	CRITERIA	JUDGEMENT	EVIDENCE
RESOURCE USE	Are the resources required small?	No ● · Probably no ○ · Uncertain ○ · Probably yes ○ · Yes ○ · Varies ○	***Main resource requirements*** • Resources for needs assessment, curricula review and adaptation • Funding of staff time • Resources for improving infrastructure for classroom and clinical teaching (urban/rural) • Resources for improving faculty skills and knowledge, based on new curricula • Resources for improvements in teaching/learning aids, technology, etc.
	Is the incremental cost small relative to the benefits?	No ○ · Probably no ○ · Uncertain ● · Probably yes ○ · Yes ○ · Varies ○	There are uncertainties in the way the curricula can implemented as it depends on of the above resources, including the students themselves
EQUITY	What would be the impact on health equity?	Reduced ○ · Probably reduced ○ · Uncertain ○ · Probably increased ● · Increased ○ · Varies ○	A well-designed curriculum which is responsive to population health needs could contribute to improving the quality of services and to social accountability (Bartlett et al 2011; Mullan et al 2010; Abdelrahman and Alfadil, 2008; Muula 2005)
ACCEPTABILITY	Is the option acceptable to most stakeholders?	No ○ · Probably no ○ · Uncertain ○ · Probably yes ○ · Yes ● · Varies ○	Literature shows interest and willingness to change curricula to introduce core competencies (Edler et al., 2010; Mullan et al., 2010; Chan et al., 2010; Naylor et al., 2010; Smith et al., 2009; Abdelrahman, Alfadil 2008; Turner, Farquhar 2008; Smith, Lichtveld 2007). The mean score for acceptability was 6.92 SD was 2.019
FEASIBILITY	Is the option feasible to implement?	No ○ · Probably no ○ · Uncertain ○ · Probably yes ○ · Yes ● · Varies ○	Yes, especially when closely linked to the needs of the national health system (Zaman et al., 2008; Elias, Devadasan 2008). The mean score for feasibility was 5.86 SD was 2.013

PICO B5/6 RECOMMENDATION: Should adapting curricula to evolving needs through the incorporation of core competencies and development of the curriculum be implemented versus no adaptation of curricula to evolving needs?

Balance of consequences	Undesirable consequences *clearly outweigh* desirable consequences in most settings ○	Undesirable consequences *probably outweigh* desirable consequences in most settings ○	The balance between desirable and undesirable consequences *is uncertain* ○	Desirable consequences *probably outweigh* undesirable consequences in most settings ●	Desirable consequences *clearly outweigh* undesirable consequences in most settings ○
Recommendation	*We recommend against the option* ○	*We recommend the option only in the context of rigorous research* ○	*We recommend the option in the context of close monitoring and evaluation* ●	*We recommend the option* ○	
	● **If an educational institution has an ongoing curriculum, or would like to develop a competency-based curriculum, it is important to pay attention to:** • involvement of key members of the profession and other stakeholders • taking stock of the national demographic health trends/health profile and population projections especially age 15–25 years • recruitment, education, age and entry qualifications • minimum period of study and level of academic award • staffing and structural (physical infrastructure, skills labs, and technology) requirements • leverage work of similar institutions (Drehobl et al., 2012).				
Justification	Curricula review and adaptation provides a vehicle for a positive impact on quality and relevance of health professionals' education and consequently gaining support from educational institutions. It further provides an opportunity for faculty members to develop new perspectives, infrastructure development and stakeholder involvement in advocacy.				

Implementation considerations	• Resistance to curriculum change can occur. Significant changes may have implications on faculty who may be uncertain of new understandings and practices, and will need to take into account issues of timelines for the rollout and faculty development • Establishing or working with existing institutional structures including community placements for learning • Continuous evaluation
Key uncertainties	Cost implications; timing for curricula changes; effect on quantity unknown; curriculum as a means to social accountability uncertain
Monitoring and evaluation	• Numbers, locations and qualifications of educators • Numbers of health professionals produced and location/nature of their practice
Research priorities	• Impact on quantity, quality, relevance of competence-based curricula • Links between the retention of health workers trained in rural settings and adapted competency-based curricula that take into account rural settings • Evidence of improved proficiency attributed to new curricula • Long-term evaluation of the impact of improved proficiency attributed to curricula by following former course participants, their residency programme directors and perhaps peers • Longitudinal studies linking the retention of health workers trained in community and rural settings can be linked back to changes in the curricula • Special case studies of universities such as Keele which have, from the outset aimed their curricula and training in rural GP practices

7.1.3 Simulation methods

PICO B8: Should simulation methods of varying methods of fidelity be used in the education of health professionals versus no simulation?

	CRITERIA	JUDGEMENT	EVIDENCE
PROBLEM	**Is the problem serious?**	No ○ / Probably no ○ / Uncertain ○ / Probably yes ● / Yes ● / Varies ○	It is important to help trainees acquire necessary skills while minimizing adverse effects on patients they are taking care of. This search was based on the original question of the "Effectiveness of infrastructure materials and related resources (including information and communication technologies) necessary for health professionals' education and training in producing quantity, quality and relevance". A number of studies have shown a clear relationship between the availability of resources for education, the deployment of these resources and the production of health professionals. Although the availability of educational resources, whether in resource-poor or resource-high contexts, is a pre-condition for their deployment, it is not a pre-condition for efficient use. To this end, availability of infrastructure, materials and resources, and their efficient use in the education and production of health professionals are considered on two areas: 1. the infrastructure of interest researched were: classrooms; meeting rooms; libraries; clinical skills lab student housing; 2. resources such as: audiovisual; technology; computers; e-learning; ICTs; Internet. The systematic reviews for simulation were of high quality. Notes: How to define simulation: • anatomical models • three dimensional video • expert patients • students practicing on students? Could this include educational games?
	Are a large number of people affected?	No ○ / Probably no ○ / Uncertain ○ / Probably yes ● / Yes ● / Varies ○	Most health workers are affected, as well as people who seek health care

