

MIGRATION AND MALARIA

Abstract. Migration is an important global issue as poorly managed migration can result in a diversity of problems, including an increase in the transmission of diseases such as malaria. There is evidence to suggest that malaria is no longer a forest-dependent disease and may largely be affected by population movements, mostly to agricultural areas. While internal and transnational migration has different legal implications in most countries, both types of migration occur for the same reasons; economic and/or safety. Although migration in itself is not a definitive risk for malaria, several factors can put, migrants and local communities alike, in vulnerable situations. In particular, infrastructure and rural development, deforestation for logging and economic farming, political movements, and natural disasters are some of the major factors that push and pull people in and out of malaria-endemic areas. Therefore, understanding the changing socio-environmental situation as well as population movements and their associated risks for malaria infection, is critical for malaria control, containment, and elimination. Efforts to address these issues should include advocacy, mapping exercises and expanded/strengthened surveillance to also include migrant health information systems. Malaria related information, prevention measures, and early diagnosis and appropriate treatment should be made easily accessible for migrants regardless of their migration status; not only to ensure that they are equipped with appropriate knowledge and devices to protect themselves, but also to ensure that they are properly diagnosed and treated, to prevent further transmission, and to ensure that they are captured by the surveillance system.

Keywords: malaria, migration pattern, trend, implication, GMS

INTRODUCTION

Migration is a process encompassing any kind of population movement regardless of its length, composition or cause, either across an international border or within a State. It includes migration of refugees, displaced persons, uprooted people and economic migrants (IOM, 2004). Migration is considered an important global issue as roughly one of every 55 persons in the world is a migrant today (IOM, undated). With modern transportation and telecommunications, more people are motivated and able to move. While cross-border migration poses a big challenge for many countries, both in terms of the magnitude and variety of migration patterns and processes, migration within a Nation also remains a big challenge, though it is often neglected. If appropriately managed, migration can greatly benefit the individual as well as his/her source and destination communities. In contrast, poorly managed migration can result in various social, cultural and economic problems, including public health problems such as malaria (Welshman and Bashford, 2006; Rezza *et al*, 2007; Stoddard *et al*, 2009; Tatem and Smith, 2010; Huguet and Chamratrithirong, 2011). A challenge for all countries is

how to properly manage migration as it is a very complex and time sensitive phenomenon. This chapter is focused on key migration patterns and flows in the GMS in recent years, as well as future trends and their associated implications for the malaria situation.

OVERVIEW OF THE MIGRATION SITUATION AND TRENDS IN THE GMS

The GMS is home to more than 300 million people; close in size to that of the USA. Migration in the GMS has become increasingly complex as a result of economic expansion, widening demographic and economic disparities, the greater availability of transportation networks, and information about distant places that was previously unavailable. Migration flows in the GMS are widespread and the patterns highly diversified. While migration within the GMS has become predominant, the long track record of out-migration from the Subregion to more developed countries has also continues as depicted in Table 1.

While much of the migration from the GMS to other regions is through official labor exportation, most of the migration within the Subregion is spontaneous and through informal channels. The official labor migration figures in the GMS in 2008 only reported slightly more than one million migrants (Table 1). With porous land, river, and sea borders in the GMS, crossing the border within the Subregion is not at all difficult. Many official border crossings and check points are available but these are more popular among tourists, traders, and frontier workers. The majority of cross-border migrants use the natural border crossing points; walking across the mountains or floating across the river. In some areas, migrants can easily cross the narrow rivers that divide the nation's borders on foot. The migration process between source and destination can range from a few days to several months. Some migrants do not have enough resources and have to work at the border villages to earn money to support their border crossing and further migration. Some have to look for food and cook in the deep forests to avoid the authorities. Despite the development of legal migration channels, these channels are currently not affordable or accessible to most migrants or have limited management and/or enforcement of regulations so that the majority of migrants continue to cross the border irregularly. This makes it difficult to measure the actual migration volume and the data on migration are scarce and often unreliable (Panam *et al*, 2004; WVFT and ARCM, 2004).

A study to forecast migration flows in the GMS that also accounted for irregular migrants estimated that the number of cross-border migrants in the Subregion might have already been over 4 million people in 2010 (Table 2) [Those migrants, who, owing to unauthorized entry, breach of a condition of entry, or the expiration of her/his visa, lacks legal status in

Table 1

Source, destination and volume of documented labor migrants among Greater Mekong Subregion countries in 2008.

