, Australia | Database analysis | Serious limitation | None identified | The newly eligible areas were likely to be larger regional towns, rather than very remote locations. Incentives changed. | None identified | Large effect | Moderate to Low | 2008-2014, 21,000 to 24,000 GPs in each year period | The differences in numbers were compared across the years before and after the policy change | There was a substantial increase in entries of newly qualified GPs to areas newly eligible for the incentive payments; overall GP numbers increased from 21,000 to 24,000 in 5 years after intervention. A difference-in-differences approach was used to estimate the number of new GPs if the policy change had not occurred. The 95% CI includes the 707 eligible locations relative to 2494 locations which were never eligible. The policy change increased the entry of newly qualified GPs to newly eligible locations but had no effect on the entry and exit of other GPs. The results suggest that location incentives should be targeted at newly qualified GPs. However, total stock relative to metropolitan areas remained constant. | Yong J, Scott A, Gravelle H, Sney P, Moggridge M. Do rural incentive payments affect entry and exit of general practitioners? Soc Sci Med. 2018;214:197-205. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 57 | Community midwives, Pakistan | Awar-based qualitative descriptive interviews; institutional ethnography | Serious limitations, not a representative sample | Variability of interviewee backgrounds and expertise | Variance of practice resources for each clinician | None identified | Not generalizable to other populations | Very low | 38 CMWs, 45 other health professionals, 20 policy-makers, 78 women, 35 husbands, 23 older women | No | Maternity workers not perceived as valuable - low cost to society. Single, older, high financial need status were motivators for successful maternity practice. Skills in networking, business, professionalism and non-judgemental communication were factors predicting success. | Mumtaz Z, Layez AV, Bhatti A. Successful community midwives in Pakistan: an awar-based approach. PLoS ONE. 2015;10(6). |

### Supporting evidence

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<td>1</td>
<td>CHWs (volunteers), Uganda</td>
<td>Mixed methods: semi-structured interviews</td>
<td>Geographic diversity and sample size, monetary incentive to complete survey may have skewed results to those wanting payment</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>Low</td>
<td>134</td>
<td>No</td>
<td>Village health teams desire support in the form of payment, supplies and respect from their community and other health workers. Anticipated longevity was positively associated with stronger partnerships with local health centre staff and ease of home visiting.</td>
</tr>
<tr>
<td>1</td>
<td>CHWs, Ghana</td>
<td>Mixed methods: interviews with semi-structured questionnaire, focus groups discussion and field trip-notes and reports data analysis</td>
<td>No previous attrition rate for CHWs known for Ghana so inter-country comparison from similar programmes used.</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>Moderate</td>
<td>660 CHWs over 30 months, n=520 interviews, n=5 focus groups ~12 000 children</td>
<td>No</td>
<td>Attrition rate 21.2% = 140 (low, other countries CHW attrition rates in similar programmes range from 70-30%) during the 30-month trial. 30% reduced mortality in children &lt; 5 years old with fever treated with artesunate + amodiaquine, and 44% reduction with addition of amoxicillin. Negative attitudes of caregivers caused some CHWs to exit, e.g. anger from caregiver if ineligible child not given trial medication, mothers shouting at CHW. Technical skills training and community-based programming increased retention.</td>
</tr>
<tr>
<td>1</td>
<td>Rural health workers: doctors, nurses, allied health workers and pharmacists, Ghana</td>
<td>Mixed methods: cross-sectional surveys and interviews</td>
<td>Majority of health workers were female and nurses. Selection bias - those who did not participate may not have been less motivated and less satisfied. Possible moderacy and social desirability biases on the side of the participants.</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>Low</td>
<td>256 (41%) out of 626 health workers from 3 districts of the East Region in Ghana</td>
<td>No</td>
<td>Job satisfaction (OR=0.74, 95% CI: 0.57-0.96) were significantly associated with decreased turnover intention and higher levels of both reduced the risk of health-workers having this intention. Measure of job satisfaction used is the Job Descriptive Index.</td>
</tr>
</tbody>
</table>
1. Nurses, midwives, birth attendants, Burkina Faso

- Exploratory qualitative study of a public policy in three remote areas in Burkina Faso
- Serious limitations from lack of detailed information on policies
- None identified

The policy was characterized by the absence of written directions and by targeting only one category of personnel.

Very low

No

Claims that policy implemented over 10 years has been a success.