	CRITERIA	JUDGEMENT	EVIDENCE
BENEFITS & HARMS OF THE OPTIONS	**Are the anticipated desirable effects large?**	No ○ · Probably no ○ · Uncertain ● · Probably yes ● · Yes ○ · Varies ○	Quantity ○ · Quality ● · Relevance ○ · Unintended effects ○ A number of good quality systematic reviews identified a wide range of studies including RCTs in various professions (medical, nursing, multidisciplinary) of various levels (students, practitioners)
	Are the anticipated undesirable effects small?	No ○ · Probably no ○ · Uncertain ○ · Probably yes ● · Yes ○ · Varies ○	**Quantity** Not applicable **Quality** • Improved competence, performance • Improved knowledge • Improved trainee satisfaction • More practice yields better results • However, inconsistent results for sustainability • Results for patient outcomes inconsistent **Relevance** No evidence identified
	What is the certainty of the anticipated effects?	Very low ○ · Low ○ · Moderate ● · High ● · No evidence ○ · Varies ○	*Notes:* Large in terms of safety. Literature from emersion medical (Tulenko). American academy of paediatrics newborn resusitation. Use evidence showing increased number of times doing a procedures increases proficiency. Allows the education of more students with fewer faculty. Important bridge between theory and practice. Opportunity costs. Risk of not performing the procedure on real patients (e.g. paid patients). Question about sustainability due to expensive, high-tech models that wear out and require replacement and maintenance. When possible, use low- cost methods for simulations (e.g. oranges for injections, animals – deliver babies of cows). Anatomical models used for delivery are very relevant, intubation very relevant, intubation done on mannequins. Provides proof of clinical competence (e.g. number of births attended, etc.). No undesirable effects, if well integrated into the curriculum. Could limit creative response to unexpected if not fidel to real life. Three dimensional video does not develop manual skills. Not a substitute, but a proxy.
	Are the anticipated desirable effects large relative to the undesirable effects?	No ○ · Probably no ○ · Uncertain ○ · Probably yes ● · Yes ○ · Varies ○	
RESOURCE USE	Are the resources required small?	No ○ · Probably no ● · Uncertain ○ · Probably yes ○ · Yes ○ · Varies ●	**Main resource requirements:** Simulation cost U.S. ($5000 – $200 000) Staff to operate simulation programmes (cost to be worked out at country level) *Example:* cost of training a surgical resident in the operating room for four years nearly $50 000 MEPI schools say it is expensive (cardiovascular system, orthopedics). Some low cost/quality models are not durable. Development costs are high. If use low-cost options (e.g. oranges for injections), or open source agreements, then the cost is lower. Development costs differ by country.
	Is the incremental cost small relative to the benefits?	No ○ · Probably no ○ · Uncertain ● · Probably yes ○ · Yes ○ · Varies ●	Uncertain because of the uncertainty of the size of the benefits and the potentially large resource use Incremental cost likely to vary with the cost of the specific simulation method
EQUITY	What would be the impact on health equity?	Reduced ○ · Probably reduced ○ · Uncertain ● · Probably increased ○ · Increased ○ · Varies ○	Probably no effect Patients may refuse to serve as human mannenquins

	CRITERIA	JUDGEMENT	EVIDENCE
ACCEPTABILITY	Is the option acceptable to most stakeholders?	No ○ · Probably no ○ · Uncertain ● · Probably yes ○ · Yes ● · Varies ○	Not assessed in the stakeholders survey
FEASIBILITY	Is the option feasible to implement?	No ○ · Probably no ○ · Uncertain ● · Probably yes ○ · Yes ● · Varies ○	Not assessed in the stakeholders survey

PICO B8 RECOMMENDATION: Should simulation methods be used in the education of health professionals?

Balance of consequences	Undesirable consequences *clearly outweigh* desirable consequences in most settings ○	Undesirable consequences *probably outweigh* desirable consequences in most settings ○	The balance between desirable and undesirable consequences *is uncertain* ○	Desirable consequences *probably outweigh* undesirable consequences in most settings ○	Desirable consequences *clearly outweigh* undesirable consequences in most settings ●
Recommendation	*We recommend against the option* ○	*We recommend the option only in the context of rigorous research* ○	*We recommend the option in the context of close monitoring and evaluation* ○		*We recommend the option* ●
	● **Simulation methods should be used in the education of health professionals**				
Justification	• Needed to acquire skills, accelerate learning • Allow for a variety of situations • Develop manual skills (can only learn by doing – through repetition)				
Implementation considerations	• Availability of experienced staff • Availability of space and equipment • Seamless integration with the curriculum and a focus on developing priority competencies, based on population health needs • Cost				
Key uncertainties	• Impact of simulation techniques on patient outcomes • Cost versus effectiveness				
Monitoring and evaluation	• More data on its use in low-resource settings • Students performing a procedure an increased number of times versus without simulation • Ability to perform procedures that otherwise could not be performed				
Research priorities	• Suggest postponing the identification of research priorities until a more expanded review of the literature is conducted • Good quality studies assessing effects on patient outcomes • Identifying methods to increase sustainability of benefits • Gender considerations				

7.1.4 Direct entry of students

PICO B9: Should direct entry be used to increase the number of graduates from relevant undergraduate, postgraduate or other educational programmes into professional studies versus no direct entry of graduates from other relevant programmes?

	CRITERIA	JUDGEMENT	EVIDENCE
PROBLEM	**Is the problem serious?**	No ○ · Probably no ○ · Uncertain ○ · Probably yes ● · Yes ○ · Varies ○	There is a severe shortage of health workers and an inequity of distribution. The need for increasing the number of registered health professionals is a serious challenge. Direct Entry or Accelerated Degree Programs provide a quick and safe method to increase the number of health workers.
	Are a large number of people affected?	No ○ · Probably no ○ · Uncertain ○ · Probably yes ○ · Yes ● · Varies ○	All health workers and health students

BENEFITS & HARMS OF THE OPTIONS	**Are the anticipated desirable effects large?**	No ○ · Probably no ○ · Uncertain ● · Probably yes ● · Yes ○ · Varies ○	Quantity ● · Quality ● · Relevance ○ · Unintended effects ○
			A number of literature reviews were identified but no systematic reviews
			Quantity
			Anecdotal reports of increasing numbers of health workers but no evaluation studies directly addressed this
			• Some moderate evidence:
			  • for improved retention (1 study – low-quality evidence)
			  • job satisfaction.
			Quality
			Better outcomes or at least equivalence for:
			• critical thinking
			• passing rates for national exams
			• professional practice
			• clinical competence
			• leadership.
			Relevance
			No specific evidence identified