To\From	Myanmar	Thailand	Cambodia	Lao PDR	Viet Nam	Total
Thailand	614,590	-	82,251	76,459	N/A	773,300
Malaysia	102,781	22,835	6,620	N/A	>100,000	232,236
China	>1,500	4,060 ^a	N/A	N/A	N/A	5,560
Sub-total	717,317	26,895	88,871	76,459	>100,000	1,011,096
Taiwan	N/A	98,322	N/A	N/A	90,000	188,322
Japan	5,914	48,078	2,353	2,478	19,000	77,823
South Korea	3,374	47,813	2,464	N/A	50,000	103,651
USA	6,793	N/A	N/A	183,265	10	190,068
United Kingdom	N/A	N/A	N/A	N/A	400	400
Bangladesh	21,053	N/A	N/A	N/A	N/A	21,053
India	1,471	N/A	N/A	N/A	259,010	260,481
Israel	N/A	30,100	N/A	N/A	N/A	30,100
United Arab Emirates	N/A	N/A	N/A	N/A	1,000	1,000
Saudi Arabia	N/A	N/A	N/A	N/A	200	200
Total	757,476	251,208	93,688	262,202	518,420	1,884,194

^a Hong Kong

Source: Adapted from MMN and AMC (2008).

a transit or host country (Terminology, IOM Website, undated)]. The combined volume of migrants in Thailand and Cambodia accounted for over 90% of migrants in the whole Sub-region (Lewis *et al*, 2010).

Migrants in the GMS can be classified into two main categories: short-term/ short-range migrants along the border, and long-term/ long-range and more extensive migrants. However, the first waves of cross-border migrants are frequently concentrated at the border provinces closer to their countries of origin, probably because the majority of the movements are at overland border crossings. Further migration takes place once their social networks expand to other regions in the host countries. With trade restrictions having been lowered over the years, the official launch of the ASEAN Economic Community (AEC) in 2015, and Free Trade Agreements between ASEAN countries and China, intense mobility in the GMS will only increase. Although economic turbulence will reduce migrant flows in the GMS, this is expected to be short-term and migrant stocks and flows will continue to grow substantially

in the long run. Migration is predicted to increase among young adults who are generally poor as it is the poorest who cannot earn enough to support their families in their places of origin. As migration usually relies on social networks, even if wider regular channels are available, there will always be a large portion of migrants who prefer irregular channels (Maltoni, 2006; Lewis *et al*, 2010).

Due to its relatively more advanced economy and peaceful society, **Thailand** is the major receiving country for migrants from neighboring countries, hosting approximately two-thirds of all cross-border migrants in the GMS (Fig 1). Over 80% of the estimated 2.5-3 million labor migrants and dependents in Thailand are from Myanmar, while Cambodian and Lao have an almost equal share of the remaining less than 20% (Huguet and Chamrathirong, 2011; Jones and Im-em, 2011). However, the number of Lao migrants may be much higher than Cambodian migrants but they are not detected as it is very difficult to distinguish a Lao from a northeastern Thai because of their similar languages, appearances and cultural practices. Migrants from different countries are employed in different types of jobs according to the demands in different labor sectors, migration networks, and their background and experiences. While migrants from Myanmar are mostly found in agricultural, construction, seafood processing, and domestic sectors, Cambodian migrants are mostly engaged in construction, agricultural, and fishing businesses. Lao migrants are more commonly employed in domestic work, the agricultural sector, food sales, and construction work. However, overall, most migrants from the three countries are involved in four key sectors out of 24 sectors that the Thai government allows: agriculture, construction, seafood processing, and domestic service. Within the agriculture sector, southern rubber plantations, northern rice and fruit farms, and the coastal seafood processing provinces are the biggest employers of migrants in absolute terms. While the Lao and Cambodian are economic migrants, those from Myanmar can be categorized into several sub-groups such as displaced persons, economic migrants, stateless persons, ethnic highlanders, asylum seekers, and dependents of all the groups, while some of them hold a double status. It is important to note that almost 200,000 irregular Chinese and South Asians were estimated to be in Thailand in the early 1990s. The current figure is unknown but has possibly increased. Few Vietnamese migrants were reported to stay in Thailand but there may be many more than estimated, as some recent studies have reported Vietnamese migrants in Trat, Samut Sakhon, and Bangkok (Jitthai, 2010, 2011, unpublished). Because of the strong pull demand for migrants in Thailand, and strong push supply of migrants in the rest of GMS countries, it is expected that migration into Thailand will continue to grow significantly by about 28% over the next decade (Table 2).

