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Human resources for health in southeast Asia: shortages, distributional challenges, and international trade in health services

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In this paper, we address the issues of shortage and maldistribution of health personnel in southeast Asia in the context of the international trade in health services. Although there is no shortage of health workers in the region overall, when analysed separately, five low-income countries have some deficit. All countries in southeast Asia face problems of maldistribution of health workers, and rural areas are often understaffed. Despite a high capacity for medical and nursing training in both public and private facilities, there is weak coordination between production of health workers and capacity for employment. Regional experiences and policy responses to address these challenges can be used to inform future policy in the region and elsewhere. A distinctive feature of southeast Asia is its engagement in international trade in health services. Singapore and Malaysia import health workers to meet domestic demand and to provide services to international patients. Thailand attracts many foreign patients for health services. This situation has resulted in the so-called brain drain of highly specialised staff from public medical schools to the private hospitals. The Philippines and Indonesia are the main exporters of doctors and nurses in the region. Agreements about mutual recognition of professional qualifications for three groups of health workers under the Association of Southeast Asian Nations Framework Agreement on Services could result in increased movement within the region in the future. To ensure that vital human resources for health are available to meet the needs of the populations that they serve, migration management and retention strategies need to be integrated into ongoing efforts to strengthen health systems in southeast Asia. There is also a need for improved dialogue between the health and trade sectors on how to balance economic opportunities associated with trade in health services with domestic health needs and equity issues.

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Introduction

The quality, composition, and distribution of the health workforce is widely recognised as a crucial determinant of health system performance[1] and of maternal and child health outcomes.[2] The ten countries in the Association of Southeast Asian Nations (ASEAN) region (Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam) exhibit a wide diversity in socioeconomic status, political systems, health systems, and health situation.[3,4] As elsewhere in the world, most countries in the region face problems of health workforce shortages and maldistribution that hamper progress towards the health Millennium Development Goals and contribute to inequalities in health outcomes.[5] The region is perhaps unique, however, with respect to the rapid growth of trade in health services, including migration of health personnel and medical tourism. Indeed, medical tourism has emerged as a key economic strategy for several countries, notably Singapore, Malaysia, and Thailand.

We aimed to consider the shortage and maldistribution of health personnel in countries in southeast Asia in the context of the engagement of these countries in the international trade in health services. We analyse the situation and identify factors contributing to shortages and maldistribution that are experienced in many countries in the region. Trade in health services is a recent venture for

Key messages

- Like other regions, many countries in southeast Asia suffer from problems in the health workforce related to shortages, skill mix imbalances, and maldistribution of skilled staff.
- Low-income countries face common problems of health-worker density and distribution due to low production capacity, restricted capacity for employment of graduates, and low pay in the public sector. But use of health services is also low, as a result of poor-quality services, financial barriers, and cultural factors. Because of the low quality of services and training, migration of health workers is not yet a major issue, but wealthy and middle-income patients often seek care elsewhere in the region.
- Health-worker density and production varies substantially among middle-income countries, but all face difficulties in attracting health workers to remote areas, because of fiscal constraints and inadequate financial and non-financial incentives for health workers.
- A distinctive feature of southeast Asia is its high level of engagement in international trade in health services, including migration of health workers and provision of services to international patients.

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- Although international trade in health services is not the main cause of health-worker shortages or maldistribution in southeast Asia, it clearly affects health-worker production and employment patterns, particularly in middle-income and high-income countries.
- The rapid growth of export-oriented private training in the Philippines and Indonesia has mitigated the effect of migration on the total stock of health workers, but poor regulation of private training has compromised quality and contributed to overproduction of health workers with scarce employment prospects.
- Medical tourism has grown rapidly in Singapore, Thailand, and Malaysia, and has emerged as an important source of revenue. The effects of medical tourism on domestic health systems have been small so far, but are contributing to a brain drain of highly skilled specialists to private hospitals serving foreign patients.
- National policy coherence is needed to balance benefits gained from trade in health services, while maintaining the health of the population. This balance will require a combination of policies, including careful human-resource planning and strengthened oversight of private training institutions, improved quality and accreditation systems, public-partnership arrangements, and measures to improve retention and recruitment of staff in rural areas.

Search strategy and selection criteria

The paper is based on data and information obtained from various published and unpublished sources. We sought to compile comparable data for stock, distribution, and production of health workers in southeast Asia and for health-worker migration and medical tourism. We also reviewed published and unpublished articles and documents about these issues. We reviewed English literature through Pubmed, Google Scholar, Google search, and institutional websites such as WHO, the Organisation for Economic Co-operation and Development, and the Association of Southeast Asian Nations. We focused our search on issues related to human resources for health and international trade in health services, including shortage, maldistribution, retention, migration of doctors and nurses, and effect on human resources for health; search terms used were "doctor rural retention", "distribution of doctors", "trade in health services", "medical hub", "human resources for health migration", and "ASEAN mutual recognition arrangement". Grey literature included ministry of health reports, health workforce planning documents, statistical yearbooks, records from medical and nursing councils regarding the number and distributions of members, and annual production data from training institutions. Detailed description of these data sources is provided in webappendix pp 1–2, which includes the classification of different types of health professional used in the study.

some countries in southeast Asia, and the effect of these international movements on the health workforce is discussed. Webappendix p 3 shows a conceptual framework of the issues and analysis discussed in this paper.

Although all groups of health personnel—doctors, nurses, public health specialists, health administrators, and laboratory technicians—are essential in management and provision of effective health services, we concentrate on doctors, nurses, and midwives because comparable data are most readily available for these groups.

Data and methods

We sought to compile comparable data for stock, distribution, and production of health workers in southeast Asia and for health-worker migration and medical tourism (see panel for search strategy). For Cambodia, Indonesia, Laos, Thailand, and Vietnam, data for the number of doctors, nurses, and midwives were compiled from official statistics to obtain more complete information. These data included both the public and private sectors, apart from Cambodia and Vietnam. For the other five countries, data were compiled from WHO Statistical Information Systems.

Where subnational data were available, we produced Lorenz curves and Gini indexes to depict geographical inequality of doctor and nurse density. The Gini coefficient and Lorenz curve are among the most well known measures of inequality and have been applied to previous studies of health workforce inequality.[6] Our inequality analysis was based on the density at the first administrative division below national level, which is equivalent to province level in all countries apart from the Philippines (regional level). The analysis included only public-sector health workers for all countries apart from Thailand, for which private-sector data were included. For trend analysis in the Philippines and Vietnam, where new regions or provinces were established, data from newly created states and provinces were aggregated with their original counterparts to maintain the same number of administrative level units across time and to ensure that results could be compared between periods.