	Are the anticipated undesirable effects small?	No ○ · Probably no ○ · Uncertain ○ · Probably yes ● · Yes ○ · Varies ○	
	What is the certainty of the anticipated effects?	Very low ○ · Low ○ · Moderate ● · High ● · No evidence ○ · Varies ○	
	Are the anticipated desirable effects large relative to the undesirable effects?	No ○ · Probably no ○ · Uncertain ○ · Probably yes ● · Yes ○ · Varies ○	
RESOURCE USE	Are the resources required small?	No ○ · Probably no ○ · Uncertain ○ · Probably yes ● · Yes ○ · Varies ○	**Main resource requirements:**
	Is the incremental cost small relative to the benefits?	No ○ · Probably no ○ · Uncertain ○ · Probably yes ● · Yes ○ · Varies ○	
EQUITY	What would be the impact on health equity?	Reduced ○ · Probably reduced ○ · Uncertain ○ · Probably increased ● · Increased ○ · Varies ○	
ACCEPTABILITY	Is the option acceptable to most stakeholders?	No ○ · Probably no ○ · Uncertain ○ · Probably yes ● · Yes ○ · Varies ○	
FEASIBILITY	Is the option feasible to implement?	No ○ · Probably no ○ · Uncertain ● · Probably yes ○ · Yes ● · Varies ○	Not assessed in the stakeholders survey

PICO B8 RECOMMENDATION: Should simulation methods be used in the education of health professionals?

Balance of consequences	Undesirable consequences *clearly outweigh* desirable consequences in most settings ○	Undesirable consequences *probably outweigh* desirable consequences in most settings ○	The balance between desirable and undesirable consequences *is uncertain* ○	Desirable consequences *probably outweigh* undesirable consequences in most settings ○	Desirable consequences *clearly outweigh* undesirable consequences in most settings ○
Recommendation	*We recommend against the option* ○	*We recommend the option only in the context of rigorous research* ○	*We recommend the option in the context of close monitoring and evaluation* ●		*We recommend the option* ○
	● **Most of the evidence was from non-randomized parallel two group comparisons with no pre- and post-tests (Level III-c), however, the findings were consistent in showing equivalence in quality outcomes with potential to increase quantity outcomes. A Grade B level of moderate support.** **We are taking the question as relating to undergraduate (pre-qualification) education and to graduates.**				
Justification	-				
Implementation considerations	Consideration should be given to the type of pre-degrees as a number of studies were identified that evaluated the predictors of success. These studies were excluded but should be considered in any implementation.				
Key uncertainties	-				
Monitoring and evaluation	-				
Research priorities	Standard outcome measurement				

7.1.5 Admission procedures

PICO B10: Should targeted admissions policies seek to increase the ethnic and geographical diversity of students and be supported by mechanisms to ensure completion of education programmes versus no targeted admissions policies and supportive mechanisms?

	CRITERIA	JUDGEMENT	EVIDENCE
PROBLEM	**Is the problem serious?**	No ○ / Probably no ○ / Uncertain ○ / Probably yes ● / Yes ○ / Varies ○	There is substantial evidence to show that admissions of students from rural or poorer areas is unbalanced and some but less published evidence that there are insufficient numbers of women in some countries to produce a balanced workforce. Although issues of recruiting and retaining doctors in rural and remote service numerically dominant in the published literature found there are some studies on other categories of health worker, and reports relating to low- and middle-income countries. Few references were found to any linkage between admission procedures or criteria and the numbers of graduates produced. This is not surprising, given that the main determinants of the volume of outputs from training are the volumes of health workers needed/ demanded and the capacity of training institutions.
	Are a large number of people affected?	No ○ / Probably no ○ / Uncertain ○ / Probably yes ○ / Yes ● / Varies ○	All undergraduate students There is a general, but not universal finding, that previous academic achievement is a good predictor of success in medical schools in Austria (Reibnegger et al 2010), Canada (Kularunga-Moruzi, Norman 2002), Croatia (Jankovic et al., 2002), Germany (Hansel et al., 2010), Holland (Urlings-Strop et al., 2009; Cohen-Schotanus et al., 2006), UK (Brown, Lilford 2008) and the USA (Mitchell 1990). The same broad conclusion is reached in some studies from developing countries, among them Bahrain (Al Nasir, Robertson 2001), Nigeria (Egbewale et al., 2009) and Sri Lanka (Hewage et al., 2011). Some evidence disputing the predictive validity of previous academic attainment is offered for the New Zealand (Collins et al., 1995; Poole et al., 2012) and for Pakistan (Huda et al., 2001) and Sri Lanka (De Silva et al., 2004 and 2006) and the USA (Basco et al., 2000). For nurse education, a meta-analysis carried out in the US (Grossbach, Kuncel 2011) found that standardized admission tests were effective predictors of performance in the National Council Licensure Examination for Registered Nurses. Pre-nursing grade point average was also effective, but to a lesser extent. In the UK, a study of an entering cohort of pre-registration Diploma of Nursing students concluded that students with higher level entry qualifications performed consistently better than those with lower level qualifications (McCarey et al., 2007). A Canadian study (Carpio et al., 1996) found that school grades in English and chemistry were the best predictors at entry stage of success in licensure examinations. A New Zealand study which took as the outcome performance in the first year of an undergraduate nursing programme (Shulruf et al., 2011) found that the best predictor of success was final year secondary school achievement as measured by the National Certificate of Educational Achievement Grade Point Average (NCEAGPA). A dissenting voice from the UK (Ofori 2000) argued that paper qualifications in psychology, sociology or biology should not be relied on as predictors of academic performance in their related nursing modules, and that age was a good predictor (mature students, defined as >34 years on entry, did better), a finding which has been reported from other studies, and is advanced in the cause of a more diverse student body.