Despite a large number of cross-border migrants, internal migrants remain the largest group of migrants in Thailand. Internal migration rates have gradually increased and stood

Table 2

Results from a consensus survey on forecast of migration flows in Greater Mekong Subregion between 2008 and 2018 (in thousands).

Origin	Destination						
	Total GMS	Thailand	Myanmar	Cambodia	Lao PDR	Viet Nam	GMS Regions of PRC
Migrant Stock 2008	3,918	2,553	125	1,048	118	27	47
Thailand	44	N/A	5	20	12	4	3
Myanmar	2,083	2,072	N/A	0	0	0	11
Cambodia	262	248	0	N/A	6	8	0
Lao PDR	217	208	0	3	N/A	1	5
Viet Nam	1,073	25	0	1,000	20	N/A	28
GMS regions of PRC	239	0	120	25	80	14	N/A
Migrant Stock 2013	4,473	2,937	146	1,162	142	34	52
Thailand	49	N/A	6	20	15	5	3
Myanmar	2,276	2,264	N/A	0	0	0	12
Cambodia	288	266	0	N/A	12	10	0
Lao PDR	252	232	0	12	N/A	2	6
Viet Nam	1,184	28	0	1,100	25	N/A	31
GMS regions of PRC	277	0	140	30	90	17	N/A
Migrant Stock 2018	5,026	3,314	167	1,281	166	41	57
Thailand	55	N/A	7	20	18	6	4
Myanmar	2,788	2,775	N/A	0	0	0	13
Cambodia	346	316	0	N/A	18	12	0
Lao PDR	265	240	0	16	N/A	3	6
Viet Nam	1,314	40	0	1,210	30	N/A	34
GMS regions of PRC	315	0	160	35	100	20	N/A

PCR, People Republic of China

Source: Adapted from Lewis *et al* (2010).

at about one-quarter of the total population in 2000. The key migration flow is for people from the seasonally barren northeastern region to migrate to Bangkok and other provinces, especially to the central region which includes malaria-prone areas. These migrants accounted for 45% of the 1.25 million internal migrant workers in Thailand in 2009 while approximately 26%, 17% and 10% of internal migrant workers were from the central, northern,

and the southern regions, respectively. Internal migrants from the northeastern region are predominantly involved in two sectors that are considered high risk for malaria; agriculture (68%) and national security forces (39%). All of these population movements can be both permanent and temporary, including significant levels of seasonal or periodic migration. However, the volume of seasonal migrants is unclear and could be underestimated. Overall trends for medium and short-term migration are, however, declining. One-year migrant rates have fluctuated and stood at less than 3% in 2009. Internal migration in Thailand seems to be cyclical. Current trends indicate that the highest levels of migration are to the central provinces (other than Bangkok) and the southern region (Jones and Im-em, 2011) depending on evolving regional and global commodity needs.

While on the third rank in terms of the volume of out-migration in the GMS, **Cambodia** is the second key destination for migrants in the Subregion and hosts over one million migrants, who are mostly from Viet Nam and include long-term residents. More than 150,000 Vietnamese migrants are estimated to be residing in Cambodia with a large proportion coming from border provinces working mainly in construction and service industries. They can also be found in Kampot, a rural area under the GMP's monitoring for drug resistance that is further away from the main Cambodia-Viet Nam border crossing point (NCDD, 2009). It is estimated that over 1 million Cambodians are working abroad, mostly in Thailand. However, the number of Cambodian workers in Thailand slightly decreased in the past few years, following a conflict between the two countries. In addition, the Cambodian government has entered into a bilateral agreement for labor exportation with several countries besides Thailand. Nevertheless, it is anticipated that changes in the Thai government administration in late 2011 and the policy to increase the daily labor wage will attract more Cambodian workers into Thailand.

