

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

Web Annex B. Descriptive evidence profiles

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

Web Annex B. Descriptive evidence profiles

Retention of the health workforce in rural and remote areas: a systematic review. Web Annex B. Descriptive evidence profiles  
ISBN 978-92-4-001389-6 (electronic version)

© World Health Organization 2020

Some rights reserved. This work is available under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 IGO licence (CC BY-NC-SA 3.0 IGO; <https://creativecommons.org/licenses/by-nc-sa/3.0/igo>).

Under the terms of this licence, you may copy, redistribute and adapt the work for non-commercial purposes, provided the work is appropriately cited, as indicated below. In any use of this work, there should be no suggestion that WHO endorses any specific organization, products or services. The use of the WHO logo is not permitted. If you adapt the work, then you must license your work under the same or equivalent Creative Commons licence. If you create a translation of this work, you should add the following disclaimer along with the suggested citation: "This translation was not created by the World Health Organization (WHO). WHO is not responsible for the content or accuracy of this translation. The original English edition shall be the binding and authentic edition".

Any mediation relating to disputes arising under the licence shall be conducted in accordance with the mediation rules of the World Intellectual Property Organization (<http://www.wipo.int/amc/en/mediation/rules/>).

**Suggested citation.** Web Annex B. Descriptive evidence profiles. In: Retention of the health workforce in rural and remote areas: a systematic review. Geneva: World Health Organization; 2020. Licence: CC BY-NC-SA 3.0 IGO.

**Cataloguing-in-Publication (CIP) data.** CIP data are available at <http://apps.who.int/iris>.

**Sales, rights and licensing.** To purchase WHO publications, see <http://apps.who.int/bookorders>. To submit requests for commercial use and queries on rights and licensing, see <http://www.who.int/about/licensing>.

**Third-party materials.** If you wish to reuse material from this work that is attributed to a third party, such as tables, figures or images, it is your responsibility to determine whether permission is needed for that reuse and to obtain permission from the copyright holder. The risk of claims resulting from infringement of any third-party-owned component in the work rests solely with the user.

**General disclaimers.** The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of WHO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by WHO in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by WHO to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall WHO be liable for damages arising from its use.

EDUCATION EVIDENCE PROFILES							
Category of intervention	Country	Intervention	Occupation(s)	Description	Study design and methods	Reported results	Reference
Education	Afghanistan	Community midwifery education (CME) programme	Facility managers and midwives employed in public facilities	Measure rate and determine factors associated with CME graduate retention in the public health sector.	Cross-sectional assessment between October 2011 and April 2012 utilizing quantitative and qualitative methods within public sector facilities across 11 provinces purposely selected by geographic location and security conditions.	Within 456 surveyed facilities, 570 midwives were interviewed with more than 50% being CME graduates. Graduate retention in public sector positions was relatively low. 61% (n=209/341) CME graduates were working in public sector facilities and 36.8% were working at their assigned site. Reasons for leaving employment were insecurity (46.4%), family disagreement (28.1%), increased workload without compensation (9.9%) and lack of appropriate housing (7.8%).	Mansoor GF, Hashemy P, Gohar F, Wood ME, Ayoubi SF, Todd CS. Midwifery retention and coverage and impact on service utilisation in Afghanistan. Midwifery. 2013;29(10):1088-1094.
Education	Australia	Longitudinal integrated clerkship, rural, primary care based	Doctors	Survey of doctors graduating after a year-long rural placement. Survey of self-efficacy for rural practice and experience gaps, including expectations vs reality during the student placement.	Cross-sectional study. Survey of rural practice self-efficacy, current and intended location of practice, and expectation-experience gap of placement, via survey of medical graduates who had undertaken a longitudinal rural placement in primary care as students.	An expectation gap during the rural placement while in medical school was associated with lower rural-practice self-efficacy. Lower self-efficacy was associated with lower intention to practise rurally. Ensuring good support during the student placements may prevent this negative expectation-experience gap, which may have an impact on intention to practise rurally. Most doctors chose their location of practice after graduation. Doctors were happy where they were, whether it was rural or metro, suggesting low incentive to move away from metro areas to rural ones. Doctors with high confidence in their ability to practise rurally were the ones working rurally.	Bentley M, Dummond N, Isaac V, Hodge H, Walters 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.
Education	Australia	Senior students of different health occupations placed in rural sites in interprofessional learning (IPL) teams	Different health occupations	Evaluation of IPL placements	Questionnaire for participants involving a debriefing questionnaire (using established rating scales) and an audience feedback questionnaire.	Evaluation showed positive short-term outcomes suggesting benefits of this approach in preparing for interprofessional practice.	Craig PL, Barnard A, Glasgow N, May E. Evaluating the health "hubs and spokes" interprofessional placements in rural New South Wales, Australia. J Allied Health. 2014;43(3):176-183.
Education	Australia	Rurally based undergraduate clinical training experience	Doctors	Monitoring of impact of rural undergraduate clinical training on trends in workforce participation patterns of graduates as long as 9 years in the workforce by career location and specialty choice.	Longitudinal mixed methods sequential explanatory design with quantitative and qualitative phases.	Out of a 64% response rate, 40% of respondents were non-urban and general practice was the most frequent specialty choice. Primary drivers were personal/family reasons and specialty training requirements. The longer the exposure to training in the rural context the greater the impact on interest in future rural practice and the likelihood important life decisions will also be made in the rural context.	Eley DS, Synnott R, Baker PG, Chater AB. A decade of Australian Rural Clinical School graduates - where are they and why? Rural Remote Health. 2012;12:1937.
Education	Australia	Rural clinical placement programme for undergraduate dentists	Dentists	To determine the long-term impact of rural clinical placement programme for dentists on workforce outcomes and workforce retention; and to explore potential confounding factors or rural predictors associated with rural employment.	Pre-post design using cross-sectional survey.	It was found that participation in the programme had a significant positive association with working rurally in 2015 (OR = 2.16, 95% CI: 1.77-2.64, P < 0.01). However, no association was found in 2017. In the multivariate analyses, both rural experience prior to the programme and pre-placement rural intentions were significant independent predictors of an increased likelihood for rural employment and rural retention.	Johnson G, Byun R, Foster K, Wright F, Blinkhorn A. A longitudinal workforce analysis of a rural clinical placement program for final year dental students. Aust Dent J. 2019;64(2):181-92.
Education	Australia	Regionalized training for general practice	GP trainees	To assess the medical workforce return on regional investment in training by local stakeholders in terms of qualified GPs remaining in the region.	Observational. Audit of 222 trainees. Examination of contribution to rural workforce during training and retention in rural practice.	53% remained in rural practice. However, over 40% moved to practise in metropolitan area. Local contextualization of training, completion of additional advanced skills training and being an Australian graduate were associated with increased retention in the region.	Kitchener S. Local regional workforce returns on investment of a locally governed and delivered general practice vocational training program. Aust Health Rev. 2019.
Education	Australia	Recruitment of rural background students and establishing Rural Clinical Schools (RCS)	Medical graduates of the University of Queensland 2002-2011.	To determine the regional results of an Australian Government sponsored national programme which aimed to recruit rural background students and establish RCS, and to determine predictors of graduates' longer term rural practice (LTRP) with a focus on comparison between GPs and specialists.	Cross-sectional cohort study of 729 medical graduates. Primary place of graduates’ practice categorized as rural for at least 50% of time since graduation among GPs and specialists was the outcome of interest. The main exposures were rural background (RB), metropolitan background (MB), and attendance at a metropolitan clinical school (MCS) or RCS for 1 or 2 years (RCS-1, RCS-2).	729/754 respondents provided information relevant to the study. “Independent predictors of LTRP were RB (2.10 [1.37-3.20]), RCS-1 (2.85 [1.77-4.58]), RCS-2 (5.38 [3.15-9.20], GP (3.40 [2.13-5.43]), and bonded scholarship (2.11 [1.19 – 3.76]).” “Specialists were less likely than GPs to be in LTRP with some significant differences in the effects of the duration of RCS attendance, bonded scholarships and partners background being apparent.”	Kwan MMS, Kondalsamy-Chennakesavan S, Ranmuthugala G, Toombs MR, Nicholson GC. The rural pipeline to longer-term rural practice: general practitioners and specialists. PLoS ONE. 2017;12(7):e0180394.
Education	Australia	Establishment of the rural clinical schools programme	Medical students attending an RCS	This study identified rural workforce outcomes of multiple RCS by examining data from graduating classes to determine association between rural location of practice in 2017, extended rural clinical placement effects and effects of having a rural background.	De-identified data analysed from 12 RCS domestic students programmes. Differences in gender, rural background and extended placement between RCS and MCS, were analysed. Predicting factors for rural practice were also identified.	14 RCS took part; data available from 12 out of 14 nationally. After controlling for rural background, students attending an RCS were 1.5 times more likely, and students who participated in extended placement were 2.6 times more likely, to practise in a rural location. Gender was not associated with rural practice. RCS have contributed to significant rural workforce increase relative to MCS.	McGirr J, Barnard A, Cheek C, Garne D, Greenhill J, Kondalsamy-Chennakesavan S et al. The Australian Rural Clinical School (RCS) program supports rural medical workforce: evidence from a crosssectional study of 12 RCSs. Rural Remote Health. 2019;19:4971.
Education	Australia	Rural training	Medical graduates	This study identifies the return rate of doctors to regional areas after receiving medical training in the same regional areas.	Data for medical graduates from a Victoria medical programme were analysed. Rural region of work 1-9 years postgraduation, region of secondary schooling, and duration of rural training were examined for association with region of practice.	15% of graduates were working rurally, 25% working in the same rural region as their training. 24% were working in the same region where they had their secondary schooling. A longer duration (18-24 months vs 12 months) of rural training was associated with returning to the same region after training.	McGrail MR, O’Sullivan BG, Russell DJ. Rural training pathways: the return rate of doctors to work in the same region as their basic medical training. Hum Resour Health. 2018;16:5.
Education	Australia	Provision of medical student training in regional location	Medical students	Tracking study of graduates (n=536) of a medical programme at an Australian regional university.	Tracking study of all graduates from 7 student cohorts.	Primary practice location at time of study: 65% undertook internship in non-metropolitan location; metropolitan-origin graduates more likely to work in major cities compared with non-metropolitan.	Sen Gupta T, Woolley T, Murray R, Hays R, McCloskey T. Positive impacts on rural and regional workforce from the first seven cohorts of James Cook University medical graduates. Rural Remote Health. 2014;14:2657.
Education	Australia	Influence of background, rural or urban, and rural undergraduate exposure on intention to work rural	Medical graduates	Survey to determine if selecting rural background students had affected the respondents’ intended place of practice after completion of training, and to compare outcomes.	Retrospective cohort survey	Provided additional evidence of an increase in intent to practise in a rural setting following undergraduate medical education that includes rural clinical placements. This was especially clear for urban background graduates. Suggests that internship and vocational training need to provide sufficient rural clinical experiences to ensure continued interest in rural practice.	Strasser R, Hogenbirk JC, Lewenberg M, Story M, Kevat A. Starting rural, staying rural: how can we strengthen the pathway from rural upbringing to rural practice? Aust J Rural Health. 2010;18(6):242-248.