Data from Ministry of Health documents and published sources were used in our analysis of health-worker production. Dependent on the reporting system in each country, production capacity refers to either the total number of graduates or those passing requisite examinations. Data reflect both public and private sectors for all countries apart from Brunei, Cambodia, and Myanmar, for which data for production capacity from private medical and nursing schools were not available. Data for migration of health workers and medical tourism were obtained through the Organisation for Economic Co-operation and Development (OECD), trade publications, and other published sources.

We encountered several difficulties with respect to data. First, data for private-sector employment, remuneration, and training of health workers were not available or were incomplete for most countries. In particular, the coverage of WHO Statistical Information Systems health workforce data varies across countries, especially with respect to the private sector, but detailed information about data sources and issues is not available. Second, data for health-worker migration and medical tourism were available for most countries with middle and high incomes, but were incomplete. Third, definitions and levels of training for

	Population (millions)	Number		Density per 1000 population			Gap in health workers*†	Ratio of nurses and midwives per doctor†
		Doctor	Nurse and midwife	Doctor	Nurse and midwife	Combined		
Brunei	0·4	400	2120	1·1	6·1	7·2	..	5·3
Singapore	4·4	6380	18 710	1·5	4·4	5·9	..	2·9
Malaysia	26·6	17 020	43 380	0·7	1·8	2·5	..	2·5
Thailand	63·9	31 855	140 404	0·5	2·2	2·7	..	4·6
Philippines	88·0	90 370	480 910	1·2	6·1	7·3	..	5·3
Indonesia	231·6	56 938	387 458	0·2	1·7	1·9	83 652	6·8
Vietnam	87·4	43 292	77 233	0·5	0·8	1·4	78 747	1·8
Laos	5·9	1863	5363	0·3	0·9	1·2	6226	2·9
Cambodia	14·4	2047	11 125	0·2	0·9	1·1	19 660	5·4
Myanmar	48·8	17 791	49 341	0·4	1·0	1·4	44 132	2·8
ASEAN	571·4	266 301	1 248 117	0·5	2·2	2·7	..	4·7
Global	6659·0	8 404 351	17 651 585	1·3	2·8	4·1	..	2·1

Population data and health professional statistics for 2000–07 are from reference 7; data for health professionals from Thailand,[8,9] Indonesia,[10] Vietnam,[11] and Laos[12] are from country sources. ASEAN=Association of Southeast Asian Nations. *Number of additional health workers needed to achieve the WHO threshold of 2·28 doctors, nurses, and midwives per 1000 population; the total number of additional health workers needed in these five critical shortage countries is 232 417 (for the ASEAN region overall, there is no shortage). †Authors' calculation.

Table 1: **Basic health professional statistics for countries in southeast Asia**

	Year	Number of institutions or schools			Annual production capacity			Production per 100 000 population*		
		Doctors	Nurses	Midwives	Doctors	Nurses	Midwives	Doctors	Nurses	Midwives
Brunei	2010	1	1	1	17†	146	11	4	38	3
Singapore	2010	2	3	NA	350	1347	NA	8	32	NA
Malaysia	2008	21	99‡	NA	2000	8153‡	NA	8	34‡	NA
Thailand	2009	12	69	NA	1305	7555	NA	2	12	NA
Philippines	2007	39	517	268	2930	60 199	3498	4	78	5
Indonesia	2008	52	682	465	5500	34 000	10 000	2	15	4
Vietnam	2008	14	14	ND	3520	860§	..	4	1§	..
Laos	2007	1	6	0	70¶	576¶	0	1	11	0
Cambodia	2008	2	6§	6§	290¶	410¶	398¶	3¶	4¶	4¶
Myanmar	2005	4	23	20	650¶	1200¶	1100¶	1	4	2

See webappendix pp 1–2 for data sources. NA=not applicable, since these countries no longer produced midwives. ND=no data. *Authors' calculation. †Only graduated from Bachelor of Health Science (Medicine) 3-year programme in Brunei; did not include students who graduated from partner universities to complete the Doctor of Medicine programme. ‡Data are for 2009. §Data are for nurses and midwives combined. ¶Public only.

Table 2: **Production capacity of doctors, nurses, and midwives in southeast Asian countries**

nurses and doctors vary between countries. Fourth, few studies exist to compare the quality of medical training or clinical competence of health workers between countries. Finally, studies assessing the effectiveness of policy interventions in the region were very scarce. With this limitation of data, we focus on analysis of data from the public sector and of data that were available.

Outstanding challenges: shortages and maldistribution

The stock of human resources for health

The availability of a qualified health workforce is a crucial determinant of a health system's capacity to deliver services to the population. Webappendix p 4 shows the relation between health workforce densities (measured by the number of doctors, nurses, and midwives per 1000 population) and gross national income per head in the ten countries in the ASEAN region. The aggregate level of human resources in southeast Asia suggests no critical shortage, with a regional average of 2·7 doctors, nurses, and midwives (combined) per 1000 population (table 1).[7–12] At a national level, however, five countries (Cambodia, Indonesia, Laos, Myanmar, and Vietnam) fall below the critical shortage threshold of 2·28 doctors, nurses, and midwives per 1000 population, as defined by WHO.[1,13] To meet the WHO threshold in these five countries, an estimated 884 868 health professionals would be needed, representing a shortfall of around 232 417 relative to the current workforce.