A number of Cambodian workers can also be found in Malaysia, South Korea, Taiwan, China, and the Middle East. Although the actual number is unknown, many Cambodians also migrate to Viet Nam where they are involved mostly in construction work and begging (Dickson *et al*, 2011). Emerging concerns for cross-border migration in Cambodia is a potential for an influx of Chinese workers; following an increase of Chinese infrastructure projects and business investments in Cambodia (China Daily, 2007; Asia Times, 2008). Internal migration is, as mentioned earlier, not to be neglected as approximately 27% (about 3.5 million people) of the total Cambodian population was estimated to be internal migrants in 2009 (Maltoni, 2006; Dickson *et al*, 2011). Almost 58% migrated to or within urban areas to work mainly at factories and construction sites. However, movements in rural areas (49%) among agricultural, forestry, and fishery workers are also very common. The patterns of migration were found to be similar to migration patterns in other countries. For example, from high to

low population density areas and from non-forest to forest areas. Unique migration patterns were also found, *ie*, from low land to highland areas and from central to border areas (Guyant *et al*, 2010, unpublished report). Labor migration is still a relatively new phenomenon but it has been significantly accelerating. Internal migrants heavily outnumber international migrants and have more impact on rural development. Cambodian migrants view migration as a short term strategy to cope with unexpected problems and not as a long or medium term process to improve the socioeconomic status of the family. Since the Cambodian population is young, with 50% being under 20 years of age (CDRI, 2007), the challenge will only become more daunting in the future as large numbers of job seekers will begin to enter the workforce over the next decade.

Although relatively small and least studied, **Lao PDR** is also both a migrant sending and receiving country. As a land-locked country with a porous border, Lao PDR has over 100 official and unofficial border check points with its neighboring countries (Inkochasan, 2010). Although the agricultural sector has gradually lost its labor force to the industrialized and service sectors (Phenthongsawat, 2011), only 6% of the labor force in the country comprises paid employees, the vast majority are self-employed (Phetsiriseng, 2007). Accordingly, very few migrations occur in the country, mainly to the capital, Vientiane. Many Laotians see more economic opportunities and jobs in Thailand. It is estimated that about 7% of Lao PDR's household members are on the move; of which 81% are abroad (mostly in Thailand) and more than one in five are children under 18 years old. Given the population of only about 6 million, the migration volume is relatively small compared to other GMS countries, but has dramatically accelerated (Phetsiriseng, 2007). The majority of Lao migrants in Thailand are domestic and agricultural workers (Huguet and Chamrathirong, 2011). Much smaller numbers are in China (Yunnan) and Viet Nam and they mostly migrate voluntarily but irregularly. Many are seasonal/ circular migrants. Lao PDR also officially hosts some 6,800 Vietnamese; 3,500 Thai; thousands of Chinese; and an unknown number of Myanmar migrants in 2009; mostly for construction (hydropower and mining) and business. The establishment of special economic zones and construction of Chinese markets in major towns suggest that the number of Chinese migrants could be much larger than the reported figure (Inkochasan, 2010). Although there are both land border (Dom Kralor-Voeung Kam) and riverine (Koh Chheuteal Thom) crossing points between Cambodia and Lao PDR, Lao migrants in Cambodia and vice versa are rarely found. This is probably because both can find more or better employment opportunities in Thailand with less problems and there are no push or pull factors for them to cross the border between Cambodia and Lao PDR.

Myanmar has experienced large volumes of most, if not all, types of migration within and beyond its frontiers. It is estimated that over 540,000 internally displaced persons (IDPs)

have resettled in the deep malaria-prone forests in the eastern part of Myanmar but much less is known about the IDP situation in other areas not accessible to the international aid agencies. Many IDPs have undergone several – with some reporting over 100 – migration episodes. The majority of IDPs are in hiding in the forests, increasing their risk and vulnerability to malaria infection. As the government has been able to negotiate ceasefires in most of the armed conflict areas, national development activities are probably the main drivers for migration of people in Myanmar today, in addition to economic reasons. However, progression in causes of population movement is not strictly linear. Many people are in cyclical transition between different phases or conditions of displacement and could be categorized in different ways at different times (Bosson, 2007; Skidmore and Wilson, 2007). The volume of economic migrants within the country is very large, involving millions of people. The top sources of internal migrants are Ayerwaddy, Mandalay, Bago and Sagiang, while the top destinations include the urban and semi-urban areas of Yangon and Mandalay. Due to the land development and strong establishment of border trade with Thailand, a large number of people, mainly from the central dry zones of Myanmar migrate for work especially in the eastern states/ divisions (UNDP, 2008; Huguet and Chamrathirong, 2011; Gfreeney.com, undated; MOH and WHO, 2011). People from many areas, including the major migrant receiving areas like Mon State, also move to bigger cities such as Yangon and Mandalay to seek jobs. Seasonal migrant workers also move to the larger towns and cities, seeking work in the construction, transport and service industries, and to the 'boom towns' of the dry zone oil fields and gems mines. In 2005, at least 70,000 people from all over the country were working as daily laborers in three mining areas in Mandalay (COHRE, 2007). The current figures cannot be obtained but are assumed to be stable or higher than that of 2005.