	CRITERIA	JUDGEMENT	EVIDENCE
BENEFITS & HARMS OF THE OPTIONS	**Are the anticipated desirable effects large?**	No ○ · Probably no ○ · Uncertain ○ · Probably yes ● · Yes ○ · Varies ○	Quantity ● · Quality ○ · Relevance ● · Unintended effects ○ **Selection** The potential impact of selecting medical students of rural origin was quantified by Rabinowitz in a longitudinal study that evaluated the impact of the Physician Shortage Area Program (PSAP) in the USA. The PSAP combined selective admission criteria with a rurally orientated educational programme. On multivariate analysis, rural origin was the single variable most strongly associated with rural practice (OR 4.2, 95% confidence interval [CI] 2.8–6.3). Another strong influence that was rarely considered is the origin of the spouse. Rabinowitz found that 64% of rural physicians had spouses of rural origin; in Australia, doctors whose spouses had a rural background were significantly more likely to practice in a rural setting (OR 3.14; 95% CI 1.96–5.1). A home prefecture recruiting scheme in Japan was successful in recruiting medical professionals from rural areas and retaining them as qualified professionals in medically underserved prefectures A number of literature reviews were identified but no systematic reviews **Quantity** There is a substantial body of evidence that selection according to geographic origin increases the number of graduates who practise in rural settings. **Quality** There is a considerable literature on admission criteria as a predictor of performance within the training experience, which takes as the end point course completion or attainment of a qualification (sometimes attainment before course completion). **Relevance** No specific evidence identified There is considerable evidence that students selected from rural areas are most likely to serve in rural areas, though this is not always the case.
	Are the anticipated undesirable effects small?	No ○ · Probably no ○ · Uncertain ○ · Probably yes ● · Yes ○ · Varies ○	
	What is the certainty of the anticipated effects?	Very low ○ · Low ○ · Moderate ● · High ○ · No evidence ○ · Varies ○	
	Are the anticipated desirable effects large relative to the undesirable effects?	No ○ · Probably no ○ · Uncertain ○ · Probably yes ● · Yes ○ · Varies ○	
RESOURCE USE	Are the resources required small?	No ○ · Probably no ○ · Uncertain ○ · Probably yes ○ · Yes ○ · Varies ●	**Main resource requirements:** **Resource** Faculty and adjunct faculty time in terms of intensive academic and social support, individual mentoring, MCAT preparation, coaching in the application process, and upper-level science course work. Secondary school pre-admission coaching Financial support to complete academic programmes Social services support where necessary
	Is the incremental cost small relative to the benefits?	No ○ · Probably no ○ · Uncertain ○ · Probably yes ○ · Yes ○ · Varies ●	This will depend on the country and the cadre of health professional required for scaling up
EQUITY	What would be the impact on health equity?	Reduced ○ · Probably reduced ○ · Uncertain ○ · Probably increased ○ · Increased ● · Varies ●	Recruiting students across ethnic, geographical and all categories of social classes would lead to increased equity
ACCEPTABILITY	Is the option acceptable to most stakeholders?	No ○ · Probably no ○ · Uncertain ○ · Probably yes ● · Yes ○ · Varies ○	There may be some resistance from some medical colleges who may regard this as lowering of standards

	CRITERIA	JUDGEMENT	EVIDENCE
FEASIBILITY	Is the option feasible to implement?	No ○ / Probably no ○ / Uncertain ○ / Probably yes ○ / Yes ● / Varies ○	There are number of these programmes already running in Australia, UK and USA

PICO B10 RECOMMENDATION: Should targeted admissions policies seek to increase the ethnic and geographical diversity of students and be supported by mechanisms to ensure completion of education programmes versus no targeted admissions policies and supportive mechanisms?

Balance of consequences	Undesirable consequences *clearly outweigh* desirable consequences in most settings ○	Undesirable consequences *probably outweigh* desirable consequences in most settings ○	The balance between desirable and undesirable consequences *is uncertain* ○	Desirable consequences *probably outweigh* undesirable consequences in most settings ○	Desirable consequences *clearly outweigh* undesirable consequences in most settings ○
Recommendation	*We recommend against the option* ○	*We recommend the option only in the context of rigorous research* ○	*We recommend the option in the context of close monitoring and evaluation* ●		*We recommend the option* ○
	● There is an extensive literature on recruiting and retaining trained health workers for service in rural and remote areas, and this proved to be the most frequently encountered theme in the literature. Less well documented are published studies on minority groups, nursing and allied professions and medical mid-level providers. **We are taking the question as relating to undergraduate (pre-qualification) education.**				
Justification	-				
Implementation considerations	**Quantity** Admissions policies should be consistent with decisions concerning the supply of particular cadres of health workers. They should take into account the likely numbers of each cadre needed. **Quality** Admissions reforms tend to imply curriculum reforms as the student population changes. In some cases (e.g. China) there are different certificates available to graduates depending on their entry qualifications. However, students may still go on to pursue more advanced qualifications. **Relevance** There is evidence that students selected from rural areas are most likely to serve in rural areas, though this is not always the case. The preferences of applicants should be taken into account. **Complexity and caution** Admissions procedures by themselves will not overcome inequalities in health-care systems. Where targeted admissions policies are used, support mechanisms must be in place to ensure conditions in which students are able to complete programmes. These may include adjustments to the curriculum, teaching and learning methods and financial support. Currently, many of the students who do not complete their courses do so for financial reasons, so disadvantaged students would need financial support (South Africa subsidy system). The characteristics of underserved populations may vary from place to place. For example in Brazil populations in favelas may be less well served than populations in rural areas.				
Key uncertainties	• The impact of admissions procedures on their own. • The impact of admissions policies on underserved populations across countries or even in the same country may vary.				
Monitoring and evaluation	Close monitoring and evaluation is needed for admissions of innovative admissions policies but in particular monitoring of policies introduced with supportive mechanisms to obtain better information on their impact.				

Research priorities	The literature on admissions criteria and practices is hugely biased in favour of rich countries. It is also biased in favour of medical education, to the relative neglect of nursing and allied health professions. This suggests a need to make research funding available in low- and middle-income countries to enable academics to replicate the types of studies that have been undertaken in developed countries, and to extend their scope particularly to types of health worker specific to those locations, for example medical assistants/clinical officers and pharmacy technicians. Make research funding available to low- and middle-income countries to enable academics to replicate the types of studies that have been undertaken in developed countries. Extend their scope, particularly to types of health workers specific to those locations, for example mid-level providers such as medical assistants/clinical officers/clinical associates/non physician clinicians. It would be helpful if cohort studies with large national samples following the entire pipeline from pre-admission characteristics through to long-term employment could be undertaken. Even in the rich countries, most of the studies encountered suffer from severe limitations of scope (restriction to one cadre or one training school), sample size (often below 100 and sometimes below 10 subjects) and weak methodology (low response rates, biased selection of subjects, failure to control for confounding variables, use of proxy outcome measures such as career intentions instead of observed career paths.

7.1.6 Educational pathways and ladder programmes

PICO C1: Should streamlined educational pathways, or ladder programmes, for the advancement of practicing health professionals be adapted in both undergraduate and postgraduate programmes, improve the quantity, quality, and relevance of health professionals?