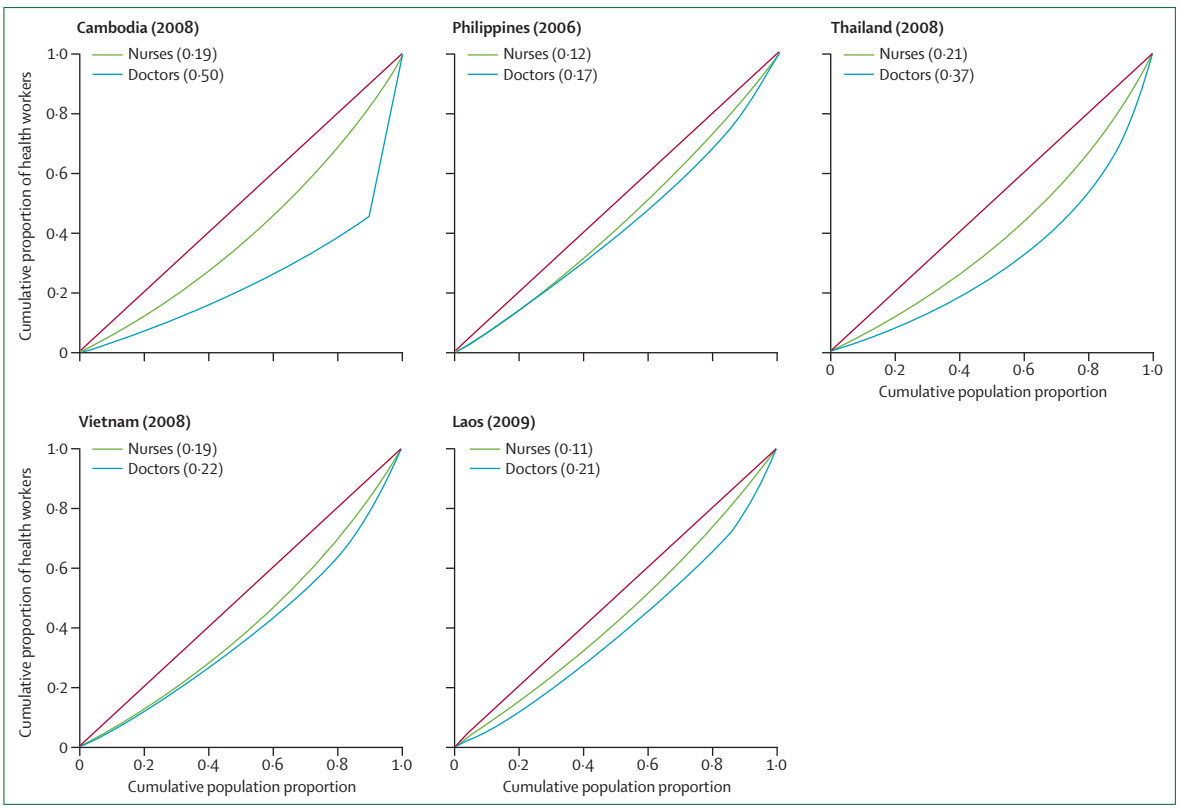

Figure 1: **Subnational distributions of doctors and nurses in selected southeast Asian countries**
Greater deviation of the Lorenz curve from the red diagonal line (line of equality) shows higher inequality (which is reflected in a higher Gini coefficient, with zero indicating perfect equality). Green lines show the distribution of nurses and blue lines show distribution of doctors. Gini coefficients are shown in parentheses in the key of each figure.

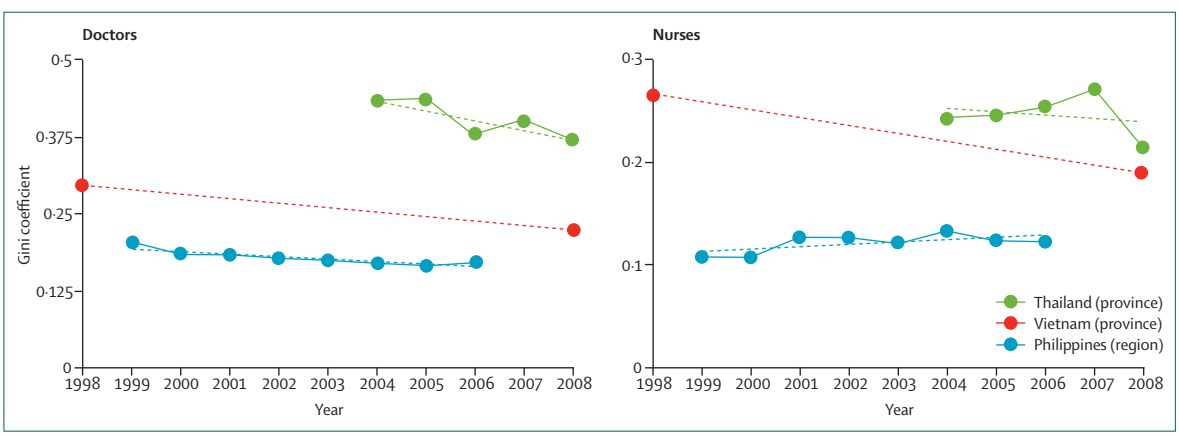

Figure 2: **Trends in Gini coefficients of doctor and nurse densities in the Philippines, Thailand, and Vietnam**
Data are for the province level apart from for the Philippines, for which data are at a regional level. Only public sector staff are included, apart from for Thailand, for which public and private staff data are included. Results are not fully comparable across countries because the administrative level units and data composition are different.

Although there is no international standard for nurse-to-doctor ratio, a low ratio could suggest inefficiencies in the health system, since there might be scope to shift some tasks from higher paid doctors to nurses without a detrimental effect on quality. Moreover, training of doctors is more expensive and takes longer than does training of nurses, and positioning of doctors in rural areas is more difficult and expensive. So in a resource-poor country, production of more doctors can be difficult, and a high reliance on doctors might exacerbate urban–rural imbalances in the distribution of human resources for health. The ratio of nurses and midwives to doctors in

southeast Asia is higher than the global average, but there is substantial variation between countries. Indonesia has the highest ratio at 6·8 nurses and midwives per doctor, whereas Vietnam has only 1·8 nurses per doctor. These differing ratios might reflect policy choices—for example, some countries (eg, Thailand and Cambodia) explicitly focus on nurse-based primary care. However, differences across countries can also be a consequence of local labour market dynamics and trade in health services.

Aggregate ratios can conceal shortages in specific groups of professionals—for example, shortages of midwives in Cambodia and Laos. Singapore has a high density of doctors, but also reports problems with shortages in the public sector, mainly due to the low pay and long working hours compared with the private sector.[14]

Although a shortage of health workers can constrain access to services and coverage of health interventions, the adequacy of the workforce cannot be assessed in isolation of other factors affecting the demand for and use of available services. For instance, even though Laos falls below WHO's shortage threshold, the workforce is in many cases underemployed, with less than one patient per staff member per day in many district hospitals and health centres.[15] This situation reflects very low use of public facilities, which in turn is a consequence of financial barriers, quality concerns, physical accessibility, and cultural factors.[16–18] In this context, measures to increase the number of health workers are unlikely to lead to substantial improvements in health outcomes without complementary interventions.

Production and employment

Low production and employment capacities are closely related to shortages of health workers in resource-poor countries such as in Africa, as well as in Laos, Cambodia, and Myanmar.[19] Production of doctors per 100 000 population ranged from a high of eight in Singapore and Malaysia, four in the Philippines and Vietnam, two in Indonesia and Thailand, to less than one in Laos and Myanmar. Annual nurse production per 100 000 (not including midwives) ranged from 78 in the Philippines, 11–15 in Laos, Thailand, and Indonesia, to about four in Myanmar and Cambodia (table 2). The Khmer Rouge period in Cambodia (1975–79) and the Indochina war before the establishment of Laos in 1975 resulted in substantial loss of health personnel and disrupted training. Moreover, medical training in Laos completely stopped between 1976 and 1981, during the period of national reconstruction. Despite efforts to increase production in recent years, the medical school produced only 70 doctors in 2007.[20] In Cambodia, 290 doctors and 400 midwives graduated from the public medical school and training centres in 2008,[21–24] but because training of secondary midwives (a 3-year training course for secondary school graduates) was stopped for 6 years between 1996 and 2002 (because of delays in revising curricula), critical shortages remain for this group of professionals.