Myanmar is by far the largest migrant sending country in the GMS today. To date, the vast majority of Myanmar migrants have migrated to Thailand but a shift has also been evident in recent years. After the success of the border trade development with Thailand, Myanmar is considering the creation of other economic and industrial zones on its borders with Bangladesh (Maungdaw-Chittagong), India (Tamu-Moreh), and China (Muse-Shweli) (Skidmore and Wilson, 2007). The 105th Mile Border Trade Zone, established on the Myanmar-China border of Yunnan Province in 2006, is the first zone in terms of importance. It is estimated that up to 2 million Chinese have flooded upper Myanmar but they are not officially counted due to the lack of a recent census. The manpower in the Myanmar-China joint development zones is actually Chinese as the Chinese contractors are using their own laborers even for low-paid jobs. In addition to the mountain dwellers and farmers in Kokang, ethnic Chinese now constitute an estimated 30-40% of the Mandalay population, many of whom are recent immigrants from Yunnan (and Sichuan). Subsequently many Myanmar people have progres-

sively and naturally moved to the outskirts of the city. Kachin State which borders China in three directions, has also seen a recent influx of Chinese migrant workers, traders and gamblers. Future prospects for the border economic and trade zones are very promising, and could develop quickly, since Myanmar has 13 main border-trade points with its four neighboring countries and has demonstrated more willingness to engage all stakeholders after the 2010 election. This will facilitate ample opportunities for even more formal and informal trade, investment, transport, and border crossings in the near future (Caouette *et al*, undated; Skidmore and Wilson, 2007).

In 2011, **Viet Nam** was estimated to host about 90.5 million inhabitants. As a result of the government's equitable economic policies, a large movement of population and resources has been taken place. Simultaneously, the strategy for "leaving the rice fields, but not the countryside" was formed. The census survey showed that proportions of both inter-provincial and inter-district migrations have gradually increased. Volumes of rural-rural, rural-urban, and urban-urban migrations are similar while much smaller numbers of people movements are from urban to rural areas. However, the projection model indicates that there will be many more rural-rural migrations in the next decade (Ministry of Planning and Investment, 2011; Phan, 2011).

Circular migration is common in Viet Nam where many laborers migrate seasonally to work in agricultural sectors according to their farming calendar, or work in manufacturing sectors in urban areas only for some months. Although the migrant population accounts for a small proportion of the population, the absolute number of migrants is not small given the large population size of Viet Nam. As Viet Nam continues to develop, it is expected that the population distribution will shift from rural to urban areas as well as to the "New Economic Zones" as internal migration is one of the major socioeconomic drivers in Viet Nam (Haub and Phuong, 2003; Winkels, 2004). By region, the pattern of migration has been generally consistent with only two regions having received a net balance of in-migrants: the Southeast and the Central Highlands, mainly from the northern parts of the country. Due to similar physical environments, indigenous populations and the economic development, some parts of the southeastern provinces *eg*, Binh Phuoc and Dong Nai, are considered parts of the Central Highlands. This "Greater Central Highlands" has become an agricultural frontier with nearly 80% of individuals working on farms, due to its suitable climate and soil, official resettlement areas for several hundred-thousand people, and the New Economic Zones that have resulted in an influx of spontaneous migrants. As a consequence, forests are converted into plantations. While the majority of the migrants from the north are of Kinh or Viet ethnic origin, and several studies have been conducted among them, very little is known about labor migration of the Mekong Delta Region and the Central Highlands. In the global flow

of labor migrants, the Khmer lowlanders who account for more than one million of the total population, have a long history of labor migration (Huynh, 2009; Ho, 2010). They live mainly in specific provinces of the Mekong Delta, but more densely in Tra Vinh (over 30% of total population of Tra Vinh). More than one-third of family members were reported to be migrant laborers working outside their village, including in Binh Phuoc Province. In general, they are mostly seasonal workers engaged mainly as farm laborers. A high-speed railway route linking Hanoi to central Vinh as well as central Nha Trang to Ho Chi Minh City is underway and scheduled to be completed in 2015. From 2015 to 2020, construction will begin on the routes between Vinh and Nha Trang and between Hanoi and the northern provinces of Lao Cai and Lang Son. There is no doubt that these railway networks will facilitate increased and faster migration within Viet Nam and across the border.