	CRITERIA	JUDGEMENT	EVIDENCE
PROBLEM	**Is the problem serious?**	No ○ · Probably no ○ · Uncertain ○ · Probably yes ○ · Yes ● · Varies ○	Rigid professional boundaries between professionals makes less adaptable to the needs of the population. The problem is serious in underserved areas.
	Are a large number of people affected?	No ○ · Probably no ○ · Uncertain ● · Probably yes ○ · Yes ○ · Varies ○	The proportion of rural population is huge in developing countries (ex. 60% in SEARO region). Urban poor also can be served by the graduates of this ladder programmes.
BENEFITS & HARMS OF THE OPTIONS	**Are the anticipated desirable effects large?**	No ○ · Probably no ○ · Uncertain ○ · Probably yes ● · Yes ○ · Varies ○	Quantity ● · Quality ● · Relevance ○ · Unintended effects ○ **Quantity** The intent to stay at the hospital for more than a year increased as nurses moved upward in the career ladder programme. No quantifiable measures reported although authors hypothesize retention might be due to intrinsic motivation factors such as updating of nursing knowledge and skills, personal development and possibility of salary increase when moving up along the ladder (Bjørk et al., 2007). **Quality** Participants in the ladder programme showed a higher involvement in leadership ($p<0.001$) quality improvement ($p<0.02$) and preceptorship ($p<0.001$) compared to non-career ladder professionals in the same job role (Nelson, Cook 2008). **Relevance** Outcome not reported
	Are the anticipated undesirable effects small?	No ○ · Probably no ○ · Uncertain ● · Probably yes ○ · Yes ○ · Varies ○	
	What is the certainty of the anticipated effects?	Very low ○ · Low ● · Moderate ○ · High ○ · No evidence ○ · Varies ○	
	Are the anticipated desirable effects large relative to the undesirable effects?	No ○ · Probably no ○ · Uncertain ○ · Probably yes ○ · Yes ● · Varies ○	

	CRITERIA	JUDGEMENT	EVIDENCE
RESOURCE USE	Are the resources required small?	No ● / Probably no ○ / Uncertain ○ / Probably yes ○ / Yes ○ / Varies ○	**Main resource requirements:** • Salary increases for the upper ladder • Dedicated staff for the ladder programme • Training/capacity building of current faculty An observational study describing a 20-year clinical ladder programme. Resources needed to implement the clinical ladder included an annual budget plan highlighting salary increases reflecting advancement in the ladder and an initial benchmarking with known successful programmes in the same geographical area (Pierson 2010).
	Is the incremental cost small relative to the benefits?	No ○ / Probably no ○ / Uncertain ● / Probably yes ○ / Yes ○ / Varies ●	-
EQUITY	What would be the impact on health equity?	Reduced ○ / Probably reduced ○ / Uncertain ○ / Probably increased ○ / Increased ○ / Varies ○	It depends on the context
ACCEPTABILITY	Is the option acceptable to most stakeholders?	No ○ / Probably no ○ / Uncertain ○ / Probably yes ○ / Yes ● / Varies ○	Based on the stakeholders survey, on scale 1-9: Mean (sd) = 7.2 (1.8) See pages 34–35 for qualitative comments
FEASIBILITY	Is the option feasible to implement?	No ○ / Probably no ○ / Uncertain ● / Probably yes ○ / Yes ○ / Varies ○	If regulations are strict, career ladder is difficult. In Africa, for example, it is very difficult to change the mindset. Based on the stakeholders survey, on scale 1-9: Mean (sd) = 6.0 (x.x) See pages 34–35 for qualitative comments

PICO C1 RECOMMENDATION: Should streamlined educational pathways, or ladder programmes, for the advancement of practicing health professionals be adapted in both undergraduate and postgraduate programmes?

Balance of consequences	Undesirable consequences *clearly outweigh* desirable consequences in most settings ○	Undesirable consequences *probably outweigh* desirable consequences in most settings ○	The balance between desirable and undesirable consequences *is uncertain* ○	Desirable consequences *probably outweigh* undesirable consequences in most settings ●	Desirable consequences *clearly outweigh* undesirable consequences in most settings ○
Recommendation	*We recommend against the option* ○	*We recommend the option only in the context of rigorous research* ○	*We recommend the option in the context of close monitoring and evaluation* ●	*We recommend the option* ○	
	● **Ladder programmes should be delivered** • **Specify conditions; available resources (training, faculty, cost, time)** • **Evidence of pilot interventions. Negative consequences also should be studied**				
Justification	-				
Implementation considerations	• **ILO issued relevant documents. Duplication should be avoided. If its implementation is limited, this guideline can reinforce its implementation** • **Regulations should be carefully examined** • **Commitment by senior management and faculty** • **Interest and expertise among faculty and administrators** • **Budget plan for increasing the salary** • **Community contributions to implement the programme**				

Key uncertainties	Negative consequences of the ladder programmes are not well studied
Monitoring and evaluation	Careful monitoring of those who stepped up the ladders and those who wanted but failed
Research priorities	Gather more information on HRH problems that lend themselves to the application of educational and clinical ladders; (2) more specific costs and benefits of educational and clinical ladders through more evaluation or case studies

7.1.7 Interprofessional education

PICO B7 : Should inter-professional education (IPE) be implemented in both undergraduate and postgraduate programmes versus no inter-professional education be used?

	CRITERIA	JUDGEMENT	EVIDENCE
PROBLEM	**Is the problem serious?**	No ○ / Probably no ○ / Uncertain ○ / Probably yes ● / Yes ○ / Varies ○	Patient care is a complex activity which demands that health and social care professionals work together in an effective manner. The evidence suggests that these professions do not effectively work well together. Interprofessional education (IPE) offers a possible way to improved collaboration and patient care. In this question, our judgement is on the problem of IPE, not on the question of whether professions do not effectively work well together.
	Are a large number of people affected?	No ○ / Probably no ○ / Uncertain ○ / Probably yes ○ / Yes ● / Varies ○	All health workers are affected as well as people that seek care
BENEFITS & HARMS OF THE OPTIONS	**Are the anticipated desirable effects large?**	No ○ / Probably no ○ / Uncertain ● / Probably yes ○ / Yes ○ / Varies ○	Quantity ○ / Quality ● / Relevance ● / Unintended effects ○ Only three small-size controlled trials assessing intermediate outcomes **Quantity** Not relevant. (We comment on 'quantity' below) **Quality** • The evidence from controlled studies demonstrated that IPE resulted in increased confidence in their own professional identity and helped them value the difference making them better for clinical placement. • Students demonstrated more positive attitudes to team collaboration, improved communication skills • No practice-level impact assess**ment** **Relevance** • Interdisciplinary community-oriented exercises during IPE offer unique opportunities for students to appreciate health problems as they occur in the community • Only one study which compared students from one school to another where there was no intervention did not show **a significant difference**
	Are the anticipated undesirable effects small?	No ○ / Probably no ○ / Uncertain ● / Probably yes ○ / Yes ○ / Varies ○	
	What is the certainty of the anticipated effects?	Very low ● / Low ○ / Moderate ○ / High ○ / No evidence ○ / Varies ○	
	Are the anticipated desirable effects large relative to the undesirable effects?	No ○ / Probably no ○ / Uncertain ● / Probably yes ○ / Yes ○ / Varies ○	