	Density of doctors, nurses, and midwives per 1000 population	Cross-border trade (mode 1)		Consumption abroad (mode 2)		Commercial presence (mode 3)		Temporary movement of natural persons (mode 4)	
		Import	Export	Import	Export	Import	Export	Import	Export
Brunei	7·2	0	0	+	0	0	0	+++	0
Singapore	5·9	+	0	+	+++	+	++++	++++	+
Malaysia	2·5	0	0	+	++	+	+	++	+
Thailand	2·7	0	0	+	++++	++	++	0	+
Philippines	7·3	0	++	+	+	+	0	0	++++
Indonesia	1·9	0	0	+	+	+	0	0	++
Vietnam	1·4	0	0	+	+	++	0	0	0
Laos	1·2	0	0	+	0	0	0	0	0
Cambodia	1·1	0	0	+	0	+	0	0	0
Myanmar	1·4	0	0	+	0	0	0	0	0

The greater the number of + in each cell, the greater the engagement of that country. Table adapted from references 25 and 32.

Table 3: **Level of engagement in trade in health services in southeast Asian countries**

Production capacity, however, does not always relate to availability of health professionals. The Philippines, for example, produced nearly 3000 doctors and more than 60 000 licensed nurses in 2007, whereas Indonesia (with a population that is three times higher) produced 5500 doctors and 34 000 nurses. Indonesia has shortages at a national level, and both countries have shortages at subnational levels, due to restricted capacity for employment (health-service provision is highly decentralised in both countries), migration toward urban centres, and outmigration of health workers. This situation is comparable to a diabetic status of human resources for health, in which health systems cannot use the available human resources. Despite fairly low production relative to population, only half of the nurses who graduate in Indonesia can be employed, of whom half go to the public sector and half to the private sector.[25] There is little information about what those who are unemployed are doing, whether working abroad or leaving the profession. In 2009, an estimated 400 000 licensed nurses in the Philippines were not employed in the nursing profession.[26]

Most governments in southeast Asia restrict production from public training schools on the basis of projected recruitment into the public service. However, policy coordination between public producers and users is often difficult because training schools are in many cases centrally or regional managed, whereas recruitment is largely decentralised (as in the Philippines and Indonesia). Moreover, coordination with the private sector on employment needs is often poor. Indonesia and particularly the Philippines have developed market-driven, export-led production of nurses and doctors that seeks to respond to international demand. In the Philippines, state universities dominated nursing education and production in the 1950s, but the global nursing shortage in the 1990s led private

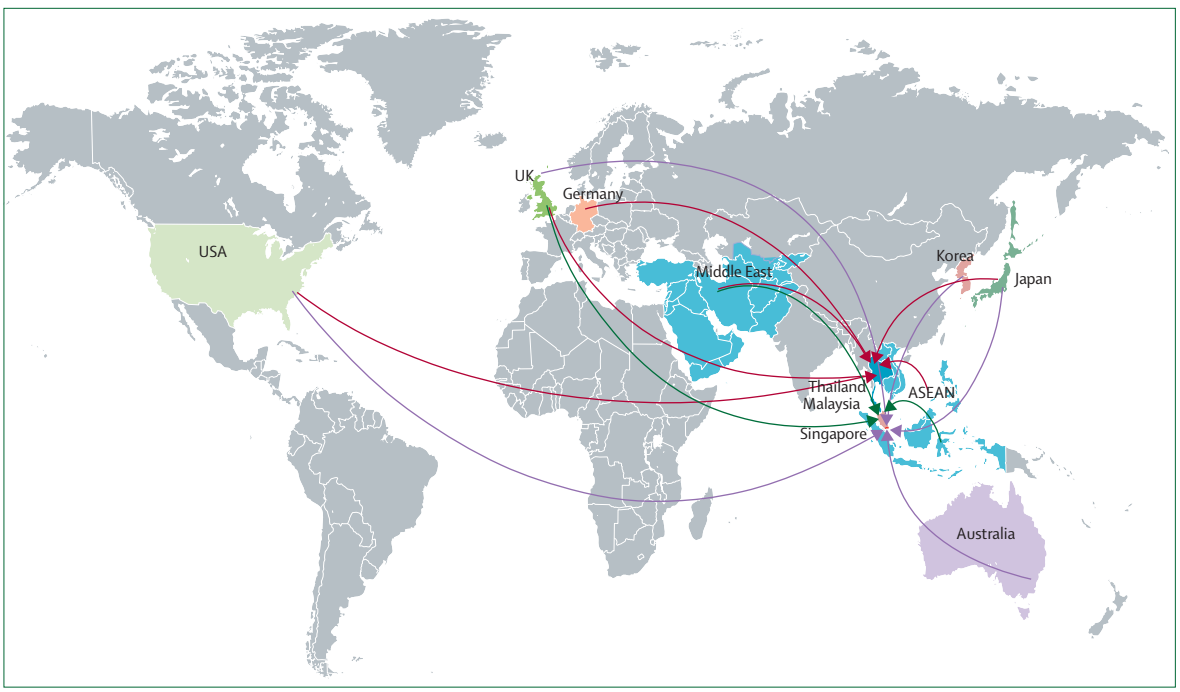

Figure 3: **Intraregional and international flows of patients (mode 2)**
ASEAN=Association of Southeast Asian Nations.

colleges to rapidly expand nursing programmes. Currently, more than 80% of nursing schools in the Philippines are private for-profit and export-driven businesses that can flexibly adjust production capacity to match global demands.[27] Between 2005 and 2007—years of high international demand for nurses—public and private nursing colleges produced an average of 55 000 nurses per year, which was more than seven times the production during 2000–04.[26] Even though private schools do not receive direct commissions from receiving countries or institutions, profits tend to be related to volume. There is therefore an incentive to maximise enrolment, irrespective of employment prospects for graduates.

Increased enrolment of medical and nursing students in the Philippines outpaced increases in faculty members and sites for clinical and community training, which compromised the quality of teaching, supervision, and student competency. In 2007, for example, less than half of nursing graduates passed licensing examinations.

In low-income countries, the private sector plays a smaller part in training of medical professionals, but public-sector oversight is also poor. Cambodia has just one private medical school, and only recently allowed recruitment of a small number of privately trained doctors into the public service. The number of private nursing schools is growing, however.

Inequality in distribution of the health workforce

National averages of health workforce density disguise underlying disparities in the distribution of health workers. Using methods and summary measures from the income distribution literature, in particular the Lorenz curve and the corresponding Gini coefficient, we show in figure 1 the subnational distribution of doctors and nurses in five countries for which data were available. In all five countries, nurses are more equally distributed across subnational regions than are doctors. Cambodia has the greatest subnational inequalities in the distribution of doctors.