2. CHWs, Bangladesh

- Qualitative study
- No serious limitations
- None identified

Detailed decision framework developed for plan in study.

Low

No

Identified retention factors as financial incentive, feeling needed by the community and the value of the CHW position in securing future career advancement. Challenge for the delivery is the ongoing need and cost of the training programme (6 weeks).


3. Nurses and midwives, Australia

- Pre- and post-intervention design, triangulating data from surveys and archival information
- Lower statistical significance in matched group, 30% turnover rate of participants will impact the study
- None identified

An outcome of improved motivation, and a reduction in turnover in rural general practice.

Moderate

No

A system level intervention was implemented to reduce stress and turnover in two NT hospitals. Nurses in both hospitals showed significant improvement in psychological health outcomes and job satisfaction, and turnover was reduced in Hospital 2 from May 2004 83% to June 2010 39% (statistically significant) and in Hospital 1 from May 2004 46% to June 2010 29% (not significant). Using 17 indicators, and pre- and post-measures, it was concluded that the improved psychological health outcomes could be attributed to the intervention strategy implemented by the NT DoH that included strategies to improve system factors, and reduce job demands and increase job resources.


Competence

1. GPs, Australia

- Longitudinal, quasi-experimental study utilizing an intervention baseline group and a control group.
- Potential biases. Too many factors could influence the decision to leave or not. Unable to distinguish baseline intention to leave or not versus intention influenced by behavioral coaching.
- None identified

Intervention group (n=65), baseline group (n=80), and control group (n=132).

Yes, n=312

Cognitive behavioral coaching reduced the stress levels of rural GPs who self-identified the need for managing stress and reduced their intention to leave rural general practice. Further, despite initially being more stressed compared with the general population of rural GPs, more GPs from the coaching group remained in rural practice.


1. Community medicine distributors, Uganda

- Structured interviews of 300 current CMDs in Tororo district of Uganda
- Interviewed the first 5 per parish, convenience sampling may have introduced a selection bias. Snapshod in time when the malaria case management programme had changed.
- None identified

The programme’s future was uncertain and in transition.

Low

No

The health workers felt disillusioned by unrealistic community expectations, limited drugs and supplies, poor supervision compounded by lack of compensation and lack of future paid opportunities.


1. Maternal health workers, United Republic of Tanzania

- Key informant interviews
- Very serious limitations, poor internal controls of those interviewed
- None identified

The programme’s future was uncertain and in transition.

Very low

No

Identified importation of organizational structure and accountability, communication, safe mechanism for worker input, available quality housing, equity of compensation for extended duties, effective onboarding, mentorship, adequate support resources and work environment.


Responsiveness

Intended effects

1. Nurses, midwives, birth attendants, Burkina Faso

- Exploratory qualitative study of a public policy in three remote areas in Burkina Faso
- Serious limitations from lack of detailed information on policies
- None identified

The policy was characterized by the absence of written directions and by targeting only one category of personnel.

Very low

No

Claims that policy implemented over 10 years has been a success.


2. CHWs, Bangladesh

- Qualitative study
- No serious limitations
- None identified

Detailed decision framework developed for plan in study.

Low

No

Identified retention factors as financial incentive, feeling needed by the community and the value of the CHW position in securing future career advancement. Challenge for the delivery is the ongoing need and cost of the training programme (6 weeks).


3. Nurses and midwives, Australia

- Pre- and post-intervention design, triangulating data from surveys and archival information
- Lower statistical significance in matched group, 30% turnover rate of participants will impact the study
- None identified

An outcome of improved motivation, and a reduction in turnover in rural general practice.

Moderate

No

A system level intervention was implemented to reduce stress and turnover in two NT hospitals. Nurses in both hospitals showed significant improvement in psychological health outcomes and job satisfaction, and turnover was reduced in Hospital 2 from May 2004 83% to June 2010 39% (statistically significant) and in Hospital 1 from May 2004 46% to June 2010 29% (not significant). Using 17 indicators, and pre- and post-measures, it was concluded that the improved psychological health outcomes could be attributed to the intervention strategy implemented by the NT DoH that included strategies to improve system factors, and reduce job demands and increase job resources.


Competence

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1. Maternal health workers, United Republic of Tanzania

- Key informant interviews
- Very serious limitations, poor internal controls of those interviewed
- None identified

The programme’s future was uncertain and in transition.

Very low

No

Identified importation of organizational structure and accountability, communication, safe mechanism for worker input, available quality housing, equity of compensation for extended duties, effective onboarding, mentorship, adequate support resources and work environment.