	CRITERIA	JUDGEMENT	EVIDENCE
RESOURCE USE	Are the resources required small?	No ○ · Probably no ● · Uncertain ○ · Probably yes ○ · Yes ○ · Varies ○	**Main resource requirements:** **Resource** Staff from different faculties, work settings and locations Staff training Significant layer of coordination for interprofessional educators and curriculum developers Supervision of students Space issues
	Is the incremental cost small relative to the benefits?	No ○ · Probably no ○ · Uncertain ● · Probably yes ○ · Yes ○ · Varies ○	Uncertain given the uncertainty of benefits
EQUITY	What would be the impact on health equity?	Reduced ○ · Probably reduced ○ · Uncertain ○ · Probably increased ○ · Increased ○ · Varies ●	-
ACCEPTABILITY	Is the option acceptable to most stakeholders?	No ○ · Probably no ○ · Uncertain ○ · Probably yes ● · Yes ○ · Varies ○	Based on stakeholders survey, score on a scale from 1–9: Mean; 6.9 SD: 2.2 Refer to pages 51–52 for qualitative comments
FEASIBILITY	Is the option feasible to implement?	No ○ · Probably no ○ · Uncertain ● · Probably yes ○ · Yes ○ · Varies ○	Based on stakeholders survey, score on a scale from 1–9: Mean; 6.0; SD: 2.2 Refer to pages 51–52 for qualitative comments

PICO B7 RECOMMENDATION: Should inter-professional education (IPE) be implemented in both undergraduate and postgraduate programmes be used versus no IPE?

Balance of consequences	Undesirable consequences *clearly outweigh* desirable consequences in most settings ○	Undesirable consequences *probably outweigh* desirable consequences in most settings ○	The balance between desirable and undesirable consequences *is uncertain* ○	Desirable consequences *probably outweigh* undesirable consequences in most settings ○	Desirable consequences *clearly outweigh* undesirable consequences in most settings ○
Recommendation	*We recommend against the option* ○	*We recommend the option only in the context of rigorous research* ●	*We recommend the option in the context of close monitoring and evaluation* ○	*We recommend the option* ○	
	● **Before supporting this recommendation fully, we would recommend work to obtain much better evidence, in institutions with programmes and resources available to support the necessary research.** **We find a disconnect between the question ("Should inter-professional education [IPE] in both undergraduate and postgraduate programmes be used?") and the related problem statement ("Low number, quality and relevance of health professionals"); and the statement "the evidence suggests that these professions do not effectively work well together". The evidence for the latter statement should be included.** **IPE may also be relevant to quantity as well as quality and relevance questions. IPE may be resource-efficient in a way that allows more health workers to be educated.** **We are taking the question as relating primarily to undergraduate (pre-qualification) education.**				
Justification	-				
Implementation considerations	Students in the 'non-clinical' professional categories (such as biomedical sciences) were less appreciative of IPE. They needed more explicit learning objectives				

Key uncertainties	• Impact of IPE on the outcome of interest • Cost effectiveness
Monitoring and evaluation	Given the uncertainties noted above, careful monitoring of the rollout of this intervention will be needed, particularly on resource use (human, material, financial, time)
Research priorities	• Better quality studies looking at quality of health professionals and relevancy to the communities being served. • Other priorities: 1. Approaches for training educators involved in IPE 2. Studies of cost effective models for IPE and sustaining IPE 3. Evaluation of impact of IPE on health professional practice in developing countries.

7.2 Accreditation

7.2.1 Accreditation

PICO C2: Should accreditation of health professionals' education be introduced to improve the quality of health professionals' education versus no accreditation?

	CRITERIA	JUDGEMENT	EVIDENCE
PROBLEM	**Is the problem serious?**	No ○ / Probably no ○ / Uncertain ○ / Probably yes ○ / Yes ● / Varies ○	Health professions education is resource intesnsive and attracts some of the most promising students in all countries. Less than 50% of countries have a credible, transparent and comprehensive accreditation system.
	Are a large number of people affected?	No ○ / Probably no ○ / Uncertain ○ / Probably yes ○ / Yes ● / Varies ○	Affects all health professionals and the population they serve
BENEFITS & HARMS OF THE OPTIONS	**Are the anticipated desirable effects large?**	No ○ / Probably no ○ / Uncertain ○ / Probably yes ● / Yes ○ / Varies ○	Quantity ○ / Quality ● / Relevance ● / Unintended effects ● Historical experience in the UK (Medical Act of 1858 establishing the General Medical Council) and the USA (Flexner Report, 1910) indicates substantial closing of sub-standard schools as a result of the introduction of quality standards. Two systematic reviews identified for medical education and two studies for nursing education. The reviews found very limited evidence of the effectiveness of accreditation on educational and service outcomes. **Quantity** Could negatively affect quantify as a result to school closures but no evidence identified **Quality** Strongly believed to improve quality but evidence weak. Historically, there is evidence of schools being closed on the introduction of accreditation or re-accreditation **Relevance** Positive – provided accreditation standards reflect population needs **Other** • Education and training in non-accredited institutions could lead to non-recognition of qualifications post graduation • Risk of abuse with private accrediting bodies • Poor accreditation may produce a false sense of security
	Are the anticipated undesirable effects small?	No ○ / Probably no ○ / Uncertain ● / Probably yes ○ / Yes ○ / Varies ○	
	What is the certainty of the anticipated effects?	Very low ○ / Low ○ / Moderate ● / High ○ / No evidence ○ / Varies ○	
	Are the anticipated desirable effects large relative to the undesirable effects?	No ○ / Probably no ○ / Uncertain ○ / Probably yes ● / Yes ○ / Varies ○	