Figure 2 shows that inequality in the distribution of doctors has been falling over time in the three countries for which data were available for several years. The distribution of nurses has also become more equal in Thailand and Vietnam, whereas the opposite is true for the Philippines. However, these changes across time were not statistically significant.

Many factors contribute to the uneven distribution of the health workforce, including the distribution of health facility infrastructure, poor working and living conditions in rural areas, and the concentration of income-earning opportunities (eg, through secondary employment) in urban and more prosperous areas. Hence, doctors and nurses in Indonesia are reluctant to relocate to work in remote areas or isolated islands,[28] in some cases because of an unwillingness to become local district government employees.[29] In Thailand and Indonesia, 60–70% of public physicians work in private practices outside office hours to earn additional income.[10,30] In the Philippines, public doctors are allowed to treat private patients in addition to their public patients in an effort to retain them in public service. The effects of such practices on health systems and health provision have not yet been systematically

assessed, but they are likely to contribute to a preference for employment in urban areas.

Trade in health services

An overview of trade in health services in southeast Asia

Trade in health services is substantial in many southeast Asian countries, and includes international movement of both patients and health workers.[31] Singapore, Malaysia, and Thailand are important medical hubs, attracting patients from within and outside the region, whereas Indonesia and the Philippines export many doctors and nurses. In low-income countries such as Cambodia and Laos, movement of health workers is limited by language barriers and qualifications that are not recognised outside the respective countries; however, similarly to many of the middle-income countries in the region, there is a substantial flow of patients to facilities abroad. Although this flow consists mainly of better-off individuals who travel abroad for services that are either unavailable locally or are perceived to be of better quality, many patients from low-income segments of the population cross the borders from Laos, Cambodia, and Myanmar to access services in Thailand and Vietnam, or to use services as registered or unregistered migrants.

Table 3 shows countries' engagement in different modes of trade in health services.[25,32] These modes are: (1) cross-border trade (telemedicine and medical transcription); (2) consumption abroad (movement of foreign patients); (3) commercial presence (foreign direct investment); and (4) temporary movement of natural persons (migration of human resources for health). In this report we focus on the two modes of trade in health services in which countries in the region are actively engaged—movement of patients (mode 2) and movement of health workers (mode 4). Engagement of the southeast Asian region in mode 1 (cross-border supply) and mode 3 (foreign direct investment) remains limited. One example of mode 1 trade is the export of medical transcription services from the Philippines to the USA. In terms of foreign direct investment in the region, only 1% of total hospital beds in Indonesia are foreign owned, and 3% of total investment in private hospitals in Thailand is by foreign agencies.[32]

Medical tourism

Medical tourism or health tourism refers to patients travelling to other countries to seek health care. They sometimes combine medical care with other leisure activities—hence, medical tourism. Singapore, Thailand, and Malaysia have emerged as major destinations of international patient flows (figure 3), with an estimated 2 million foreign patients in 2005–06. 1·3 million foreign patients came to Thailand for treatment in 2005, and 300 000 and 400 000 patients entered Malaysia and Singapore, respectively, in 2006.[33–35] Foreign patients accounted for less than 1% of total patients in Thailand, however, compared with 4·3–4·5% in Singapore and Malaysia.[32] Moreover, around 60% of foreign patients in Thailand are working in Thailand or neighbouring countries, 10% are tourists who become unwell and need health care, whereas only 30% are foreign patients who come specifically to receive health care.[36] Thus, the effect of medical tourism on the Thai health system remains small (panel 1).[36–38] However, the percentage of foreign patients attending private hospitals is increasing. For example, 60% of patients at Bumrungrad Hospital are foreigners, and in Piyavet Hospital—a medium-sized private hospital in Thailand—foreign patients as a percentage of total patients increased from less than 1% in 2003 to 14% in 2007. The increase in foreign patients in the private sector is contributing to an internal brain drain of highly specialised staff from the public sector to the private sector, and will have an effect on the teaching hospitals where these specialists are working (panel 1).

Enabling factors for foreign patients seeking health care in southeast Asia are high-quality medical services

Panel 1: **The effect of medical tourism in Thailand**

The volume of international patients travelling to Thailand increased from half a million in 2001 to 1·3 million in 2007—a 16% annual increase[36]—and generated US$1·3 billion in 2007, with a forecast of $4·3 billion in 2012. Foreign investors, including Dubai Istithmar and Singapore Temasek Holding, have purchased major shares in private hospitals in Thailand.

If the annual increase of 16% in international patients is maintained between 2005 and 2015, additional doctors will be needed to meet this demand. Estimates range from 176 to 909 additional doctors for 2014–15.[36,37] Even the high estimates are 10% of the total full-time equivalent of current Thai doctors, so in principle the increased demand can be managed through overtime with additional financial incentives. Thus, the effect on the overall shortage of doctors is not significant.

To provide services for international patients, however, highly specialised staff such as cardiologists, neurologists and neurosurgeons, intervention radiologists, and oncologists are needed. This need increases pressure on medical schools in particular because of a shortage of teaching staff, with for example more than 300 specialists resigning to join private hospitals during 2005–06.

In the absence of effective measures to manage the outflow of senior specialists from medical schools, the quality of medical training will suffer. Even if specialists remain in medical schools and teaching hospitals, secondary employment in the private sector could compromise preparation and teaching time and reduce time for bedside teaching and demonstration.[38] The phenomenon could increase waiting times for surgery in the public sector. Although the main beneficiaries from the growth of medical tourism are the private hospitals and their employees, the public sector will gain tax revenues. In principle, the expansion of the high-end private sector could also have positive spillover effects—eg, through the development of medical expertise and improvements in quality control through hospital accreditation and other processes. The challenge for Thailand and other countries that engage in medical tourism is to put in place policies and approaches to maximise benefits and manage health system risks. Even if this challenge is met, whether the potential benefits will actually materialise, and whether they are sufficient to make up for adverse effects on the health system, remains to be seen.

	Number by country of birth (2000)		Number by country of training (2004)
	Nurse	Doctor	Doctor
Brunei	129	94	42
Singapore	1913	1356	678
Malaysia	7569	4679	2552
Thailand	3050	1390	633
Philippines	110774	15859	10181
Indonesia	3449	2773	480
Vietnam	5778	7591	2578
Laos	867	331	36
Cambodia	1119	669	76
Myanmar	418	1725	782

Data are from references 43 and 44. OECD=Organisation for Economic Co-operation and Development.