## D4. Identify and implement appropriate outreach activities to facilitate cooperation between health workers from better served areas and those in underserved areas, and, where feasible, use telehealth to provide additional support to health workers in remote and rural areas

### Quality assessment

<table>
<thead>
<tr>
<th>No. of studies</th>
<th>Health worker occupation(s)</th>
<th>Design</th>
<th>Limitations</th>
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</table>

### Availability (measured as perceived/reported impact on attractiveness of rural post)

<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Limitations</th>
<th>Indirectness</th>
<th>Impression</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Doctors, Canada</td>
<td>Qualitative, cross-sectional</td>
<td>Bias in self-reporting</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>Very low</td>
<td>13</td>
<td>No</td>
</tr>
</tbody>
</table>

- Health professionals reported being motivated to work and stay rurally (despite difficulties). Staff perceived benefits of telehealth were new skills, improved service quality, improved patient and staff relationships, and time and money savings. Downsides of telehealth were increased workload and reduced opportunities for external training. The authors summarized that this could aid retention and recruitment but added no direct evidence of this occurring.

### Exclusions


### Supporting evidence


## D5. Develop and support career development programmes and provide career posts in rural areas so that health workers can move up the career path as a result of experience, education and training, without necessarily leaving rural areas

### Quality assessment

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</tbody>
</table>

### Availability (measured as factors that would make a health worker choose a certain job post)

<table>
<thead>
<tr>
<th>Study</th>
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<td>None identified</td>
<td>None identified</td>
<td>Very low</td>
<td>13</td>
<td>No</td>
</tr>
</tbody>
</table>

- The presence of a rural medical campus was perceived as having important impacts on the quality of professional life, research, medical practice and regional development. Increased recruitment and retention of faculty to teach.

### Exclusions


### Supporting evidence

### BUNDLED INTERVENTIONS EVIDENCE PROFILES

**Quality assessment**

<table>
<thead>
<tr>
<th>No. of studies</th>
<th>Health worker occupants</th>
<th>Design</th>
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<th>Indirectness</th>
<th>Imprecision</th>
<th>Other considerations</th>
<th>Quality of evidence</th>
<th>No. of participants/users</th>
<th>Was there a control group?</th>
<th>Reported effects/outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Doctors and nurses, Brazil</td>
<td>Qualitative study (interviews, document review, literature review, key informant interviews and round table discussions with stakeholders and policy-makers)</td>
<td>Small numbers</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>Very low</td>
<td>None identified</td>
<td>No</td>
<td>Recruitment and training of rural scholars is worthwhile, viable, long-term strategy for the staffing of rural institutions in a developing country such as South Africa. A scholarship scheme can be a successful strategy for both recruitment and retention. These graduates found their work to be both satisfying and enjoyable and were able to provide and extend health care services. They gained status and respect within the community and were role models to scholars in the area. Access to resources, improved conditions at home and changed the trajectory of the lives of their family members. However, if such a scheme is to be an effective long-term strategy for the recruitment and retention of HCPs for other rural areas, managers need to invest in the effort of finding and supporting such rural-origin scholars. They also need to give attention to addressing context factors (which lead to frustration) and content factors (that promote motivation) in the workplace.</td>
</tr>
<tr>
<td>2</td>
<td>Doctors, multiple African countries</td>
<td>Database review and survey</td>
<td>Small numbers</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>Low</td>
<td>Database: 67 graduates; survey: 30 responders</td>
<td>No</td>
<td>100% retention of surgeons in rural African countries and 79% within their home country. PAACS graduates had 15% 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 COSECSA exams.</td>
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<tr>
<td>3</td>
<td>Doctors, Brazil</td>
<td>Integrative literature review</td>
<td>Small numbers</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>Moderate</td>
<td>1450 remote and deprived municipalities enrolled in the programme, Yes, 318 municipalities that were eligible but not enrolled in the programme</td>
<td>No</td>
<td>In 2012, there were 6948 teams and a coverage of 77.9% for the municipalities enrolled in the programme. In 2015, there were 8038 teams and a coverage of 86.3% in these municipalities. This period, with the PMM, the growth in the number of doctors in rural hospitals: an analysis of PAACS surgeons with twenty-year program follow-up. World J Surgery. 2019;43(1):75-86.</td>
</tr>
<tr>
<td>4</td>
<td>Doctors, Brazil</td>
<td>Before- and- after study to evaluate implementation</td>
<td>Small numbers</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>Moderate</td>
<td>Yes, 258 municipalities</td>
<td>No</td>
<td>None identified</td>
</tr>
</tbody>
</table>