	CRITERIA	JUDGEMENT	EVIDENCE
RESOURCE USE	Are the resources required small?	No ● / Probably no ○ / Uncertain ○ / Probably yes ○ / Yes ○ / Varies ○	**Main resource requirements:** **Resource** Two items of importance in literature: • Resources for implementing the accreditation process • Resources for improving institutions to allow them to reach accreditation standards
	Is the incremental cost small relative to the benefits?	No ○ / Probably no ○ / Uncertain ○ / Probably yes ● / Yes ○ / Varies ○	Uncertain because of the uncertainty of the size of the benefits and the potentially large resource use. Resources also depend on the current level of quality in educational institutions.
EQUITY	What would be the impact on health equity?	Reduced ○ / Probably reduced ○ / Uncertain ○ / Probably increased ● / Increased ○ / Varies ○	Depends on whether accreditation standards are attuned to population health, as set by country
ACCEPTABILITY	Is the option acceptable to most stakeholders?	No ○ / Probably no ○ / Uncertain ○ / Probably yes ○ / Yes ● / Varies ○	Based on the stakeholders survey, on scale 1-9: Mean (sd) = 7.6 (1.7) Qualitative comments drawn from feasibility and acceptability survey.
FEASIBILITY	Is the option feasible to implement?	No ○ / Probably no ○ / Uncertain ○ / Probably yes ● / Yes ○ / Varies ○	Based on the stakeholders survey, on scale 1-9: Mean (sd) = 6.7 (2.1) Qualitative comments drawn from feasibility and acceptability survey

PICO C2 RECOMMENDATION: Should accreditation of health professionals' education be introduced to improve the quality of health professionals' education versus no accreditation?

Balance of consequences	Undesirable consequences *clearly outweigh* desirable consequences in most settings ○	Undesirable consequences *probably outweigh* desirable consequences in most settings ○	The balance between desirable and undesirable consequences *is uncertain* ○	Desirable consequences *probably outweigh* undesirable consequences in most settings ●	Desirable consequences *clearly outweigh* undesirable consequences in most settings ○
Recommendation	*We recommend against the option* ○	*We recommend the option only in the context of rigorous research* ○	*We recommend the option in the context of close monitoring and evaluation* ○	*We recommend the option* ●	
	● **If a country has a health professions educational institutions accreditation system(s), the system(s) should be reviewed relative to established professional guidelines for accreditation** **If a country does not have a health professions educational institutions accreditation system(s), an accreditation system(s) should be developed with reference established professional guidelines for accreditation** **In both instances, it will be important that accreditation includes attention to:** • addressing population needs • providing holistic health professionals' education • concern with health workforce needs.				

Justification	Strong historical and limited current evidence suggests that accreditation is an important quality improvement and assurance mechanism for health professions schools. Moreover, accreditation can be a strong building block in effecting the relevance of a county's health workforce in meeting population health needs. Lastly, accreditation can promote social responsibility in terms of institutions addressing population needs.
Implementation considerations	Sets of accreditation process standards have been developed. International professional groups such as ICN, ICM, WFME should discuss these so that a set of global standards can be developed. Such standards should include inter alia: • accreditation must be based on standards • it must be supported by legislation • it should be done independently • the process should be transparent • the system and process should be periodically evaluated
Key uncertainties	• Effect on quantity, quality, relevance • Cost • Ability/willingness to address population health issues in accreditation process
Monitoring and evaluation	• Given the uncertainties noted above, careful monitoring and evaluation of effectiveness of this intervention will be needed, particularly on transparency and expertise requirements (human, financial, time) • Monitoring of appropriate implementation
Research priorities	• Impact on quantity, quality, relevance • Success in addressing population health issues in accreditation process • Impact on educational institutions and the graduates they prepare • Comparative studies on the process of accreditation, using criteria such as purpose, cost, transparency and social accountability

7.2.3. Continuous professional development (CPD)

PICO C5. Should continuous professional development and in-service training of health professionals implemented be implemented which reflects reforms in education to address evolving population health needs, increase the coverage of services, and actively engage education and training institutions in its design and execution versus no such training and development of health professionals?

	CRITERIA	JUDGEMENT	EVIDENCE
PROBLEM	**Is the problem serious?**	No ○ · Probably no ○ · Uncertain ○ · Probably yes ○ · Yes ● · Varies ○	Given the exponential progress seen today in technology, diagnostics tools and treatment methods, updating and maintaining the knowledge and skills of health workers throughout their professional life becomes more important than ever. Problems is serious
	Are a large number of people affected?	No ○ · Probably no ○ · Uncertain ○ · Probably yes ○ · Yes ● · Varies ○	All health workers are affected, as well as people that seek health care
BENEFITS & HARMS OF THE OPTIONS	**Are the anticipated desirable effects large?**	No ○ · Probably no ○ · Uncertain ○ · Probably yes ● · Yes ○ · Varies ○	Quantity ○ · Quality ● · Relevance ● · Unintended effects ● **Undesireable effects:** • absenteeism (time out of the clinics while sitting on CPD programmes). • Essential newborn care practices -- Sri Lanka (Senarath 2007): The intervention group received a comprehensive 4-day training programme based on WHO Training Modules on Essential Newborn Care and Breastfeeding, aiming at increasing knowledge of essential newborn care (ENC), and developing the corresponding skills among midwives, nurses and doctors in obstetric units. Teaching strategies included lecture discussions, demonstrations, hands-on training, practical assignments, and small group discussions. Sample size: 27 midwives, 19 nurses and 13 doctors in the study group, and 26 midwives, 19 nurses, and 16 doctors in the control group. Results: Practices of cleanliness, thermal protection and neonatal assessment improved significantly in the intervention group relative to the control group ($p<0.05$). • Sexually transmitted diseases (STD) – Peru: The course design used a learning theory approach, was based on participants' needs assessment, had an interactive format, used case-based learning with performance feedback, was tailored to local STD problems and included reinforcement components (e.g. mail consultation and learning materials). Sample size: 10 intervention cities, with 642 health workers participating in training, and 527 who did not participate in intervention. Results: knowledge scores among physicians improved from 64.2% to 77.9% at 4-month follow-up ($p<0.001$). Self-reported STD management practices did not change. Covered 60% of health workers of 10 Peruvian cities. • Diarrhoea and cholera case management – Guatemala (Flores et al., 2002): an in-service distance education programme in diarrhoea and cholera case management for physicians and nurses (which was simultaneously introduced in El Salvador, Guatemala, Honduras and Nicaragua in 1994). Sample size: intervention group: 66 health workers, control group: 66 health workers. The programme was conducted for three weeks and follow up was made after one month to see the health workers' performance. Results: percentage of diarrhoea cases assessed correctly and dehydration cases classified correctly increased by 25% more in the programme group than in the control group ($p<0.05$), but post-course performance was still only 55–60% in the programme group. Rehydration treatment did not improve. Counselling improved insignificantly. Completion rates were high.
	Are the anticipated undesirable effects small?	No ○ · Probably no ○ · Uncertain ● · Probably yes ○ · Yes ○ · Varies ○	
	What is the certainty of the anticipated effects?	Very low ○ · Low ○ · Moderate ● · High ○ · No evidence ○ · Varies ○	
	Are the anticipated desirable effects large relative to the undesirable effects?	No ○ · Probably no ○ · Uncertain ● · Probably yes ○ · Yes ○ · Varies ○	