Table 4: **Number of doctors and nurses from southeast Asia working in OECD countries, by country of birth and country of training**

(accredited by national accreditation systems and increasingly by Joint Commission International [JCI]),[39] long queues and supply shortage in home countries, low costs, and a strong focus on hospitality.[31] International hospital accreditation and medical tourism are mutually reinforcing—currently, 38 hospitals in the ASEAN region are JCI accredited (16 in Singapore, 11 in Thailand, six in Malaysia, three in the Philippines, and one each in Indonesia and Vietnam), with more than 70% accredited since 2007.[39] Patients who seek health care in Asia can save up to 90% compared with the cost in some OECD countries.[40] A coronary bypass operation in the USA costs up to US$130000, compared with less than $11000 in Thailand and around $16500 in Singapore.[41] The affordable cost of travel to the region creates a stronger market for complex surgeries or elective procedures that are not covered by insurance, which in turn increases demand for health workers in these specialties.[35]

In 2005–06, revenue from foreign patients was estimated at US$1 billion in Thailand. Singapore has set a target of 1 million foreign patients in 2012. If the target is reached, it would generate US$2·3 billion, while creating 13000 new jobs.[42] Several countries have established websites to promote medical tourism, and pricing suggests growing competition within the region. The Philippines is vying to become the new hub of wellness and medical care in southeast Asia, offering competitive prices as well as skilled and US-trained physicians.

Export of doctors and nurses

Many health workers from the Philippines and Indonesia migrate to countries within southeast Asia and to the rest of the world. Malaysia also experiences outmigration of health workers to Singapore, the Middle East, and OECD countries. However, Malaysia and Singapore are also popular destinations for health workers in southeast Asia.

About 110774 Filipino nurses were estimated to work in OECD countries in 2000 (table 4).[43,44] In total, an estimated 163756 Filipino nurses were working abroad in 2000.[45] The number of Filipino nurses who migrate annually (to all destinations) increased from 7683 in 2000, to 13014 in 2009,[46] with Saudi Arabia, the USA, the UK, and the United Arab Emirates being the top destinations (figure 4). Migration is in large part driven by the substantial wage premium associated with overseas employment—a nurse in Manila earns US$58–115 per month, compared with $5000 a month in the UK or USA.[47]

There are two types of health-worker migration. Temporary migration refers to health workers who have time-restricted or contract work visas as are often seen in Middle Eastern and ASEAN countries. Conversely, permanent migration refers to those whose stay in destination countries does not depend on work contracts. In the early 1990s, permanent migration of Filipino nurses was driven by relaxation of resident visa requirements, particularly in the USA and the UK. Temporary and permanent migration have differing implications for the health system, since temporary migrants are more likely to return to work in their home country and to send remittances to family than are permanent migrants.

One of the potential benefits of migration of health workers are the remittances sent home by migrants to their families. Such income can improve the economic status of migrant families while also having a positive effect on the local economy.[48] But migration also has potential downsides. For instance, the recent upsurge in the demand for nurses abroad and opportunities for permanent emigration to the USA resulted in Filipino doctors retraining as nurses in order to seek overseas employment as nurses.[48] Roughly 2000 and 3000 doctors in 2001 and 2003 were retrained as so-called nurse medics.[48] These nurse medics sought to take advantage of opportunities open to nurse migrants.

The experience in the Philippines illustrates the complex interactions between global demand and domestic supply and demand. By 2009, the global recession had led to a drop in international demand for migration of nursing staff (including sharp reductions in work visas for entry into the USA), even as nursing schools continued to produce new graduates. Nurses are typically required to have a licence as well as 2–3 years' experience in a referral hospital before they can apply for overseas employment visas, and this requirement has emerged as a major bottleneck. In 2008, the Philippines Overseas Employment Administration reportedly had 20000 unfilled job orders for nurses to the Middle East, Singapore, and Europe.[49] Thus, whereas some hospitals in the Philippines have reportedly had to close wards because of loss of experienced staff and sometimes entire teams, other hospitals have a backlog of junior nurses seeking

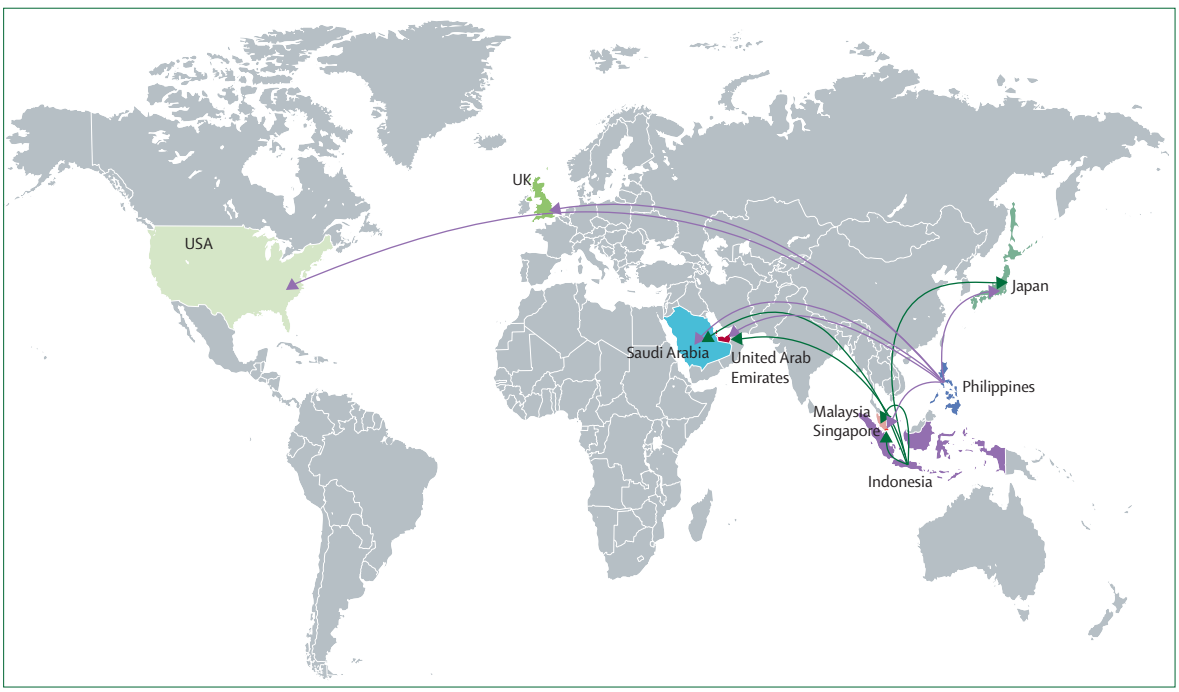

Figure 4: **International flows of doctors and nurses (mode 4)**

internships. A survey of 200 public and private hospitals found that administrators had little difficulty recruiting nurses with less than a year's experience, but had more difficulty recruiting experienced nurses, particularly in private hospitals, which offered lower wages on average than did public hospitals.[50] The Philippines is thus hampered by its low capability to employ the new nurses it has produced, and is now in surplus.