Education	Australia	Aboriginal and rural immersion for a student placement	Allied health students	Explored the opportunity to reduce the "fear factor" of rural and Aboriginal practice by undertaking an undergraduate rural and Aboriginal experience.	Semi-structured interviews pre- and post-intervention.	The placement provided sound preparation for future rural practice, removed uncertainties about what to expect and enhanced confidence about being able to cope. 6 of the 8 employed participants were working in regional/rural areas; 1 was interested in working long term in remote settings. Most were concerned about isolation. Community connections and a cultural mentor were considered pivotal to the success of the placement.	Thackrah RD, Hall M, Fitzgerald K, Thompson SC. Up close and real: living and learning in a remote community builds students' cultural capabilities and understanding of health disparities. Int J Equity Health. 2017;16(1):119.
Education	Australia	Follow-up study to 2017 Aboriginal and rural immersion programme	Allied health workers	Explored the impact on professional practice and employment decision-making amongst a subset of the original cohort.	Interviews 4 years post student placement.	5 out of original 12 (7 re-interviewed after 4 years) were in rural/regional practice.	Thackrah RD, Thompson SC. Learning from follow-up of student placements in a remote community: a small qualitative study highlights personal and workforce benefits and opportunities. BMC Med Educ. 2019;19(1):331.
Education	Australia	Rural clinical training	Doctors	The Remote Vocational Training Scheme (RVTS ) trains doctors for remote communities, in remote communities. Supervisors support registrars remotely 1 hour per week in the first 6 months, 1 hour per fortnight in the second 6 months, and 1 hour per month thereafter.	Retrospective cohort study of 1999-2005 RVTS programme participants; self-administered questionnaires in December 2007.	"Overall retention rates are 17 out of 21 (81%) in RRMA (Rural and Remote Medical Area classification) 3 or above, 47% in RRMA 4 or above, 41% in RRMA 5 or above, 20% in RRMA 6 or above and 16% in RRMA 7." "All past registrars believe RVTS prepared them either 'extremely well', 'very well', or 'well' for clinical practice. Graduates reported valuing the support and social network provided by the scheme as well as the emphasis on the extended skills needed in emergency and remote medicine."	Wearne S, Giddings P, McLaren J, Gargan C. Where are they now? The career paths of the Remote Vocational Training Scheme registrars. Aust Fam Physician. 2010;39(1-2):53-56.
Education	Australia	Educational programme	International medical graduates (IMGs)	This educational programme involves five sessions held over 3 months and featured practice-based scenarios, simulation and other experiential activities reflecting local practices. A website offered diverse learning experiences.	IMGs completed a learning needs analysis and pre- and post-programme evaluations of the GIPSIE distributed medical education programme.	Participants rated the programme highly and reported increased knowledge, skills and professionalism. The website promoted learning networks, which were considered essential to sustained professional development.	Wright A, Haige C, Reagan M, Sunderji I, Vijayakumar P, Nestel D. Evaluation of an educational program to support international medical graduates in rural Victoria, Australia. Intern Med J. 2010;40:62-63.
Education	Canada	A1, A2, A3, distributed rural and remote medical school with community engaged medical education for undergraduates (MD) and rural postgraduate programmes	Medical students and graduates	Review of experience of establishing new medical school (NOSM) based in two urban centres, Sudbury and Thunder Bay, > 1000 km apart in Northern Ontario (NO). Programmes have strong emphasis on interprofessional education and integrated clinical learning in over 70 communities in a vast area (800 000 sq. km = > Germany + France).	Review of experience	2005-2010: 12 000 applicants for 346 places. 91% of students admitted were from NO, 9% from other rural/remote areas of Canada. 45% of students came from rural/remote communities vs 10% in other Canadian medical schools. GPA comparable to other Canadian schools. 2009-2012: of 220 graduates, 135 (61%) chose family medicine training, most in rural. 33% trained in general specialties (internal medicine, surgery) and 6% in sub-specialties (dermatology, plastic surgery). Other Canadian schools: 30% family medicine, 40% general specialties, 30% sub-specialties. 35% of NOSM graduates continuing training in NO. Many of the other graduates indicated intention to practise in NO. Increasing numbers of NOSM graduates are practising family physicians in NO, some have become NOSM academic staff. NOSM students perform above the national average in Medical Council of Canada (MCC) Part 1 examinations. In 2008 and 2010 NOSM trainees' total scores in MCC Part 2 examinations placed NOSM 1st of the 17 medical schools. Economic impact of NOSM significant adding Ca\$67-82 x 106 per year to NO economy, mainly in cities Sudbury and Thunder Bay and lesser amounts in other communities. Societal impact includes community empowerment, and other university courses (Architecture and Law) being established in NO.	Agr��us L, Strasser R. [Medical education in rural areas - a radical concept from Canada]. Lakartidningen. 2014;111(3-4):91-92.
Education	Canada	Participating nurses were ensured 20% of their paid time to engage in professional development (PD), through an application process, and provided additional leave. Positions were backfilled with temporary staff through funding.	Paediatric unit nurses	Implementation of a pilot 80/20 staffing model promoting PD, and its effect on work experience, leadership capacity, work environment and better recruitment and retention of nurses in a small rural community where PD opportunities are limited.	Qualitative semi-structured phone interviews after undertaking the PD activities. Cross-sectional survey to study the effect on work experience, leadership capacity, work environment, recruitment and retention.	4000 hours of PD were gained, leading to increase in experience, knowledge and credentials. Project challenges included those related to resources, staffing and those of participating nurses. Improvements in staff retention, quality of care, collaboration and engagement, hospital profile, and personal growth emerged.	Healey-Ogden M, Wejr P, Farrow C. British Columbia: improving retention and recruitment in smaller communities. Nurs Leadersh (Tor Ont). 2012;25(2012):37-44.
Education	Canada	Distributed medical education (DME) programme delivered by the Centre for Family Medicine (CFFM) in Southwestern Ontario	DME programme graduates since 2005 to date	To explore the factors that contributed to family doctors' decisions to practise in an underserved area following graduation from the DME programme.	Semi-structured face-to-face interviews and programmed records reviewed to identify practice location of DME graduates. May to August 2013, semi-structured in-person interviews of 19 family doctors who graduated from a distributed medical education (DME) programme, set up in 2003, outside of academic centres.	21/32 (66%) of graduates to date had established their practices in the region following residency training, including all those who were interviewed (n=19). Key themes in relation to deciding to establish their practice in an underserved area were identified including: familial ties to the region, practice opportunities, positive clerkship and residency experiences, established professional relationships, and lifestyle opportunities.	Lee J, Walus A, Billing R, Hillier LM. The role of distributed education in recruitment and retention of family physicians. Postgrad Med J. 2016;92(1090):436-440.
Education	Canada	Rural academic and clinical training	Occupational therapists, physiotherapists, speech-language pathologists, audiologists	Northern Studies Stream (NSS) and Rehabilitation Studies (RS) programmes.	Retrospective cohort study of 2002-2010 programme participants; self-administered questionnaire in June 2011.	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."Job satisfaction, professional networking opportunities, and rural lifestyle options were identified as important factors for retention in rural/remote practice areas."	Winn CS, Chisholm BA, Hummelbrunner JA, Tryssenaar J, Kandler 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. 2015;15(2):3126.
Education	Canada	Rural workforce focused programmes	Medical students and family medicine trainees	Rural doctor workforce impact of one university compared with Canada-wide outcomes.	Retrospective cohort study of workplace of doctors at least 5 years after completing vocational training.	Graduates of this university are more likely to be working in rural practice than the Canadian national average.	Rourke J, Asghari S, Hurley O, Ravalia M, Jong M, Graham W, et al. Does rural generalist focused medical school and family medicine training make a difference? Memorial University of Newfoundland outcomes. Rural Remote Health. 2018;18(1):4426.
Education	Germany	1-day "rural day" exposure	GP trainees	To determine whether the rural day was an effective intervention for GP workforce shortages in rural communities.	Internet-based questionnaire, completed by 110 (38 rural day, 72 not) of 500 trainees; outcome = intention to work in a rural area.	There was no significant difference in the intention to work in a rural area for participants before and after the rural day experience; intention also similar for non-participants.	Flum E, Goetz K, Berger S, Ledig T, Steinh��user J. Can a 'rural day' make a difference to GP shortage across rural Germany? Rural Remote Health. 2016;16(1):3628.
Education	Indonesia	Medical internship in rural area	Graduate doctors (interns)	Focus group interviews of interns who had completed an intern year in a rural hospital, looking at factors important in their retention.	Focus group interviews	The rural medical internships were perceived negatively, characterized by financial hardship and adverse workplace culture. Most did not intend to continue working in a rural area.	Dasman H, Mwanri L, Martini A. Indonesian rural medical internship: the impact on health service and the future workforce. Indian J Public Health Res Dev. 2018;9(7):231-6.