**Summary of findings**

- **Doctors and nurses, Brazil**
  - **Study design**: Evaluating the impact of PAAMS on the training of professionals
  - **Limitations**: Small numbers
  - **Indirectness**: None identified
  - **Imprecision**: None identified
  - **Other considerations**: Challenges in organizing the logistical arrangements necessary for this implementation, or Inception of non-priority areas in the programme.
  - **Quality of evidence**: Low
  - **Sample size**: 30 graduates; survey: 10 respondents
  - **Control group**: No
  - **Effectiveness**: 100% retention of surgeons in rural African countries and 79% within their home country. PAACS graduates had 15% 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 COSECSA exams.

- **Doctors, multiple African countries**
  - **Study design**: Database review and survey
  - **Limitations**: Small numbers
  - **Indirectness**: None identified
  - **Imprecision**: None identified
  - **Other considerations**: Challenges in organizing the logistical arrangements necessary for this implementation, or Inception of non-priority areas in the programme.
  - **Quality of evidence**: Low
  - **Sample size**: Database: 67 graduates; survey: 30 responders
  - **Control group**: No
  - **Effectiveness**: 100% retention of surgeons in rural African countries and 79% within their home country. PAACS graduates had 15% 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 COSECSA exams.

- **Doctors, Brazil**
  - **Study design**: Integrative literature review
  - **Limitations**: Small numbers
  - **Indirectness**: None identified
  - **Imprecision**: None identified
  - **Other considerations**: Challenges in organizing the logistical arrangements necessary for this implementation, or Inception of non-priority areas in the programme.
  - **Quality of evidence**: Low
  - **Sample size**: 30 studies
  - **Control group**: No
  - **Effectiveness**: In 2012, there were 6948 teams, with a coverage of 77.9% for the municipalities enrolled in the programme. In 2015, there were 8038 teams and a coverage of 86.3% in these municipalities. This period, with the PMM, the growth in the number of doctors in rural hospitals: an analysis of PAACS surgeons with twenty-year program follow-up. World J Surgery. 2019;43(1):75-86.

- **Doctors, Brazil**
  - **Study design**: Before- and- after study to evaluate implementation
  - **Limitations**: Small numbers
  - **Indirectness**: None identified
  - **Imprecision**: None identified
  - **Other considerations**: Challenges in organizing the logistical arrangements necessary for this implementation, or Inception of non-priority areas in the programme.
  - **Quality of evidence**: Moderate
  - **Sample size**: 1450 remote and deprived municipalities enrolled in the programme, Yes, 318 municipalities that were eligible but not enrolled in the programme
  - **Control group**: No
  - **Effectiveness**: From 2013 to 2015, the programme increased the availability of doctors to remote and deprived populations by 29.8%. Municipalities with <14 doctors per 1000 population decreased from 202 to 81.
### 2. Bundled initiatives/Integrated evidence A, B and C

**Quality assessment**

<table>
<thead>
<tr>
<th>No. of studies</th>
<th>Health worker occupation(s)</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Doctors, Brazil</td>
<td>Retrospective study of data from MOPH hospitals for doctors who are not working in the MOHR. Variation with geographic area and changes introduced over time make it difficult to correlate intervention with retention.</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>Moderate</td>
<td>19 338 doctors over 8 years</td>
<td>No</td>
<td>None identified</td>
</tr>
</tbody>
</table>

**Availability (measured as retention, proportion of health workers recruited to rural areas)**

<table>
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<td>None identified</td>
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**Competence**

**Responsiveness**

**Unintended effects**

### 3. Bundled initiatives/Integrated evidence A, B, C and D

**Quality assessment**

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</thead>
<tbody>
<tr>
<td>1</td>
<td>Medical graduates, Thailand</td>
<td>Observational study of multiple interventions</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>Moderate</td>
<td>Yes</td>
<td>None identified</td>
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**Availability (measured as retention, proportion of health workers recruited to rural areas)**

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<td>None identified</td>
<td>None identified</td>
<td>Moderate</td>
<td>Yes</td>
<td>None identified</td>
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**Competence**

**Responsiveness**

**Unintended effects**

---

**Notes and References**

### Summary of findings

**Quality assessment**
- **No. of studies**
- **Health worker occupation(s)**
- **Design**
- **Limitations**
- **Inconsistency**
- **Indirectness**
- **Imprecision**
- **Other considerations**
- **Quality of evidence**
- **No. of participants/sample size**
- **Was there a control group?**
- **Reported effects/outcomes**

**Availability (measured as retention, proportion of health workers recruited to rural areas)**
- **E4. Bundled initiatives/integrated evidence A, C and D**
  - Descriptive demographic and professional data analysis
  - Retrospective. Face-to-face survey may increase tendency to stop volunteering. 55% were dissatisfied with non-monetary incentives.