Indonesia also exports many nurses. Muslim countries such as Saudi Arabia, the United Arab Emirates, Malaysia, and Singapore are the main destinations. Few data are available, however, either for migration or employment in the domestic private sector. With lower health-worker production capacity per population than that of the Philippines, outmigration of experienced and highly skilled nursing and midwife staff creates great challenges for the system, and exacerbates the problems of shortage and quality of care in the Indonesian health system.[32]

Singapore is the major importer of doctors in southeast Asia. In 2009, a recruiting target was set of up to 1000 foreign trained doctors. The Ministry of Health has a webpage to advertise the benefits of migration to Singapore. Recent statistics show that two-thirds of doctors in the country and a third of doctors in the public sector are foreign-educated (including those Singaporean doctors who trained abroad).[14] Singapore also imports nurses from other countries—an estimated 30% of all nurses working in the country are foreigners.

Recent years have seen a tendency for recruitment patterns to shift from individual applications or institution recruitment to bilateral and multilateral formal agreements between origin and destination governments. For instance, the Philippines and Indonesia have entered into bilateral agreements with several countries. The UK–Philippines agreement, signed in 2002, resulted in the recruitment of 225 experienced Filipino nurses from 2002 to 2006. The agreement came to a close in 2006, when the UK declared that nurse shortage was no longer a concern.[51] Japan and Canada also entered into agreements with the Philippines and Indonesia to provide skilled nurses.

At the regional level, the ASEAN Framework Agreement on Services, signed in 1995, progressively liberalises trade in services, with health being one of the 11 priority sectors. In 2001, members began negotiating mutual recognition arrangements to facilitate flow of professionals, as agreed by the Framework Agreement, with the expectation of achieving free flow of health workers by 2010. The agreements call for mutual recognition of qualifications and professional licences across ASEAN countries. A mutual recognition arrangement on nursing services was signed in 2006, followed by an agreement for medical practitioners in 2008. The diversity of the ASEAN region, including differences in the quality of education and training, licensing requirements, language, and cultural dimensions of daily medical practices between countries, makes implementation of these agreements challenging.[15] These barriers, as well as additional requirements of 3 years of work experience for nurses and 5 years for doctors, have posed difficulties for the free flow of health professionals in southeast Asia.

Panel 2: **Experiences of coping with shortage, maldistribution, and retention of health workers in southeast Asia**

In reponse to a shortage of midwives in Cambodia, the government established in 2003 a 1-year primary midwife programme, recruiting local students with grade 7 education. The programme was scaled up nationwide in 2005, including recruitment of grade 10 students to improve quality. The government's goal of one primary midwife in each health centre was achieved in 2009. In Laos, a low-grade auxiliary nurse training programme was implemented between 1960 and 2002, after which a 3-year nursing and midwifery programme was adopted to ensure standards. These programmes have increased access to midwives in rural areas, but recent midwifery assessments concluded that most of these midwives lacked basic lifesaving skills.[20] Both Cambodia and Laos have introduced Health Equity Funds to increase access for poor patients and to generate additional revenue for health workers. Cambodia also piloted performance-based contracting through non-governmental organisations, which improved availability of health workers and reduced absenteeism.

Myanmar linked licensing of medical doctors with rural area practice. Nurses are obliged to work for the public sector for 3 years, otherwise their licences to practise will be withdrawn.[55] Compulsory rural practice has a short-term effect, however, so other measures were introduced in parallel, including financial and non-financial incentives such as social recognition and career advancement.[56]

Vietnam requires 4 additional years of training for existing assistant doctors in health centres at commune level to qualify as a medical doctor. Additionally, Vietnam increased student recruitment from local areas and for ethnic minorities in disadvantaged isolated communities (without entrance examination requirements), improved collaboration between local hospitals and medical schools to accelerate in-service training, expanded the 4-year community doctor training programme for grassroots-level staff, and rotated high-level staff to work in low-level facilities.

Thailand responded with integrated approaches for rural retention, including recruitment of local students, local training, and home-town placement of nurses and doctors. Mandatory government bonding was initiated in the 1970s, and both financial and non-financial incentives or motivation were subsequently provided for doctors in rural practice.[57] This measure reduced the gap in density of doctors between the poorest northeast region and Bangkok from 21 times in 1979 to 9·4 times in 2000. Despite these efforts, retention of doctors in rural areas beyond the bonding period is difficult—impeding factors include preferences among physicians for urban practice and specialisation training.[58]

Discussion

Southeast Asian countries face diverse health workforce challenges. Although there is not an aggregate shortage of health workers at the regional level, five countries in the ASEAN region (Indonesia, Vietnam, Laos, Cambodia, and Myanmar) fall below the WHO threshold of 2·28 doctors, nurses, and midwives per 1000 population. Thailand and Malaysia have low densities of health workers in view of their level of economic development, whereas the Philippines, Singapore, and Brunei have high densities.

Irrespective of how health-worker density relates to international norms, most countries in the region face pressures to increase the availability of qualified and motivated health workers in order to meet the needs of the population. Increased production of health workers clearly has an important part to play in addressing this challenge. However, in many southeast Asian countries, fiscal capacity restricts the scope for expansion of public-sector employment, and many graduating doctors and nurses are not able to find jobs in the health sector. This problem points to the need to strengthen the link between production and use or deployment of trained workers through health workforce planning and effective engagement (and regulation) of medical education providers.

One approach to improving the availability of staff with limited resources is to shift some clinical functions and other responsibilities to lower level staff. This process—often referred to as taskshifting or substitution—has been found to be a cost-effective solution to increase access to services in various settings, although the evidence from middle-income countries is scarce.[52–54] Taskshifting can also entail increased reliance on community-level workers, such as the community midwives that are widely deployed in Myanmar, which might be particularly helpful in contexts with underuse of facility-based services.

However, a high health workforce density does not necessarily translate into improved availability of services, in particular for poor and rural populations. As elsewhere in the world, many countries in southeast Asia face persistent challenges in deployment (and retention) of doctors, nurses, and midwives to rural and remote areas, resulting in a high degree of inequality in the distribution of the health workforce (particularly doctors) across provinces and regions. Many countries are also having difficulty retaining staff in the public sector, with potentially adverse implications for the availability of services for the poor and near-poor populations, who tend to be less likely to use private formal providers. Some countries in the region have had success in addressing these challenges (panel 2), but imbalances remain substantial. Although there are significant gaps in the evidence base with respect to how best to address these imbalances, there is growing consensus on the mix of approaches that countries should consider to improve deployment and retention.[59,60] Experiences in specific countries show that comprehensive strategies are more effective than a single approach (panel 2). However, countries need to be able to respond to changing situations to ensure sustainable outcomes.

Of course, low health workforce density is by no means the only constraint to meeting population health needs. In many of the low-income countries in southeast Asia with low health-worker density (critical shortage), use of health services is often also low. Scarcity of human resources is one factor in this situation, but poor-quality services, financial barriers, and other factors might be more important. Hence, efforts to expand the health workforce in these contexts need to go hand-in-hand with complementary measures to reduce financial and other barriers to service use.