Education	Liberia	Continuous professional development (CPD) model using mobile learning and regular mentoring	Midwives	To increase the competency of the midwifery workforce to address high maternal mortality in rural locations.	Two component CPD modules: face-to-face mentoring of midwives and mobile learning and skills training completed by 24 midwives in the pilot study.	The new CPD programme links maintenance of professional competence through continued training/education and mentoring and highlights potential and future positive impact to improve capacity, knowledge and skills of midwives.	Michel-Schuldt M, Dayon MB, Klar RT, Subha M, King-Lincoln E, Kpangbala-Flomo C et al. Continuous professional development of Liberia's midwifery workforce - a coordinated multi-stakeholder approach. Midwifery. 2018;62;77-80.
Education	Norway	Decentralized nursing education (DNE) model implementation as part of a bachelor programme in nursing	Nursing students	The study investigates how the DNE has impacted recruitment and retention of DNE students in rural health care services.	Quantitative survey of graduates of the DNE programme 1994-2011.	233 graduates participated; 87.5% of registered nurses (RNs) were employed at community health services, with an 81.6% retention rate. 52% also completed postgraduate education afterwards. Reasons for doing the DNE included family responsibility (60.9%) and possibility to study part time (56.2%). The DNE provided a sustainable health care service model in rural Norway.	Norbye B, Skaalvik MW. Decentralized nursing education in Northern Norway: towards a sustainable recruitment and retention model in rural Arctic healthcare services. Int J Circumpolar Health. 2013;72:22793.
Education	Norway	Interventions conducive to professional development in rural areas. Both internship and postgraduate training take place in all the small municipalities in the county.	Primary care doctors	Establishment of a new primary care internship in the northern Norway.	Observational pre and post vacancy rate. 1998 new primary care internships: medical intern positions for 18 months, including 6 months in GP; access to public health and GP training through in-service and group tutorials rather than large lecture style.	Number of GPs retained in remote areas rose from 38% to 65%. Postgraduate medical training can be conducted in remote areas and ensures professional development, and is conducive to retention.	Straume K, Shaw DMP. Effective physician retention strategies in Norway's northernmost county. Bull World Health Organ. 2010;88(5):390-394.
Education	Norway	Observational study	Young doctors	Evaluate the results of the early sign-up model regarding the recruitment and retention of doctors to a rural area compared with the regular lottery model.	Observational study comparing the recruitment and retention of early sign-up model regarding the recruitment and retention of doctors to a rural area compared with the regular lottery model.	The proportion of interns who signed up early that still worked as doctors in the study area by April 2014 (29%) was twice as high as among the regular interns (15%) and interns in the comparison area (14%). Among the 59 interns who signed up early still working in the study area in April 2014, 33% had grown up in this area. The early sign-up model had a net contribution of additional doctors to the study area, even though the number of additional doctors recruited through this special arrangement was limited.	Gaski M, Abelsen B. Designing medical internships to improve recruitment and retention of doctors in rural areas. Int J Circumpolar Health. 2017;76.
Education	Philippines	Establishment of medical school in underserved rural area	Doctors	Study explored the impact of a medical school in a rural underserved area on improvement in medical workforce and population health outcomes.	This retrospective case study measured the number of graduates practising in the Philippines, the number of local municipalities with doctors, and changes in the provincial infant mortality rate.	80% of graduates were practising in the local underserved areas. 55% increase in municipalities with a doctor. 90% decrease in infant mortality in the region (compared with 50% reduction nationally).	Cristobal F, Worley P. Can medical education in poor rural areas be cost-effective and sustainable: the case of the Ateneo de Zamboanga University School of Medicine. Rural Remote Health. 2012;12:1835.
Education	Thailand	Community-based learning (CBL) at rural medical education centres, amongst medical students enrolled from rural backgrounds	Graduate doctors, normal track versus CPIRD (rural background students)	The Collaborative Project to Increase Production of Rural Doctor (CPIRD) has been operating since 1994 in order to increase rural doctor supply. Student admission with rural background recruitment is used for a selection method. All CPIRD students study on campus like normal track students during 3 preclinical years. They have clinical rotations during their last 3 years at regional and rural hospitals which includes some community-based learning.	Cohort study	Overall 57.6% retention rate. CPIRD retained 72.1% versus normal track 53.8% p < 0.001. Graduate entry associated with higher retention. CPIRD doctors worked rurally 62.3% compared with 49% normal track p < 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 CBL during the degree was associated with greater retention OR 1.175 (1.030-1.341) p 0.015.	Boonluksiri P, Tumviriyakul H, Arora R, Techakehakij W, Chamnan P, Umthong N. Community-based learning enhances doctor retention. Educ Health (Abingdon). 2018;31(2):114-8.
Education	Thailand	Collaborative Project to Increase Rural Doctors (CPIRD) governing a rural admissions process, collaborative training between medical schools and the Ministry of Health, and preferential return to service in their home provinces once graduated	Doctors	This study compares retention rates 2001 to 2011 in two pathways (CPIRD and non-CPIRD) for medical school graduates between 2000 to 2007.	Kaplan-Meier method of survival analysis and Cox proportional hazards ratios.	The predicted median survival time in rural hospitals was 4.2 years for the CPIRD group and 3.4 years for the normal track. The normal track doctors had a significantly higher risk of leaving public service at about 1.5 times the CPIRD doctors.	Pagaiya N, Kongkam L, Sriratana S. Rural retention of doctors graduating from the rural medical education project to increase rural doctors in Thailand: a cohort study. Hum Resour Health. 2015;13:10.
Education	United Kingdom	The GP rural fellowship programme of cumulative fellows from 2001-2003 - 1-year programme of rural training for new GPs, with return of service (ROS)	Newly qualified GPs	The article reports on a survey of the output of the fellowship from 2002 to 2013 to understand its influence on recruitment and retention of GPs in rural Scotland.	A survey of all previous rural fellows from 2002-2003 and 2012-2013 was completed in the first quarter of 2014.	A total of 65 GPs were able to be included in the survey with a response rate of 98%. 63 (97%) respondents were currently working in general practice. 46 (71%) were working in rural areas or accessible small towns in Scotland. No prior intention to work in rural practice confirmed. Further evaluation needed.	MacVicar R, Clarke G, Hogg DR. Scotland's GP Rural Fellowship: an initiative that has impacted on rural recruitment and retention. Rural Remote Health. 2016;16(1):3550.
Education	United States of America	Commentary only. Exploring the challenges and benefits or rural residency programmes.	Medical residents, rural communities	Examines particular benefits and challenges of developing residency training programmes in rural and underserved communities. In particular, lessons learned from the Health Resources and Services Administration's (HRSA) Teaching Health Center Graduate Medical Education (THCGME) programme.	Review of the programme management and evaluation of the THCGME programme and site visits to teaching health centres (THCs).	"Concluded rural-based health workforce training programs have the potential to increase the size of the health workforce, improving the ability to overcome historical challenges in the recruitment and retention of medical providers."	Lee M, Newton H, Smith T, Crawford M, Kempley H, Regenstein M et al. The benefits of physician training programs for rural communities: lessons learned from the Teaching Health Center Graduate Medical Education Program. J Health Care Poor Underserved. 2016;27(4a):83-90.
Education	United States of America	Rockford Rural Medical Education Program (RMED), University of Illinois	Medical students	The study reports on retention and practice outcomes of RMED programme in comparison with non-RMED graduates between 1997 and 2007.	Data from various sources related to characteristics of RMED and non-RMED students was gathered. Basic information on RMED graduates regarding practice location and specialty is tracked by RMED programme office, and was compared with non-RMED graduates.	92.1% (2823/3064) of graduates from 1997-2007 were still in practice. 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 currently 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.	MacDowell M, Glasser M, Hunsaker M. A decade of rural physician workforce outcomes for the Rockford Rural Medical Education (RMED) Program, University of Illinois. Acad Med. 2013;88(12):1941-1947.
Education	United States of America	Rural academic and clinical training	Medical students	Description of new medical education programme involving student outreach, recruitment, admissions, curriculum, site and faculty development, and evaluation.	Longitudinal descriptive programme evaluation.	Describes preliminary outcomes of recruitment of students interested in future rural practice and placement in primary care residencies (53%). Longer term outcomes such as graduates entering rural practice are still unknown.	Eidson-Ton WS, Rainwater J, Hilty D, Henderson S, Hancock C, Nation CL et al. Training medical students for rural, underserved areas: a rural medical education program in California. J Health Care Poor Underserved. 2016;27(4):1674-1688.

Education	United States of America	Comparison of face-to-face academic detailing vs distance learning technology to assess the satisfaction and impact of academic detailing delivered by a trained clinical pharmacist.	Clinicians in rural family practice clinics	Improving prescription practices and medical decision-making approaches through outreach methods, using evidence-based medical knowledge is an effective way to improve targeted behaviour changes of clinicians, especially those residing in rural location. This study aimed to compare face-to-face vs web-based/video-conferencing outreach approaches.	Four family practice clinics participated, two undertook face-to-face learning and two a mix of technology-enabled distance learning. Different content areas were surveyed, within different survey questions.	There was no statistical significance between in-person and distance education satisfaction. Overall 90% of participants reported being satisfied or very satisfied with the educational approaches utilized. Those in the distance-learning group scored higher in all programme satisfaction content areas compared with those from the in-person group. In-person group participants scored higher for all educational impact content questions as well as when rating the likelihood of participating in future programmes. Study limitations and sample size limit generalizability; however, overall, clinicians preferred face-to-face academic detailing approaches in these rural practice settings.	Hartung DM, Hamer A, Middleton L, Haxby D, Fagnan LJ. A pilot study evaluating alternative approaches of academic detailing in rural family practice clinics. BMC Fam Pract. 2012;13:129.
Education	United States of America	Rural nursing residency programme	Nursing	Compare job satisfaction, decision-making and job stress levels in a longitudinal study of nursing residency programme in rural versus urban hospitals.	Prospective longitudinal comparative study of job satisfaction, job stress and decision-making. Two residency programmes, one urban and the other rural. Two groups were compared over time in job stress, job satisfaction and decision-making.	At the end of the programme rural residents had significantly lower job stress level and higher job satisfaction level than urban.	Bratt MM, Baernholdt M, Pruszyński J. Are rural and urban newly licensed nurses different? A longitudinal study of a nurse residency programme. J Nurs Manag. 2014;22(6):779-791.
Education	United States of America	Provision and promotion of seamless education to a higher nursing qualification	Nurses	A higher level nursing education programme was offered in the rural state of Wyoming to address recruitment and retention of a better prepared nursing workforce.	The paper presents the details of the Leadership Education to Advance Practice (LEAP) programme and an analysis of its outcomes.	The LEAP programme provided the opportunity for nurses to seek a higher qualification through an incremental implementation of strategies supporting lifelong learning, with a resultant impact on workforce development.	Diaz Swearingen C, Clarke PN, Gatua MW, Sumner CC. Diffusion of a nursing education innovation: nursing workforce development through promotion of RN/BSN education. Nurse Educ. 2013;38(4):152-156.
Education	United States of America	Rural location of family medicine residency programmes	Family doctors	Analysis of choice of practice location rural/in state based upon residency training site, gender, undergraduate training site.	Binary regression of 5 years of family medicine residency graduates from 8 Iowa programmes, 1645 graduates.	One community residency site out of 8 located in a rural city in northern Iowa had significant rural placement success. Iowa-based medical training was significant to retention in Iowa. Females and international graduates had lower rural placement.	Nelson GC, Gruca TS. Determinants of the 5-year retention and rural location of family physicians: results from the Iowa Family Medicine Training Network. Fam Med. 2017;49(6):473-476.
Education	United States of America	Rural Medical Scholars Program (RMSP)	Medical students	Rurally based medical education. The RMSP is composed of special admission status for rural Alabama students who express interest in rural primary care and reach an MCAT score of at least 24.	Data were retrieved from archives maintained by the Office of Medical Student Services at the UASOM, including information from the AMA Physician Masterfile to 2002. Rural practice was determined by ZIP code-based Rural-Urban Commuting Area Codes (RUCAs) of 4 or greater. Family medicine residency was an intermediate outcome variable.	ORs for starting practice in rural Alabama, adjusted for sex, MCAT, and 4-year graduation rate, were highly significant with main campus 1.0, regional campus 2.5 (P < .001) and RMSP 6.4 (P < .001), indicating a dose response relationship with rural medical education.	Wheat JR, Leeper JD, Murphy S, Brandon JE, Jackson JR. Educating physicians for rural America: validating successes and identifying remaining challenges with the Rural Medical Scholars Program. J Rural Health. 2018;34(S1):s65-s74.