**Competence**
- **None**

**Responsiveness**
- **None**

**Unintended effects**
- **None identified**

**Summary of findings**
- **Quality of evidence**: Very low
- **No. of interviews**: 28
- **Was there a control group?**: No
- **Reported effects/outcomes**: Qualitative impression - the local health system and impacts the recruitment and retention of health workers.

**Inconsistency**
- **None identified**

**Imprecision**
- **None identified**

**Other considerations**
- **Staff system to consider when designing any rural hospital in the middle part of Ghana: in whose interest? IJHPM. 2018;7(9):836-46.**

## References
- Dasman H, Mwanri L, Martini A. Volunteering for health services in Cambodia, China, and Vietnam and Indonesian rural medical internship: context influencing their outcomes. IJHPM. 2018;7(9):836-46.
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<tbody>
<tr>
<td>1</td>
<td>Health graduates, United States of America</td>
<td>Case study from online surveys</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>Low</td>
<td>26</td>
<td>No</td>
<td>Milwaukee Rural Physician Residency Assistance Program (WRPRAP), influence by significant others, meaningful work, integration into local community were the most important factors revealed for remaining in a rural location.</td>
<td>Mithen C, Brasch-Merk K, Cisse B, Traxler K. Factors influencing rural physician retention following completion of a rural training track family medicine residency program. WMJ. 2018;117(5):208-210.</td>
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### Availability (measured as factors that would make a health worker choose a certain job post)

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<tbody>
<tr>
<td>2</td>
<td>Doctors, physician assistants and allied health workers, United States of America</td>
<td>Review of programme over years of development</td>
<td>Small sample</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>Low</td>
<td>Small</td>
<td>No</td>
<td>Partnership between university and local foundation improved recruitment and retention of 10 health professionals (5 GPs) over 3 years. Improved perception of clinical training rotations, increased access to consultations via telemedicine and reduced teenage pregnancies.</td>
<td>Reid R, Risling K, Kaufman A, Bussett A, McGraw MC, Silverblatt H et al. The influence of a place-based foundation and a public university in growing a rural health workforce. J Community Health. 2019;44(2):292-296.</td>
<td></td>
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</table>

### Summary of findings

**Wisconsin Rural Physician Residency Assistance Program (WRPRAP)**

- Influence by significant others
- Meaningful work
- Integration into local community

**Rural Health workforce retention**

- Influenced by institutional factors
- Underlying systems working in parallel (public and private)

**Effectiveness and retention in rural Cambodia**

- Improved attraction and retention of primary care teams in France
- Improved access to consultations via telemedicine and reduced teenage pregnancies

**Rural GP density**

- Experienced a slowdown in loss of GPs
- Areas with PCTs compared with similar areas without PCTs, experienced a more favourable evolution of GP density in deprived rural areas with an average difference in differences of 3.5 GPs per 100 000 inhabitants.

**Increased access to consultations**

- Via telemedicine
- Reduced teenage pregnancies

**Improved perception of clinical training**

- Rotations
- Access to consultations

**Increased access to**

- Consultations via telemedicine
- Reduced teenage pregnancies

**Partnership**

- Between university and local foundation
- Improved recruitment and retention of health professionals (5 GPs)
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<tbody>
<tr>
<td>1</td>
<td>Rural GPs, Canada</td>
<td>Cross-sectional qualitative</td>
<td>Semi-structured interviews</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>None identified</td>
<td>Low</td>
<td>42</td>
<td>No</td>
<td>Early career doctors have different ideas about ideal workplace conditions compared with later career doctors and this may influence recruitment and retention. Practices that adapted to these generational differences reported better recruitment and retention.</td>
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**Supporting evidence**


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

Human Resources for Health Observer Series No. 25

web annex no: Web Annex A.

Title: GRADE evidence profiles

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