We have also drawn attention to the growing trade in health services, and the significance that this trade has for

health systems and policies for human resources for health in the ASEAN region. High-income and middle-income countries are participating more actively in this trade than are those with low incomes, with flows of both patients and health workers. Indonesia and the Philippines both export many doctors and nurses, although from very different starting points in terms of the organisation of medical education and training. Thailand and Malaysia are actively involved in provision of health services to foreign patients, but have little involvement in the export of health personnel. Singapore and Brunei are the main importers of foreign health workers, and Singapore is also engaged in medical tourism. Conversely, low-income countries in the region (Cambodia, Laos, Myanmar, and Vietnam) are not engaged extensively in the trade in health services, except with respect to wealthier patients seeking care in middle-income and high-income countries.

Trade in health services is likely to continue to grow. Many countries are actively promoting medical tourism. For instance, the Thai Government is promoting Thailand as a major medical hub in Asia as part of an effort to expand and diversify exports. Moreover, the ongoing process of regional (ASEAN) integration, which has already led to mutual recognition arrangements for three groups of health professionals (doctors, nurses, and dental practitioners) and other measures to facilitate the movement of labour, is likely to result in increased movements of human resources for health within the region. However, in practice, language skills and technical competence will remain key criteria for potential employers, so the freedom to move will not necessarily translate into employment opportunities for health workers, in particular those from low-income countries.

Medical tourism and remittances from overseas workers can generate substantial economic benefits, and potentially generate broader benefits for patients and health workers through investments in facilities and health-worker training, increased competition, and strengthened accreditation and quality standards. But these benefits are by no means automatic, and trade in health services also has many potential downsides. Although the evidence suggests that trade in health services is not the main driving force behind health-worker shortages or maldistribution in the ASEAN region, this trade clearly affects health-worker production and employment patterns, particularly in middle-income and high-income countries. Migration can deplete the domestic stock of health workers, particularly specialist doctors and experienced nurses, with effects on the quality and availability of services. Similarly, medical tourism can exacerbate inequalities in access to health care because of a brain drain of highly skilled health professionals from public to private hospitals and from rural to urban areas.[37] Medical tourism can also lead to a rapid expansion of high-end, technology-intensive health care, which might not be sustainable over time and can distort practices and priorities in the broader health system.

Although the growing trade in health services is clearly an important policy challenge for countries in the region, how countries should respond to this challenge is less clear. What can countries do to maximise benefits from the trade in health services? Can the risks be mitigated or managed? How should benefits, risks, and the interests of sending and receiving countries be balanced? So far, the evidence base to answer these questions is weak, in part because the way in which trade in health services affects health systems is highly context-specific. With respect to movement of health workers, banning of migration is widely recognised as neither possible nor ethical.[61] One route to addressing this challenge has therefore been to establish codes of practice for the international recruitment of health personnel. One such code of practice was adopted by the 2010 World Health Assembly, which aims to lay down principles for ethical recruitment of health personnel to maximise benefits and mitigate negative effects on countries while maintaining the rights of migrant health personnel.[62] However, the code is voluntary in nature, and in view of the complexity of migration as an international occurrence, its implementation will inevitably be challenging.

Another route to address the challenge of migration is through bilateral agreements covering agreed numbers of migrants, but potentially also allowing for technical assistance and capacity building—measures that should allow the return of migrants to their home countries to train and to teach, provide compensation where necessary, and forge partnerships between hospitals from sending and receiving countries.[63] Experiences from other regions suggest positive results. For example, the UK and South Africa signed a memorandum of understanding in 2003 that established time-limited placements between countries and a framework for ethical recruitment of health personnel. This memorandum has resulted in a decrease in the number of South African nurses and midwives working in the UK, and the twinning policy has improved quality of health personnel in South Africa.[63]

So far, there has been less experience with similar measures implemented to balance the benefits and risks associated with medical tourism—for example, through local agreements, agreements between the public sector and providers or associations engaged in the provision of services for international patients, or codes of good practice. Such measures could have potential, in particular if accompanied by strengthening of quality and accreditation throughout the health system, to stimulate transfer of capacity and good practice from private providers through partnerships with medical education institutions, and to reallocate benefits from trade in health services to public sectors, especially to rural areas that might have been affected by internal brain drain.

More generally, the effects of trade in health services on health systems hinge on how the supply of health workers responds to a growth in migration and medical tourism.

The supply of health workers, in turn, depends on how the health education system is organised and regulated. Countries in southeast Asia offer very different models in this respect. The rapid growth of export-oriented private training in the Philippines and Indonesia has mitigated the effect of migration on the total stock of health workers, but poor regulation of private training has compromised quality and contributed to over-production of health workers with scarce employment prospects. Thailand on the other hand has no policy of training for the purposes of working abroad, and the private sector plays a very small part. Strong oversight is needed to ensure quality and to regulate output in the Philippines and Indonesia, whereas training policies especially for highly specialised staff in Thailand might need to take into consideration the projected growth of medical tourism.

A final point to emerge from our report concerns data. Despite the importance of human resources for health, there is little investment in collection of accurate and timely data that could improve understanding of the situation and inform policy. Data gaps are most notable in relation to the private sector. As a result, Ministries of Health in southeast Asia are in many cases not able to monitor public and private production and employment in the health sector. In countries where professional organisations such as medical and nurse councils are authorised to register and to license professionals, these councils can regularly update data for the stock of health professionals. Data for workers in part-time and full-time employment by public and private sectors as well as independent practitioners are more difficult to capture and to update. Moreover, data for salaries and income of different health-worker groups are necessary to help policy makers to make decisions about compensation and incentive policies. Tackling of this problem will necessitate country-specific design of effective data-capturing systems, and sharing between the public and private sectors. Finally, few comparative data are available for the quality of training and health services in southeast Asia. Such comparative information about quality could be gathered through specific studies, or through regional efforts to develop common quality indicators, monitoring tools, and possibly regional accreditation standards.

Contributors

CK set the conceptual framework of the paper, undertook the literature search, compiled data from country authors, verified data, and was responsible for data analysis, data interpretation, and writing of the paper. PH set the conceptual framework of the paper together with CK, and contributed to data analysis, production of tables and figures, data interpretation, and writing of the paper together with CK. ML (Laos) and TJ (Cambodia) set the conceptual framework of the paper together with CK, provided country data, verified data, and edited and gave comments on the draft. FML (the Philippines) set the conceptual framework of the paper together with CK, provided country data, provided information on country migration situation, verified data and gave comments on the draft. SAW (Indonesia), NLH (Vietnam), and JFdR (the Philippines) provided country data, verified data for those countries in the paper, and gave comments on the framework and on general content of the draft.

Conflicts of interest

We declare that we have no conflicts of interest.

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