REGULATORY EVIDENCE PROFILES							
Category of intervention	Country	Intervention	Occupation(s)	Description	Study design and methods	Reported results	Reference
Regulatory	Australia	Mandatory minimum 6-month training in a rural area for GP trainees - registrars	Doctors (GP registrars)	This study aimed to examine the experiences of GP trainees during their 6-month mandatory rural term and the influence it had on their career intentions.	Qualitative methodology. Semi-structured, in-depth interviews with GP registrars who had completed or nearly completed their compulsory rural term. 15 registrars participated. Thematic analysis was undertaken of the recorded and transcribed interviews.	Though generally a rewarding clinical experience, negative aspects of the rural placement included the disruption to personal lives of rural relocation and the stressors involved in higher levels of clinical responsibility. These stressors undermine rather than enhance clinical confidence. Anxiety and depression were accompaniments for some registrars. Intention to practise rurally was not strongly influenced by this compulsory placement.	Bayley SA, Magin PJ, Sweatman JM, Regan CM. Effects of compulsory rural vocational training for Australian general practitioners: a qualitative study. Aust Health Rev. 2011;35(1):81-85.
Regulatory	Australia	Rural scholarships for students	Allied health students	This study involved a review of the Queensland Health Rural Scholarship Scheme, impact on rural workforce, and attitudes of scholarship recipients to rural practice and support requirements.	Mixed-method study: quantitative analysis of scholarship data on workforce outcomes, and qualitative study from interviews with 17 past or current scholarship holders and 11 managers of scholarship holders.	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.	Devine SG, Williams G, Nielsen I. Rural allied health scholarships: do they make a difference? Rural Remote Health. 2013;13(4):2459.
Regulatory	Bangladesh	Career development opportunities, compulsory service and medical school outside of major cities	Doctors	To analyse three policies policy areas in terms of policy content, processes, contexts and actors. The three policies were: career development programmes; compulsory services in rural areas; and schools outside major cities.	Qualitative study. Key informant interviews.	Implementation of policy for recruitment, compulsory service and strategies to retain doctors were often not well enacted, contributing to ongoing failures in retaining rural doctors.	Joarder T, Rawal LB, Ahmed SM, Uddin A, Evans TG. Retaining doctors in rural Bangladesh: a policy analysis. Int J Health Policy Manage. 2018;7(9):847-58.
Regulatory	Brazil	Observational study	Doctors	Observational study of the programme “Mais Médicos” launched in 2013.	Observational study. Primary Healthcare Doctors Scarcity Index used. It makes it possible to characterize the supply of doctors beyond the criterion usually used of number of doctors per unit of population between 2003 and 2015.	The programme helped reduce the number of municipalities with a shortage of doctors from 1200 to 777. This impact also helped reduce inequalities between municipalities, but inequities in distribution persisted. It was also found that there was a reduction in the regular supply of doctors trained by municipalities, suggesting that numbers were being simply substituted by the supply coming from the programme. Thus, an overall situation of insecurity in care persists, reflecting the dependence of municipalities on the supply of doctors from the federal government.	Girardi SN, Stralen AC, Cella JN, Wan Der Maas L, Carvalho CL, Faria Ede O. Impact of the Mais Medicos (More Doctors) Program in reducing physician shortage in Brazilian primary healthcare. Ciencia & Saude Coletiva. 2016;21(9):2675-2684.
Regulatory	Brazil	Implementation of the More Doctors Program (MDP) to address shortages in regional areas	Doctors	The MDP was a politically driven programme developed to improve physical structure of the heath care network, provide educational reforms in schools and residency, and increase supply in areas of need.	Descriptive study of the Ministry of Health database, investigating baseline demographic, regional distribution and doctor placement aspects of regions participating in the programme.	68% of Brazilian municipalities participated, with 62.8% in critical regions of need. 14 168 doctors joined during the programme. Selection criteria further identified suitable doctors for the programme, of which 80% were medical aid workers. Reduction in shortfall of doctors for areas of need was identified. Various challenges inhibited effective implementation; however, an overall increase in access to primary health care for areas in need was seen.	Oliveira JP, Sanchez MN, Santos LM. The Mais Medicos (More Doctors) Program: the placement of physicians in priority municipalities in Brazil from 2013 to 2014. Ciencia & Saude Coletiva. 2016;21(9):2719-2727.
Regulatory	Canada	Return for service (RFS) agreements to work in underserved communities for financial incentives (bursaries, training positions, student loan support)	Doctors	A study to evaluate retention of doctors under the return for service agreements (RFS) programme in Newfoundland and Labrador (rural Canada).	Retrospective audit for a programme, evaluation sample: all doctors who held a RFS agreement 1997-2009 compared with those who didn't.	The RFS programme improves retention of doctors. Part 1: Proportion of RFS doctors who completed service obligations was 71.6%; Part 2: RFS doctors were 3.2 % 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 $\chi^2 (1) = 7.678$ , $p = 0.006$ .	Mathews M, Heath SL, Neufeld SM, Samarasena A. Evaluation of physician return-for-service agreements in Newfoundland and Labrador. Healthcare Policy [Politiques de sante]. 2013;8(3):42-56.
Regulatory	Canada	Rural family physicans with generalist roles	Doctors	To explore the professional, personal and community domains of the retention of doctors in four rural communities in Alberta that retained family doctors for 4 years and longer, and to develop a preliminary framework for doctors' retention.	A qualitative, collective case study design to study four rural communities (cases) in Alberta that retained family doctors for 4 years or longer. Participants included doctors, staff members, spouses and community members. Data collected from interviews, documents and observations were analysed.	Doctors' decisions to stay in a particular community is influenced by the: supply of doctors, occupational dynamics, scope of practice and practice set-up across all communities, while in other communities innovation, management and support also emerged as influencers. "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". The relationship between doctors and the community was perceived as mutually beneficial, with doctors 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.	Cameron PJ, Este DC, Worthington CA. Professional, personal and community: 3 domains of physician retention in rural communities. Canadian J Rural Med. 2012;17(2):47-55.
Regulatory	China	Universal health coverage in 2009	Health officials; health workers including county senior health officials, hospital directors, senior and junior doctors, nurses, service-users (patients)	Study addressing impact of achieving universal coverage – survey topics for health officials included progress, achievements, problems, and challenges; health worker topics included process, salaries, essential drugs list, changes in income and workload; service user topics included health services and costs.	In-person interviews were conducted from Jan to Mar 2013; 8 health officials, 80 health workers, and 80 service users were interviewed.	Differences in co-payment rates resulted in increased use of inpatient services and thus increases in medical costs. Enforcing the essential drugs list removed incentives to overprescribe but also resulted in income loss for health workers and loss of autonomy for doctors; issues with drug procurement resulted in experienced health workers moving away from township hospitals and patients seeking care at relatively more expensive county hospitals.	Zhou XD, Li L, Hesketh T. Health system reform in rural China: voices of healthworkers and service-users. Soc Sci Med. 2014;117:134-141.



Regulatory	Ghana	Community involvement and volunteerism (1970s)	Community-based health volunteers in rural areas	Interviews of all community-based health volunteers in rural areas > 5 years in sub-districts, health workers in charge of them and drop-outs.	32 in-depth interviews: random sampling of sub-districts, purpose sampling of CBHV and health workers in charge of CBHV, snowball sampling of drop-outs; grounded theory thematic analysis.	Retention improved by logistical supplies, transport, respect from community members ("community doctor", help to free up volunteer's time) and health workers (training, allowances, supervision and presence).	Chatio S, Akweongo P. Retention and sustainability of community-based health volunteers' activities: a qualitative study in rural Northern Ghana. PLoS ONE. 2017;12(3):e0174002.
Regulatory	India	None, observational	Doctors (allopathic, ayurvedic and homeopathic), nurses and medical specialists, plus key informants	Interviews and observations of health facilities and review of state policies, to understand factors in the decision of health workers to stay or leave a rural area. Qualitative, semi-structured interviews based on WHO 2010 framework of factors affecting decisions to stay in or leave rural and remote areas; Neghalaya and Nagaland, NE India.	Qualitative study, 71 semi-structured an unstructured interviews.	Rural background and community attachment associated with decision to join a rural health service, regardless of occupation or contract. Staff had a preference to work in their own village or district of origin, and had been motivated to serve their community, often with encouragement from their parents. Some but not all nurses had financial incentives to work rurally, whereas permanent doctors had few employment choices and were motivated by the position. Multiple systems issues were a barrier to recruitment and retention such as poor work and living conditions, isolation, low salary and incentives, lack of professional growth and recognition, irrational postings, political interference, and job insecurity. Insurgency and safety concerns were also a concern.	Rajbangshi PR, Nambiar D, Choudhury N, Rao KD. Rural recruitment and retention of health workers across cadres and types of contract in north-east India: a qualitative study. WHO South-East Asia J Public Health. 2017;6(2):51-59.
Regulatory	Pakistan	Evaluation of the success of the new role of community midwives providing home deliveries in a specific rural district of Pakistan	Community midwives	Community midwives were introduced as an intervention to ensure skilled attendance at births in rural areas where the rate of maternal death associated with birthing is well below Millennium Development Goals. Birthing women have tended to prefer a traditional birth attendant. This study explored the programmatic and cultural barriers and constraints faced by midwives in delivery of maternal care to rural communities.	Qualitative research using focus groups in one rural district to explore the role of community midwives.	Community midwives are struggling for survival in rural areas as maternal care providers as they are inadequately trained, lack sufficient resources to deliver services in their catchment areas and lack facilitation for integration in district health system.	Sarfraz M, Hamid S. Challenges in delivery of skilled maternal care - experiences of community midwives in Pakistan. BMC Preg Childbirth. 2014;14:59.
Regulatory	Philippines	Doctors to the Barrios (DTTB) Program	Current DTTB and former DTTB members	To explore the reasons for the low retention rates after completion of the DTTB programme and propose potential strategies to reverse the trend. Government funded 2-year programme of service with equity in salary, priority into postgraduate programmes, advocacy, and professional support. CME contributes to Master's degree, opportunity to stay or leave or move to another site. Study: questionnaire of current and interviews of former (17, 26).	Mixed methods approach including self-administered questionnaire for current DTTB members, and oral interviews with former DTTB members. Review of technical and grey material.	Former DTTBs most common motivation was to serve rural populations, while over 50% current DTTBs joined the programme due to return of service obligations. Those who joined due to reurn of service experienced significantly less job satisfaction. Lack of support from local government units (LGUs) was the most common factor impeding retention.	Leonardia JA, Prytherch H, Ronquillo K, Nodora RG, Ruppel A. Assessment of factors influencing retention in the Philippine National Rural Physician Deployment Program. BMC Health Serv Res. 2012;12:411.
Regulatory	Review from 70 countries	Three types of compulsory service (CS) identified: (1) condition of service; (2) compulsory - with incentives; (3) compulsory - no incentives	Health workers	To review evidence of use of compulsory (return of) service policy for the rural and remote health workforce.	Literature review, snowballing of programme description and evidence of outcomes. Questionnaires for key officials in individual countries. Programmes identified in 70 countries.	Most programmes had limited evidence of outcomes. In Puerto Rico, pre CS 16/78 areas had no doctors but after, all had doctors. Many health professionals objected to compulsory programmes. Success or failure largely depends on health systems and community support.	Frehywot S, Mullan F, Payne PW, Ross H. Compulsory service programmes for recruiting health workers in remote and rural areas: do they work? Bull World Health Organ. 2010;88(5):364-370.
Regulatory	South Africa	Structured self-report questionnaire of medical professionals undertaking a community service programme in both urban and rural settings	Doctors and dentists	Community service through 12 months of contribution in a public health facility under supervision, is required following medical training in South Africa. This programme allows for professional development and facilitates improvement in inequalities of medical workforce distribution.	All medical and dental community service officers in South Africa in 2009 were invited to the study. Five questions rated on a three-point Likert scale, investigating orientation, clinical advising, ongoing mentorship and accessibility of clinical leadership, and handling of concerns were assessed.	685 doctors and dentists participated in this study conducted in 2009. Rural placement was more likely for unmarried, male and black medical officers. 87% reported an increase in professional development. Only 25% indicated continuing work in rural areas. Race was a significant predictor of rural placement location. Dentists and those with scholarships were more likely to receive rural placements. Limitations included missing data, and a low response rate (44%), especially from dentists. Several data collection and demographic details also limited the study findings.	Hatcher AM, Onah M, Kornik S, Peacocke J, Reid S. Placement, support, and retention of health professionals: national, cross-sectional findings from medical and dental community service officers in South Africa. Hum Resour Health. 2014;12:14.
Regulatory	United States of America	Implementation of hospitalists in small rural hospitals	Doctors	Phone survey of small rural hospitals on impact of introducing hospitalists on recruitment retention and health outcomes; description of strategies to address some of the negative aspects.	National phone survey	350 small rural hospitals. One third have a hospitalist programme. 73.6% report increased recruitment and retention of primary care doctors. Increased satisfaction when hospitalists live in the community. Improved patient health outcomes.	Casey MM, Hung P, Moscovice I, Prasad S. The use of hospitalists by small rural hospitals: results of a national survey. Med Care Res Rev. 2014;71(4):356-366.
Regulatory	United States of America	Observational review of administrative records for outpatient visits seen by CHA/Ps in 150 rural Alaska villages (approximate population 47 370)	Community health aide (CHA) and community health practitioner (CHP) in rural Alaska communities	Analysis of medical records of CHA/Ps in 150 rural Alaska villages	Systematic description of the clinical practice of PHC workers in rural Alaska communities. 272 242 CHA/P visits from 150 villages were recorded in IHS NPIRS between 1 October 2004 and 30 September 2006. Of these encounters, 197 190 (72.4%) had at least 1 recorded clinical diagnosis.	CHA/Ps provide a broad range of primary care in remote Alaskan communities whose residents would otherwise be without consistent medical care. Alaska's CHA/P programme could serve as a health care delivery model for other remote communities with health care access challenges.	Golnick C, Asay E, Provost E, Van Liere D, Bosshart C, Rounds-Riley J et al. Innovative primary care delivery in rural Alaska: a review of patient encounters seen by community health aides. Int J Circumpolar Health. 2012;71:18543.