	CRITERIA	JUDGEMENT	EVIDENCE
RESOURCE USE	Are the resources required small?	No ○ / Probably no ● / Uncertain ○ / Probably yes ○ / Yes ○ / Varies ○	**Main resource requirements:** Using local technology, minimal resources, and evidence-based strategies, the course was provided to nearly half of the physicians and midwives working in the private sector in 10 of the larger cities throughout Peru. Postdoctoral trainee salary for one author for 12 months, plus approximately $5,000 for course production, including platform, content and fieldwork (Canchihuamna et al., 2011). Programme cost was US$60 per enrolee (including all costs incurred to implement the programme but none of the costs to develop the curriculum or evaluate the programme), which compares favourably with the cost of other distance education programmes implemented in developing countries (Flores et al., 2002). (Discussion: What does 'small' indicate? Probably number, because of need to cover absenteesm, transportation fee, etc.)
	Is the incremental cost small relative to the benefits?	No ○ / Probably no ○ / Uncertain ● / Probably yes ○ / Yes ○ / Varies ○	One article presented a model that related the degree of treatment underuse (which can presumably be measured as one effect of CPD programmes) to the implementation costs. Two application examples of outreach programmes for the prevention of stroke and coronary disease analysed the relevance of implementation costs with respect to the cost-effectiveness ratio and total costs. The model demonstrated that implementation costs may have little impact on the cost-effectiveness ratio but may nevertheless be relevant to a third-party payer who needs to stay within the budget and ensure that care is provided to a large underserved population (Gandjour, Lauterbach 2005).
EQUITY	What would be the impact on health equity?	Reduced ○ / Probably reduced ○ / Uncertain ● / Probably increased ○ / Increased ○ / Varies ○	• If CPD is delivered according to the needs of health service and population, it may improve the quality. • Need another box for 'wishful thinking' • It is important who delivers the programme (government, professional associations and others)
ACCEPTABILITY	Is the option acceptable to most stakeholders?	No ○ / Probably no ○ / Uncertain ● / Probably yes ○ / Yes ○ / Varies ○	The option = multiple techniques CPD programmes (table 4.9 of the Policy Guidelines on Increasing Access to Health Workers in Remote and Rural Areas)
FEASIBILITY	Is the option feasible to implement?	No ○ / Probably no ○ / Uncertain ○ / Probably yes ● / Yes ○ / Varies ○	Among physicians and midwives in Peru, an Internet-based CE course was feasible, acceptable with high participation rates, and led to sustained improvement in knowledge at four months (Canchihuamna et al., 2011) Certainly CPD is taking place already, but in underserved areas, it is more important to get access to CPD and there are also more challenges It depends on the commitment of the government • - 85% (table 4.5 of the Policy Guidelines on Increasing Access to health Workers in Remote and Rural Areas)

PICO C5 RECOMMENDATION: Should continuous professional development and in-service training of health professionals be implemented which reflects reforms in education to address evolving population health needs, increase the coverage of services, and actively engage education and training institutions in its design and and execution?

Balance of consequences	Undesirable consequences *clearly outweigh* desirable consequences in most settings ○	Undesirable consequences *probably outweigh* desirable consequences in most settings ○	The balance between desirable and undesirable consequences *is uncertain* ○	Desirable consequences *probably outweigh* undesirable consequences in most settings ●	Desirable consequences *clearly outweigh* undesirable consequences in most settings ○
Recommendation	*We recommend against the option* ○	*We recommend the option only in the context of rigorous research* ○	*We recommend the option in the context of close monitoring and evaluation* ●	*We recommend the option* ○	
	● **CPD programmes, delivered through comprehensive multiple and interactive techniques, are likely to improve quality of health workers, measured as improved clinical practice, knowledge, skills and attitudes**				
Justification	• CPD is important for everyone given the rapid progress seen today in technology, diagnostics tools and treatment methods, updating and maintaining the knowledge and skills of health workers throughout their professional life • Programmes that are responsive to the needs of health service and population in all areas				
Implementation considerations	• CPD would be transformative education if they are focused especially in areas where there are resource shortages				
Key uncertainties	• Amount, relevance, impact on service quality, and costs of CPD • Impact of pharmaceutical industry				
Monitoring and evaluation	• Course evaluation survey at the end of every course is not enough • Assess durability of skills after the programme ends • It is important to monitor and to plan future sessions				
Research priorities	• There is a need for more standardized approaches in research on CPD effectiveness, particularly with regards to clearly defining the interventions, control groups and the methods and tools used to measure the effects of CPD • Explore in more depth the advantages and disadvantages of more innovative methods to deliver CPD, such as Internet-based or use of mobile phones				

Annex 8.

Example of Systematic Review

SYSTEMATIC REVIEW PROTOCOL[23]

The Effect of streamlined educational pathways, or ladder programmes, for the advancement of practicing health professionals

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Prepared by: Marilyn Lorenzo, Venice Celis, Sharlyn Celino
Document date: February 20, 2012
Version: Final

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Table of Contents

1.0 Background

Health systems everywhere need health professionals who adapt to the health demands of clients and can address the multi-faceted needs of patients. Health system strengthening goals include improving professional development and retention of health care providers who can function in multiple settings and have a wide variety of competencies.

Educational Ladder programs or other streamlined educational pathways such as clinical career ladder programs have been utilized to develop a wide array of competencies for health workers in underserved areas and to promote advancement of practicing health professionals.

23 For all systematic reviews, see http://www.who.int/hrh/education/planning/en/index.html