Regulatory	United States of America	Retention strategy: educational loan repayments (LRPs) for rural health professionals working in an area of need	38 doctors, 29 dentists, 26 other health workers	Quantitative study. Comparative/analytic/observational. Retrospective cohort study. Surveys sent to 122 health care providers who had been enrolled in 1 of 3 LRPs up to 2007.	Survey	LRPs only have a limited influence on the recruitment and retention of providers in rural Colorado. 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.	Renner DM, Westfall JM, Wilroy LA, Ginde AA. The influence of loan repayment on rural healthcare provider recruitment and retention in Colorado. Rural Remote Health. 2010;10(4):1605.
------------	--------------------------	--	--	--	--------	---	--

FINANCIAL INCENTIVES EVIDENCE PROFILES							
Category of intervention	Country	Intervention	Occupation(s)	Description	Study design and methods	Reported results	Reference
Financial incentives	Australia	Rural practice incentive payments for general practitioners	Doctors - GPs	Analysis of effect of incentive payments before and after areas became newly eligible. General Practice Rural Incentives Program (GPRIP) is a government financial incentive to GPs who continue to practise rurally. It increases over years and peaks after 5 years.	Mapped distribution of GPs, entries and exits 2008-2014, using medical directory of Australia (census of all active doctors in May each year including practice location).	755 locations became newly eligible after a change to the classification of rurality. There were 787 always eligible areas and 2249 never eligible areas. The policy change substantially increased the entry of newly qualified GPs to newly eligible areas. Overall stock of rural GPs did not change - it did not fall either. The incentives did not seem to have any positive impact on encouraging existing GPs to relocate.	Yong J, Scott A, Gravelle H, Sivey P, Mcgrail M. Do rural incentives payments affect entries and exits of general practitioners? Soc Sci Med. 2018;214:197–205.
Financial incentives	China	National Health Insurance (NHI)	Western medicine physicians, Chinese medicine physicians, dentists	Address impact of NHI on geographic maldistribution of health providers. This study has employed an interrupted trend analysis with time series observations for 32 years, including 24 years before NHI and 8 years after NHI (including 1995). The three experimental groups are thus able to serve as their own control by the long term, “before” versus “after” trend analysis.	Data on geographic locations of health professionals are from Health and Vital Statistics, Department of Health; population data are from the Demographic Fact Book, Ministry of the Interior. Spline regression addressing impact of NHI on Gini coefficients for geographic distribution.	NHI’s offering universal health coverage to all citizens and proper financial incentives to providers resulted in more equal geographic distributions among Western medicine physicians, Chinese medicine physicians, dentists.	Yang CH, Huang YTA, Hsueh YSA. Redistributive effects of the National Health Insurance on physicians in Taiwan: a natural experiment time series study. Int J Equity Health. 2013;12(1).
Financial incentives	China	Universal health coverage in 2009	Village doctors	Study addressing impact of achieving universal coverage on doctors’ recruitment and retention in rural areas.	Qualitative study consisting of interviewing village doctors. 49 of 54 village doctors from 6 counties of 6 provinces participated in the survey.	Reasonable compensation strategies should be established and monitored, and sufficient subsidies should be allocated in a timely manner.	Zhang S, Zhang W, Zhou H, Xu H, Qu Z, Guo M et al. How China’s new health reform influences village doctors’ income structure: evidence from a qualitative study in six counties in China. Hum Resour Health. 2015;13:26.
Financial incentives	India	The Chhattisgarh Rural Medical Corps (CRMC) scheme	Health workers: doctors, staff nurses, auxillary nurse midwives, rural medical assistants	To highlight the process of implementation of CRMC, assess outcomes in improving the availability of resources in underserved areas, and identify implementation loopholes.	Qualitative and quantitative research methods across 12 health facilities over three districts. Semi-structured and open-ended questionnaires for key informant (KI) interviews. Desk review of government documents about the CRMC scheme using a thematic analysis approach.	1319 health workers joined CRMC areas in 2010-2011 which decreased the vacancy rate from 90% to 45% across facilities. It then increased to 1658 in 2011-2012 with majority deployed in difficult areas. CRMC benefits and extra points during PG admission proved to be the main reasons for retaining medical officers in CRMC areas. Concerns were expressed regarding the irregular payment of financial incentives and the provision of incentives being based on overall performance of facilities. CRMC has positively impacted the retention and addition of resources to difficult areas. Gaps were also identified in implementation conditions.	Lisam S, Nandi S, Kanungo K, Verma P, Mishra JP, Mairembam DS. Strategies for attraction and retention of health workers in remote and difficult-to-access areas of Chhattisgarh, India: do they work? Indian J Public Health. 2015;59(3):189.
Financial incentives	Indonesia	Compulsory service, contracted staff, special assignment	Health workers	Policy report describes programmes, including compulsory service, contracted staff and special assignment for health workers over time period correlating location of contracted staff by remote and very remote.	Policy report describes programmes and availability of health workers over time intervals (2006-2010).	Most targeted programmes used financial incentives as the main intervention; however, also included were continuing professional education and eventual opportunities for civil service employment. Recruitment of health workers from rural backgrounds increased willingness to serve in remote areas.	Efendi F. Health worker recruitment and deployment in remote areas of Indonesia. Rural Remote Health. 2012;12:2008.
Financial incentives	Israel	Incentive payments of NIS 300 000 (US\$ 78 000 based on 2012 exchange rates - equivalent to approximately 14 months’ salary) for residents choosing to work in a hospital in the periphery (irrespective of specialty) or in a specialty in crisis (irrespective of location) and NIS 500 000 (US\$ 130 000) for residents in specialties in crisis, within hospitals in the periphery.	Doctors in residency	Analysis of impact of incentive programme on choice of peripheral versus central residency programme. Impact of where doctor had originated (peripheral/central) and intentions during medical school were also checked, and surveyed their reasons for choice.	Data file from the Scientific Council of the Israel Medical Association, compared years prior and after the 2011 incentive agreement. A national survey conducted in 2015 of residents who began their specialization in 2013-2014, via an Internet survey with telephone backup. The response rate was 71%.	Pre-2011 16-20% residents worked peripherally, compared with 23% in 2013. After the 2011 incentives began, there was a large increase in the number of medical residents in Israel, in both the periphery and in the centre. There was a small increase in the periphery’s share of those residents, and that increase consisted predominantly of doctors who were graduates of non-Israeli medical schools. About half of all hospital residents in the periphery reported that the incentives contributed to their choice of residency location. However, about 40% of that group also reported that they had planned already in medical school to practise in the periphery, while 60% of that group (i.e. 30% of all the residents working in the periphery) had no such plans prior to medical school. About 70% of the residents in peripheral hospitals grew up in the periphery. Incentives affected residency location decisions for a non-negligible proportion of young doctors, particularly among those who grew up in the periphery. 65% of residents in the periphery would like to continue working there, suggesting the increased staffing and incentives improved intention to stay.	Ashkenazi Y, Gordon M, Rosen B. Using financial incentives to attract medical residents to the periphery: the Israeli experience. Health Policy. 2019;123(1):80–86.
Financial incentives	Kenya	Incentives among health workers in a remote Kenyan district	Health workers	Decentralization of health services impacts health worker retention in rural areas; incentives may provide opportunities for health worker retention in rural regions.	Descriptive analysis of human resource data and health worker surveys (semi-structured questionnaires)	38 health workers surveyed. 65.7% reported a negative impact on family life; and same number received hardship allowances. Lack of amenities and resources provided for workers. A general lack of organization/harmonization of services, utilities and incentives was seen.	Njuguna J, Mwangi P, Kamau N. Incentives among health workers in a remote Kenyan district: implications for proposed county health system. J. Health Care Poor Underserved. 2014;25(1):204-214.
Financial incentives	Nepal, Bangladesh, India, Islamic Republic of Iran, Ethiopia	The objective of this review is to identify and examine different remuneration models of CHWs that have been utilized in large-scale sustained programmes to gain insight into the effect that remuneration has on the motivation and focus of the CHWs. ASHAs receive 23 days of training, performance based payments.	CHWs	5 case studies of those programmes that had trained > 30 000, been sustained for at least 5 years and had a retention rate of 85% or more. Case studies provided a variety of documented approaches to remuneration including: (a) part-time volunteers, working limited hours without regular financial incentives: the female community health volunteer (FCHV) programme from Nepal; (b) volunteers that sell health merchandise: Bangladesh Rural Advancement Committee (BRAC) community health volunteer (CHV) programme in Bangladesh; (c) volunteers with financial incentives: the Accredited Social Health Activist (ASHA) programme in India; (d) paid full-time CHWs: the CHWs ( <i>behtarz</i> ) in the Islamic Republic of Iran; and (e) both full-time and volunteer CHWs working together: health extension programmes (HEPs) in Ethiopia.	Mixed methods, case studies review	Both full-time and volunteer CHWs can become demotivated if they do not have access to adequate training, quality supervision, community acceptance or appreciation or if they are expected to work longer hours than they can realistically manage while fulfilling their other commitments. Full-time paid CHWs can further lose motivation if their allowances are not provided in a timely fashion. The use of gifts and community appreciation seems to be of value to all CHWs. All of the programmes had high-retention rates and contributed, albeit in different ways, to improving health outcomes in the communities they were working. However, comparing the work of a <i>behtarz</i> (rural health care worker) in the Islamic Republic of Iran who has received 2 years of university-based training and is employed full-time in government service with a FCHV in Nepal who receives 15 days of training and works with the community 5 hours per week does not seem useful. Despite the higher level of mastery that the <i>behtarz</i> s achieved, the role of the FCHVs might be seen as equally important as they demonstrated higher levels of community trust compared with government workers, at least in the Nepalese setting. Having two broader categories: CHWs who are trained to be part of the formal workforce and paid accordingly; and CHWs who receive minimal training and offer limited hours according to the context, may be more useful. High level of government commitment, through a process of ongoing action, reflection and rethinking at every level.	Singh D, Negin J, Otim M, Orach CG, Cumming R. The effect of payment and incentives on motivation and focus of community health workers: five case studies from low- and middle-income countries. Hum Resour Health. 2015;13:58.

Financial incentives	Pakistan	Introduction of new occupation category of skilled birth attendees	Community midwife workers (CMW)	Analysis of new CMW workforce effectiveness in achieving successful practice and thus leading to improved rate of skilled birth attendance and reduced maternal mortality.	Institutional ethnography conducted on a random sample of CMW practices including interviews of institutional-level respondents and community members to determine level of functional practice.	Low rate of trained CMWs providing services. Identified factors positively influencing work as CMWs include: single marital status, older trainees, family support for CMW to work driven by family poverty (social norm is woman as dependent), good business skills and professionalism, providing care model identified as respectful.	Mumtaz Z, Levay AV, Bhatti A. Successful community midwives in Pakistan: an asset-based approach. PLoS ONE. 2015;10(9).
Financial incentives	United Kingdom	Funding to individual and to team	Allied health professionals: physiotherapists, occupational therapists, speech and language therapists, radiotherapists and dieticians, and managers of multidisciplinary teams; managers of teams and recruits.	Reports on the thematic analysis of the influence of financial incentives used over a period of time on recruitment in hard to fill jobs, plus retention.	Semi-structured interviews and survey questionnaire with thematic analysis of managers, recruits and teams.	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. CPD, new equipment etc. For those who did not stay, promotion was the main reason for leaving. More benefits than just recruitment, and few negative impacts.	Solowiej K, 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.
Financial incentives	United Republic of Tanzania	Pay for performance (P4P) schemes	Health workers and district managers	Low-income countries increasingly utilize pay for performance schemes to increase health service quality and availability.	Interviews, focus group discussions with health workers and regional district and facility managers on work-environment characteristics, and staff attitudes towards work.	75 facilities and 101 health workers were interviewed. Only 7% were satisfied with salary/employment benefits; less than 20% of facilities had adequate resource availability; 62% had sufficient supervision; less than 40% reported satisfaction with access to utilities and appropriate facilities; and barriers due to community attitudes were identified. Issues for consideration include those of appropriate infrastructure, educated/skilled staff available, and adequate resources to implement P4P schemes.	Olafsdottir AE, Mayumana I, Mashasi I, Njau I, Mamdani M, Patouillard E et al. Pay for performance: an analysis of the context of implementation in a pilot project in Tanzania. BMC Health Serv Res. 2014;14:392.
Financial incentives	Zambia	A rural hardship allowance per month with occupations in rural and extremely rural districts getting more than those in peri-rural districts. Education allowances per year per child aged between 5 and 21 years. Paid renovation funds to improve accommodation, assistance for postgraduate study at expiry of contract.	Registered and enrolled nurses, paramedics, dental therapists and clinical officers	To survey health workers to find out if they were attracted or could be retained in the Department of Health (DoH) via income and other supplementations such as those available through the scheme.	Cross-sectional survey	The Zambian Health Workers Retention Scheme (ZHWRS) was not successful in recruiting sufficient numbers of health workers to reverse the shortage problem, although there was an increase in health care service providers where previously there had been no service. 40% of responders have low or very low job satisfaction, 48% desire to quit working in current location - of these 33% to private, 26% outside Zambia, 19% to local NGO facilities. The Logit model showed housing allowance reduces desire to quit. Suggestions made for non-finacial supports.	Gow J, George G, Mwamba S, Ingombe L, Mutinta G. An evaluation of the effectiveness of the Zambian Health Worker Retention Scheme (ZHWRS) for rural areas. Afr Health Sci. 2013;13(3):800-807.

SUPPORT STRATEGIES EVIDENCE PROFILES							
Category of intervention	Country	Intervention	Occupation(s)	Description	Study design and methods	Reported results	Reference
Support	Australia	Survey of hospital-based medical and nurse supervisors to discover impact of having supervisory responsibility for medical, nursing and allied health students.	Hospital-based doctors and nurses.	This study gathered qualitative data on the impact of year-long student clinical placements on senior staff with supervisory responsibility	The study specifically included only medical and nursing clinicians with responsibility for student supervision. The data was gathered by means of individual and group structured interviews.	Three themes were identified from the data: changes to the supervisor; change in the hospital learning culture; and student usefulness. The impact on supervisors was positive and led to improved professional satisfaction.	Connolly M, Sweet L, Campbell D. What is the impact of longitudinal rural medical student clerkships on clinical supervisors and hospitals? Aust J Rural Health. 2014;22(4):179-188.
Support	Australia	Quasi-experimental study utilizing an intervention group	GPs	Behavioural intervention for rural GPs to improve stress management and increase retention	A quasi-experimental study that utilizes behavioural coaching as an intervention and comparison with a control group. Rural GPs in South Australia: intervention group (n=69), baseline group (n=205) and control group (n=312). The number of GPs staying in rural general practice was analysed at	Cognitive behavioural coaching reduced the stress levels of rural GPs who self-identified the need for managing stress, and it 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 general practice.	Gardiner M, Kearns H, Tiggemann M. Effectiveness of cognitive behavioural coaching in improving the well-being and retention of rural general practitioners. Aust J Rural Health. 2013;21(3):183-189.
Support	Australia	Retention strategy: system and organizational level approaches to reduce primary/organizational level occupational stress.	484 nurses and midwives	Quantitative study, comparative/analytic/observational, cross-sectional study pre- and post-intervention design, triangulating data from surveys and archival information. Comparative design setting: two public hospitals (no odds ratio or relative risk calculated) (no control group).	Survey and archival data on staff turnover, pre-intervention survey sent to all registered nurses and midwives at two major urban referral hospitals in the Northern Territory (NT).	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 83% in May 2004 to 33% in June 2010 (statistically significant) and in Hospital 1 from 46% in May 2004 to 29% in June 2010 (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. The NT DoH could thus expect higher productivity, improved patient care with lower rates of turnover and absenteeism over time.	Rickard G, Lenthall S, Dollard M, Opie T, Knight S, Dunn S et al. Organisational intervention to reduce occupational stress and turnover in hospital nurses in the Northern Territory, Australia. Collegian. 2012;19(4):211-221.
Support	Bangladesh	Community health worker (CHW) based newborn care project.	Community health workers	Qualitative study assessing the factors contributing to retention and attrition.	Semi-structured interviews of current and past CHWs, plus document review and focus groups.	Retention factors identified were financial incentive, feeling needed by the community, and the value of the CHW position in securing future career advancement.	Rahman SM, Ali NA, Jennings L, Seraji MHR, Manna I, Shah R et al. Factors affecting recruitment and retention of community health workers in a newborn care intervention in Bangladesh. Hum Resour Health. 2010;8.
Support	Burkina Faso	Implemented a policy to recruit health workers specifically for rural areas.	Nurses, midwives and birth attendants	Government of Burkina Faso has implemented a staff retention policy - the regionalized health personnel recruitment policy.	Exploratory and qualitative study of a public policy in three remote areas in Burkina Faso.	Difficult to tell, but it was claimed that the policy had been a success after a decade of implementation.	Kouanda S, Yaméogo WME, Ridde V, Sombié I, Baya B, Bicaba A et al. An exploratory analysis of the regionalization policy for the recruitment of health workers in Burkina Faso. Hum Resour Health. 2014;12(1).
Support	Canada	Regional medical campus (RMC)	Doctors	To explore doctors' perceptions of the factors influencing recruitment and retention, including the role of the RMC.	Qualitative cross-sectional	Recruitment factors were divided into six major themes: type of practice, spousal interest, opportunity for teaching, training in a region, workforce planning, and quality of life. Participants identified positive and negative factors associated with retention. In both cases, family and quality of work environment were mentioned. The rural medical campus was perceived as having important impacts on the quality of professional life, research, medical practice, and regional development.	Levesque M, Hatcher S, Savard D, Kamyap RV, Jean P, Larouche C. Physician perceptions of recruitment and retention factors in an area with a regional medical campus. Can Med Educ J. 2018;9(1):e74-e83.
Support	Ghana	Different types of health workers	Volunteer community health workers	This study examined the attrition rate among CHWs who participated in a cluster randomized controlled trial (RCT) on community management of fever in children under 5 in the Dangme West District of Ghana and the factors contributing to the retention of CHWs.	Mixed method approach to examine CHW attrition, correlates of attrition. Reasons for correlates of attrition were analysed from data obtained from 520 structured interviews and 5 focus group discussions, with correlated data abstracted from the CHW database built as part of the project.	Attrition rate over 30 months of intervention was 21.2% (140/660). Results showed a statistically significant difference between attrition and all demographic characteristics' variables except sex of the CHWs. Attrition rate was lower in older age groups and was higher in females. Higher attrition rate was reported among single CHWs. Higher attrition in CHWs with post-secondary education, lowest in junior secondary school leavers. Significant positive relationship between the approval of a CHW both by the community and by the CHW's immediate family and the probability of remaining active. CHWs working as artisans/traders were more likely to be lost to attrition. From the focus groups, the main reasons perceived by "stayers" were lack of remuneration, a possible weak sense of social responsibility and negative attitude of caregivers.	Abbey M, Bartholomew LK, Nonvignon J, Chinbua MA Pappoe M, Gyapong M et al. Factors related to retention of community health workers in a trial on community-based management of fever in children under 5 years in the Dangme West District of Ghana. Int Health. 2014;6(2):99-105.

Support	Ghana	Effect of motivation and job satisfaction on retention.	All health workers	This study explored the effects of motivation and job satisfaction on turnover intention and how motivation and satisfaction can be improved by district health managers in order to increase retention of health workers.	Cross-sectional survey using a structured questionnaire for the interviews.	256 health workers from 3 districts of the East Region in Ghana. Overall, 69% of the respondents reported to have turnover intentions. Motivation (OR=0.74, 95% CI: 0.60-0.92) and job satisfaction (OR=0.74, 95% CI: 0.57-0.96) were significantly associated with turnover intention and higher levels of both reduced the risk of health workers having this intention. The dimensions of motivation and job satisfaction significantly associated with turnover intention included career development (OR=0.56, 95% CI: 0.36-0.86), workload (OR=0.58, 95% CI: 0.34-0.99), management (OR=0.51. 95% CI: 0.30-0.84), organizational commitment (OR=0.36, 95% CI: 0.19-0.66), and burnout (OR=0.59, 95% CI: 0.39-0.91). Our findings indicate that effective human resource management practices at district level influence health worker motivation and job satisfaction, thereby reducing the likelihood for turnover.	Bonenberger M, Aikins M, Akweongo P, Wyss K. The effects of health worker motivation and job satisfaction on turnover intention in Ghana: a cross-sectional study. Hum Resour Health. 2014;12(43).
Support	Mali	Survey of staff motivation and work satisfaction after the introduction of telehealth	6 doctors, 7 midwives, 3 technicians and 1 nurse-obstetrician	Interview of rural health professionals, and their perceptions of implementation and use of telehealth, satisfaction and motivation in their work in rural Mali.	Qualitative study, n=17 semi-structured interviews of rural health professionals working at centres where a telehealth project had been implemented.	Health professionals reported being motivated to work and stay rural (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 surmized that this could aid retention and recruitment but added no direct evidence of this occurring. In addition, the interviews revealed the majority of rural staff interviewed were either born in a rural area, or had undertaken a prior student placement in a rural area.	Mbemba GI, Bagayoko CO, Gagnon MP, Hamelin-Brabant L, Simonyan DA. The influence of a telehealth project on healthcare professional recruitment and retention in remote areas in Mali: a longitudinal study. SAGE Open Med. 2016;4:2050312116648047.
Support	United Republic of Tanzania	Survey of health workers and managers regarding working conditions for those providing maternal health care services.	Health workers providing maternal health services	Descriptive interviews to identify factors influencing working conditions.	Qualitative study: in-depth interviews were conducted with 22 informants (15 health workers, 5 members of Council Health Management Team and 2 informants from the District Director's Office).	Lack of government accountability and organization on behalf of health care workers providing maternity care leads to job dissatisfaction and turnover.	Mkoka DA, Mahiti GR, Kiwara A, Mwangi M, Goicolea I, Hurtig AK. "Once the government employs you, it forgets you": health workers' and managers' perspectives on factors influencing working conditions for provision of maternal health care services in a rural district of Tanzania. Hum Resour Health. 2015;13:77.
Support	Uganda	Support of community medicine distributors to carry out disease treatment through home-based management of fever (HBMF) programme.	Community medicine distributors (CMD)	This study evaluated the effectiveness of the deployment of 100 community medicine distributors in Tororo through HBMF to treat febrile illness including malaria, diarrhoea and pneumonia.	Qualitative study involving interviews of all 100 CMDs; 35 had to be translated. The CMD were volunteers reasonably evenly distributed by gender and average age 40. Mean duration of work was 5 years. The CMDs had limited previous education.	Despite training they performed poorly on their knowledge tests. They were poorly supported with variable drug supply which caused community distrust. The health workers felt dissatisfied by unrealistic community expectations, limited drugs and supplies, poor supervision compounded by lack of compensation, and lack of future paid opportunities.	Banek K, Nankabirwa J, DiLiberto D, Taaka L, Chandler CI, Staedke SG. Volunteer community health workers: temporary fix or long-term solution? Am J Trop Med Hyg. 2010;83(5):388.
Support	Uganda	Objective was to identify factors associated with long-term retention of village health team members, and understand their support needs and challenges.	Village health teams - unpaid volunteer community health workers	Survey of community health workers and stakeholders to understand factors in longer term retention.	Mixed methods, survey of VHTs and 6 interviews with key informants (stakeholders).	VHT workers reported needing some basic supplies such as gumboots, bicycles and umbrellas. They wanted medicines to distribute as this was a culturally determined sign of legitimacy as health workers. Monetary payment would be appreciated by a significant portion, or a travel allowance at a minimum. There was significant inter-district variability.	Mays DC, O'Neil EJ, Jr, Mworozzi EA, Lough BJ, Tabb ZJ, Whitlock AE et al. Supporting and retaining village health teams: an assessment of a community health worker program in two Ugandan districts. Int J Equity Health. 2017;16(1):129.

BUNDLED EVIDENCE PROFILES							
Category of intervention	Country	Intervention	Occupation(s)	Description	Study design and methods	Reported results	Reference
Bundled	Australia	Establishment of a case managed, government sponsored recruitment/retention programme (Rural Health Professionals Program) intended to provide mentoring, continuing professional development, spousal employment assistance.	Primary health service: nurses, physiotherapists, dentists, social workers, pharmacists, psychologists, occupational therapists, podiatrists, dietitians	Analysis of participants in Rural Health Professionals Program, including demographics and identified reasons for participation.	Descriptive review of programme participation with qualitative data analysis and chi-squared testing to explore relationships.	Financial factors were reported primary reason for participation in RHPP rural placement programme, followed by professional factors, location factors. With family factors less important. Rural living experience, being older, being a nurse and trained in country are positively related to rural/remote practice site.	Morell AL, Kiem S, Millsted MA, Pollice A. Attraction, recruitment and distribution of health professionals in rural and remote Australia: early results of the Rural Health Professionals Program. Hum Resour Health. 2014;12:15.
Bundled	Bangladesh	Policies of governments and education institutions	Medicine and nursing	Review of four decades of policies and practice. Document review including literature and government policies plus key informant interviews.	Qualitative study involving document review, literature review key informant interviews and roundtable discussions with stakeholders and policy-makers.	Bangladesh has made significant efforts in adopting health and related policies, but lacks policies and provision specifically targeted to attraction and retention of HRH in rural health facilities. Admissions quotas, rural clinical rotations, additional pay for remote work are having some effect but more effective policies are required.	Rawal LB, Joarder T, Islam SMS, Uddin A, Ahmed SM. Developing effective policy strategies to retain health workers in rural Bangladesh: a policy analysis. Hum Resour Health. 2015;13(1):36.
Bundled	Brazil	The Mais Medicos programme which aimed to actively recruit primary care doctors and provide incentives to retain them through better working conditions and increased investments in the primary care infrastructure.	Doctors	Evaluation of the contribution of the programme towards the achievement of universal health access and coverage for remote and deprived areas in Brazil	Quasi-experimental, before-and-after evaluation of the implementation of the programme in 1708 priority municipalities with remote and deprived populations. These were municipalities with 20% or more of the population living in extreme poverty and those located in the country border areas.	From 2013 and 2015, the programme increased the availability of doctors to remote and deprived populations by 29.8%. Municipalities with <0.4 doctors per 1000 population decreased from 292 to 81.	Santos LMP, Oliveira A, Trindade JS, Barreto IC, Palmeira PA, Comes Y, et al. Implementation research: towards universal health coverage with more doctors in Brazil. Bull World Health Organ [Internet]. 2017 Feb 1 [cited 2020 Oct 6];95(2):103–12. Available from:
Bundled	Cambodia	Contract management and health equity funds. In the aftermath of war: building new facilities in areas where none existed, and transforming existing hospitals and commune clinics into health centres.	TB health workers	Examination of the dissonance, dichotomies, dilemmas and effectiveness of initiatives to address sustainable and cost-effective health system in rural areas.	Data from in depth interviews, meetings, workshops and observational study. An iterative, grounded theory approach to analysis results which results in a rich descriptive study.	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, significantly, issues concerning 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: and also personal rewards, yet job performance was hindered by institutional factors.	Chhea C, Warren N, Manderson L. Health worker effectiveness and retention in rural Cambodia. Rural Remote Health. 2010;10(3):1391.
Bundled	Cambodia, China, Viet Nam	Financial incentives, education, professional support	Health workers generally (HRH)	Policy analysis based on key informant interviews (national policy-makers, academic experts, health managers, rural health workers). Total of 28 1-hour interviews.	Key informant interviews in three countries to produce a narrative account of a range of interventions. No data on retention or recruitment.	Recommendation that in this context, interventions to attract and retain health care workers should be integrated with health system reform.	Zhu A, Tang S, Thu NTH, Supheap L, Liu X. Analysis of strategies to attract and retain rural health workers in Cambodia, China, and Vietnam and context influencing their outcomes. Hum Resour Health. 2019;17(1):2.
Bundled	Canada	Variable - some practices adapted to generational expectations and reported better recruitment and retention as a result.	Rural GPs	Qualitative - interviews	Practitioners or teams responding to an invitation were interviewed in rural and remote communities of northwestern Canada, to explore adaptations, successes and challenges influencing recruitment and retention and the influence of the incoming new generation of practitioners.	Practices reported better recruitment and retention when they offered part-time flexible work, lower work loads, mentorship and back-up support such as second-on call for early career doctors. Early career doctors had lower caseloads, spent more time with their patients and provided high quality care but this meant more of them were required and their billings were lower. They wanted greater work-life balance. Generational changes were predicted to have an impact on the health system over time.	Snadden D, Kunzli MA. Working hard but working differently: a qualitative study of the impact of generational change on rural health care. CMAJ Open. 2017;5(3):E710-e716.
Bundled	Chile	Rural Practitioner Programme (RPP): a national, legislated and centralized process of recruitment to residency and subsequent obligatory service in a rural hospital; Ministry of Health directed programme. Addresses four domains: monetary compensation (direct and indirect financial incentives); education and regulatory interventions; management, environment and social support; and external incentives.	Doctors	This study evaluates outcomes for graduates applying for rural positions in the RPP from 2001 to 2008. Medical school graduates are incentivized to complete 3-6 years in rural service before entering specialized residency training in urban university.	Retrospective public data analysis of aggregate retention of medical school graduates in the 3-6 year programme.	Results suggest that the programme is successfully attracting doctors to complete obligated work in rural areas, but is limited to a maximum of 6 years. Only 10% of completers go on to residency in family medicine (specialty most likely to return to practise in a rural area; no data yet on numbers returning to rural practice).	Pena S, Ramirez J, Becerra C, Carabantes J, Arteaga O. The Chilean Rural Practitioner Programme: a multidimensional strategy to attract and retain doctors in rural areas. Bull World Health Organ. 2010;88(5):371-378.
Bundled	France	Financial incentives for primary care teams (PCTs), which provide multi-professional working environments for rural GPs, assumed to result in a more supportive and sustainable working environment for the rural GP and encourage recruitment and retention.	General practitioners (primary care doctors)	Financial incentives to attract and retain GPs in underserved areas began in 2005, and alongside this multi-professional group practice PCT development incentives were in place.	Estimated the effect of PCTs on GP density evolution based on a mixed-method framework that combines a spatial analysis using a taxonomy of rural areas with a quasi-experimental design for public policy evaluation. Assumed that the treatment effect, i.e. the settlement of a PCT within a rural area, is measured by the difference between GP density with and without the treatment. GP density was compared over different time periods 2004-2008 versus 2008-2012.	Multi-professional practices in underserved areas slow down the decrease in GP density occurring in those areas, compared with similar areas without PCTs.	Chevillard G, Mousquès J, Lucas-Gabrielli V, Rican S. Has the diffusion of primary care teams in France improved attraction and retention of general practitioners in rural areas? Health Policy. 2019;123(5):508-515.
Bundled	Ghana	Per diem and extra duty allowance. Observational, cross-sectional study of satisfaction with the role of community based volunteer.	Community-based volunteer	Structured surveys administered face to face, followed by select in-depth interviews and focus group discussion to collect data on reasons for volunteering and satisfaction with role. Attempt to find association between per diem and extra duty allowance and satisfaction.	Sequential mixed-method design, a cross-sectional survey. Structured surveys administered face to face, followed by select in-depth interviews and focus group discussion to collect data on reasons for volunteering and satisfaction. Data analysed for correlation between satisfaction and demographic characteristics, payments received. Looked for associations between volunteer satisfaction and incentives.	Receiving a per diem for travel accommodation and food costs was negatively associated with satisfaction with the role, but an extra duty allowance had a weak positive association with satisfaction. Overall, volunteers reported high satisfaction, with themes of valuable training, preferential treatment by the health service, social recognition and helping the community. A sense of unfairness compared with other volunteers' incentives was mentioned by some as a reason to stop volunteering. 55% were dissatisfied with non-monetary incentives.	Afari-Asiedu S, Asante KP, Senah K, Abdulai MA, Afranie S, Manama E. Volunteering for health services in the middle part of Ghana: in whose interest? Int J Health Policy Manage. 2018;7(9):836–846.



Bundled	Indonesia	Medical internship in rural area	Graduate doctors (interns)	Focus group interviews of interns who had completed an intern year in a rural hospital, looking at factors important in their retention.	Focus group interviews	The rural medical internships were perceived negatively, characterized by financial hardship and adverse workplace culture. Most did not intend to continue working in a rural area.	Dasman H, Mwanri L, Martini A. Indonesian rural medical internship: the impact on health service and the future workforce. Indian J Public Health Res Dev. 2018;9(7):231-6.
Bundled	Multiple African countries	General surgical training in rural African setting	Doctors - surgeons who had completed a rural surgical training programme	The Pan-African Academy of Christian Surgeons (PAACS, an NGO, rural faith-based hospitals) gained COSECSA approval for training sites in rural locations with the goal to produce rural surgeons. African graduates of medical schools with valid medical licenses who speak English must sign a statement of faith and a 5-year service agreement in exchange for free surgical training (fees often required in African countries). COSECSA (College of Surgeons of East Central and Southern Africa) have set exams for recognized surgical qualification.	Review of PAACS' residency database; and a survey of PAACS graduates. Rural defined as < 50 000 population. Primary outcome of survey was likelihood of continued practice at current location in 5 years and rurally.	51% of graduates were practising rurally; of long-term graduates in practice > 5 years (i.e. beyond service agreement) 35% were practising rurally. 100% were in Africa: 79% in their home country. 88% of graduates were male. Attrition rate was 18% within the programme. COSECSA exam pass rates were high. Survey: 45% response rate n=30, trends noted but often not statistically significant.	Van Essen C, Steffes B, Thelander C, Akinyi K, Li B, Tarpley HF. Increasing and retaining African surgeons working in rural hospitals: an analysis of PAACS surgeons with twenty-year program follow-up. World J Surgery. 2019;43(1):75–86.
Bundled	Nepal	Bundled programme consisting of compulsory service, education, and support	Family practice doctors, hospital staff and inpatients and outpatients	Competitive selection for compulsory (3-year) service scholarship and training, living quarters, internet connection, in service training for all staff and capacity development for hospital's management committee.	Detailed evaluation consisting of interviews, data analysis of changes in health services utilization - outpatient visits, admissions, deliveries, and caesarean sections in programme hospitals compared with controls. Changes in hospital use were used as a proxy indicator for community satisfaction and quality of care.	Five of programme's first 20 doctors paid fee vs completing service period. Compared with 36 control hospitals, the 7 programme hospitals significantly increased number of deliveries and caesarean sections. Admissions and outpatient visits did not significantly increase.	Zimmerman M, Shah S, Shakya R, Chansi BS, Shah K, Munday D et al. A staff support programme for rural hospitals in Nepal. Bull World Health Organ. 2016;94(1):65-70.
Bundled	South Africa	Retention strategy: rural bonded scholarship where graduates have a year-for-year work-back obligation (particular details not provided).	6 health care practitioners (1 clinical psychiatrist, 2 physiotherapists, 1 optometrist, 1 pharmacist, 1 medical officer)	Qualitative study, biographical study, presents the experiences of rural-origin HCPs supported by Umthombo Youth Development Foundation who returned to work in a rural area after graduation (for a specified bonded period of time).	Unstructured interviews. Qualitative study using a life history methodology to explore experiences of six rural-origin HCPs working in rural areas. Interviewees asked "tell me about your educational experiences from rural scholar to health care professional and what it means to work in a rural setting".	Recruitment and training of rural scholars is a 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. 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.	Ross AJ. Working in rural areas - the experiences of Umthombo Youth Development Foundation graduates. African J Prim Health Care Fam Med. 2014;6(1):E1-7.
Bundled	Thailand	Education, regulatory, support	Doctors	A special recruitment initiative, including two special projects, called the Collaborative Project to Increase Production of Rural Doctor and One District One Doctor, were launched in 1994 and 2005 respectively. This special recruitment initiative involves partnership between 14 universities and 37 accredited hospitals in the MOPH. Doctor retention in the MOPH health services up to 1 June 2016 was compared across the two training tracks using $\chi^2$ test Factors associated with 3-year retention in the MOPH health services were identified using multiple logistic regression.	This is a retrospective study using data on newly graduated medical doctors linked with the MOPH health personnel database, which allows tracking of medical graduates from the dates of entering to leaving the MOPH health services. The present study is limited to medical graduates who commenced work for MOPH hospitals between 2001 and 2015.	Compared with their normal-track counterparts, medical graduates under the special rural recruitment scheme were about 2.4 times more likely to remain working in the MOPH health services for a minimum period of 3 years (OR 2.44, 95% CI 2.19-2.72). Female doctors were 15% less likely to remain working in the MOPH than male doctors. Compared with medical graduates working in the central region, those in the northern region were 16% more likely to remain in the MOPH (OR 1.16, 95% CI 1.01-1.33), while those in the north-eastern region were 16% less likely to be retained in the MOPH (OR 0.84, 95% CI 0.74-0.95).	Arora R, Chamnan P, Nitiapinyasakul A, Lertsukprasert S. Retention of doctors in rural health services in Thailand: impact of a national collaborative approach. Rural Remote Health. 2017;17(3):4344.
Bundled	Thailand	Multiple: targeted recruitment of rural background students; locating medical training outside capital and major cities; compulsory service requirements in rural and remote areas. Two government funded projects aimed to increase production of rural doctors - Collaborative Project to Increase Production of Rural Doctor (CPIRD) and One District One Doctor (ODOD).	Medical students/graduates	Collaboration of Ministry of Education and Ministry of Public Health to undertake CPIRD and ODOD.	Study describes impact of a 20-year collaborative approach, establishment and strategies employed for the CPIRD and ODOD.	92% medical graduates under the programmes remained working in areas assigned; had increased clinical competency and were likely to continue working in rural areas after mandatory periods. Doctors entering into the system increased consistently. Targeted strategies and policy interventions implemented to achieve outcomes, including recruitment of rural background students and establishing medical training facilities in rural areas.	Nithiapinyasakul A, Arora R, Chamnan P. Impact of a 20-year collaborative approach to increasing the production of rural doctors in Thailand. Int J Med Educ. 2016;7:414-416.
Bundled	United States of America	Education and support	Medical graduates	This study explores the reasons for improved retention of rural doctors who went through the UW-Baraboo Rural Training Track Family Medicine Residency Program.	Case study of 26 graduates who completed an online survey.	Influence by significant others, meaningful work, integration into local community were the most important factors revealed for remaining in a rural location.	Morken C, Bruksch-Meck K, Crouse B, Traxler K. Factors influencing rural physician retention following completion of a rural training track family medicine residency program. WMJ. 2018;117(5):28-210.
Bundled	United States of America	Partnership between university and local foundation, with support strategies and non-financial incentives	Doctors, physicians assistants and allied health workers	Study of workforce outcomes (recruitment and retention) of partnership after 3 years.	Qualitative and quantitative analysis of partnership	Multi-party agreements in place to collaborate on recruitment and retention of health workforce.	Reid R, Rising E, Kaufman A, Bassett A, McGrew 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):292-6.

Bundled	Zambia	Bundled strategy: health workers retention scheme	Doctors	In return for signing a contract to work in a designated rural area for 3 consecutive years, each medical cadre earns a hardship allowance. Depending on the occupation category, they may also receive financial aid for housing rehabilitation, vehicle loan, and some facility incentives, such as provision of medical equipment and provision of solar panels.	The study design included semi-structured interviews, observations of health workers during field research in several provinces, relevant document review, use of MOH statistical data and expert opinions as well as a participant feedback survey.	68 doctors joined the scheme. "During the mid-term review 20 doctors on the scheme were interviewed. The majority of the doctors interviewed said that without the incentives they would not have come to the district where they were working. They would have tried to find more attractive postings (A or B districts), or would have left government service." In the satisfaction analysis of health workers (through the interviews and feedback survey), education facilities for children, workload, social amenities and secondary income opportunities were all rated as “not at all satisfactory” by participants. However, overall rates showed that participants were "somewhat satisfied" with retention allowances and benefits.	Koot J, Martineau T. <i>Zambian health workers retention scheme (ZHWSR) 2003-2004: mid-term review</i> . 2005 ( <a href="http://www.hrhresourcecenter.org/hosted_docs/Zambian_Health_Workers_Retention_Scheme.pdf">http://www.hrhresourcecenter.org/hosted_docs/Zambian_Health_Workers_Retention_Scheme.pdf</a> ).
Bundled	Zambia	Financial incentives and support	Clinical officers (11), doctors (7), environmental health technologists (9), midwives (14), nurses (40), pharmacist (1), other (13)	An analysis of factors, through focal groups and questionnaires, that makes health workers stay in rural areas.	Cross-sectional qualitative and quantitative data were collected from health workers and other stakeholders through focus group discussions and individual interview questionnaires and were supplemented by administrative data.	A salary top-up for health workers in rural areas was identified as the most effective incentive; almost none of the recruitment and retention strategies were significant predictors of health workers’ job satisfaction, likelihood of leaving, or frequency of considering leaving, which were in large part explained by individual characteristics such as age, gender, and profession. These quantitative findings were consistent with the qualitative data, which indicated that existing strategies fail to address major problems identified by health workers in these districts, such as poor living and working conditions.	Goma FM, Murphy GT, MacKenzie A, Libetwa M, Nzala SH, Mbwili-Muleya C et al. <i>Evaluation of recruitment and retention strategies for health workers in rural Zambia</i> . Hum Resour Health. 2014;12 (S1).

Health Workforce Department  
World Health Organization  
20 Avenue Appia  
CH 1211 Geneva 27  
Switzerland  
[www.who.int/hrh](http://www.who.int/hrh)