Unfortunately, international migration has not been well covered in any national census but the government records over 85,000 regular Vietnamese migrants working in more developed countries around the world, while those migrating within the GMS are mainly irregular migrants and the actual number is unknown. The majority of them are found in Cambodia where Vietnamese migrants constitute the largest economic migrant group. A number of Vietnamese migrants travel to Thailand with a passport, sometimes as part of an organized tour, and do not return (SERC, 2008). The Vietnamese government has estimated that some 100,000 Vietnamese labor migrants live in Thailand but the actual number could be much higher with an additional million Vietnamese are born every year while the more developed countries are not likely to absorb all of them and the demand for labor force in Thailand will continue to grow (Lewis *et al*, 2010). Vietnamese migrants can also be found in southern and central parts of Lao PDR and Vientiane (Nguyen, 2011), and in the southern regions of the PRC, and the numbers tend to be increasing (Epstein, 2010). Many small and medium businesses owners in Lao PDR are Vietnamese, as well as laborers for development projects such as road construction.

Historically, the GMS region of the PRC has been the main source for Chinese migration to Southeast Asia but the area has now become both a sending and receiving area for migrants. Tens of thousands of irregular migrants from Viet Nam, Cambodia and Myanmar end up in sugarcane fields, garment workshops and construction sites and the trend is increasing (Caouette *et al*, undated; Epstein, 2010). **Yunnan**, shares not only a long border with Myanmar and Lao PDR but also many ethnic and indigenous groups of the population. The Province has increasingly become a recipient of irregular migrants from Myanmar, Lao PDR, and Viet Nam as mentioned earlier. As very little regular migration takes place to Southeast Asian countries (Skeldon, 2011), numbers of recent Chinese migrants to its southern neighboring countries are unclear. However, it has been reported that approximately 280,000

Chinese officially move across the border to Myanmar each year but the total number of people crossing the border is likely to be far greater than the official figure. It is estimated that there are over 800,000 Chinese migrants in Myanmar since in just one plantation on the Dehong/ Myanmar border, three hydroelectric stations are under construction and employ 60-90,000 Chinese migrants. A single banana plantation has 10,000 workers from China. Migrations from Myanmar and other GMS countries to China are much smaller.

Overall, the recent Chinese migrants differ from other GMS migrants in that they normally work with a contract and have a relatively higher status as semi-skilled and skilled workers. In many border areas, the numbers of Chinese migrants outweigh those of the local people (Cawthorne and Schapira, 2010). Yunnan is among the high interprovincial migration provinces with the southwestern provinces as the main destination for migrants from Yunnan (UNESCAP, undated). The severe drought in 2010 convinced the government to increase the number of regular migrant workers from Yunnan by 500,000 to 800,000 (China Daily, 2010). Needless to mention that irregular migrants could be many more than the government's estimate. However, intra-provincial migration still dominates as one-third of almost 4 million migrants in Yunnan moved to Kunming (Rui, 2007). With accelerating economic development and reform in the western areas and expansion of border trade, Yunnan's population migration and flow will certainly develop at a faster rate and some new characteristics will emerge accordingly.

Migration is not only complex but is also a highly time-sensitive phenomenon. As economic situations and the seasons change, the migration flows also change. As seen in Pailin, the said origin of drug resistant malaria, the province has been through many transformations within the past few decades; from a busy gems rush town, to a dangerous zone due to armed conflict, to a boomtown for production of economic crops and the influx of militaries and officials with several services that followed them, and perhaps to a small and quiet tourist spot in the future if the irrigation and plans for cash crops production are not improved. Migration does not only occur over a matter of years but often by seasons or even by a day. Several hundred-thousand people cross the border within the GMS, officially and unofficially, for various purposes on a daily basis. Seasonal migration can be found among both internal and cross-border migrants. To further complicate matters, once crossing the border, transnational migrants can still migrate internally in the host countries seasonally, temporarily, or permanently. Many migrants shop around with no distance limit until they find a job and/or a living place that is the best for them. This is a particularly common pattern found among most of the Myanmar migrants in Thailand where some migrants regularly move according to their job requirements. For example, many Myanmar migrants working in plantations regularly move between the western and eastern coastal provinces in the

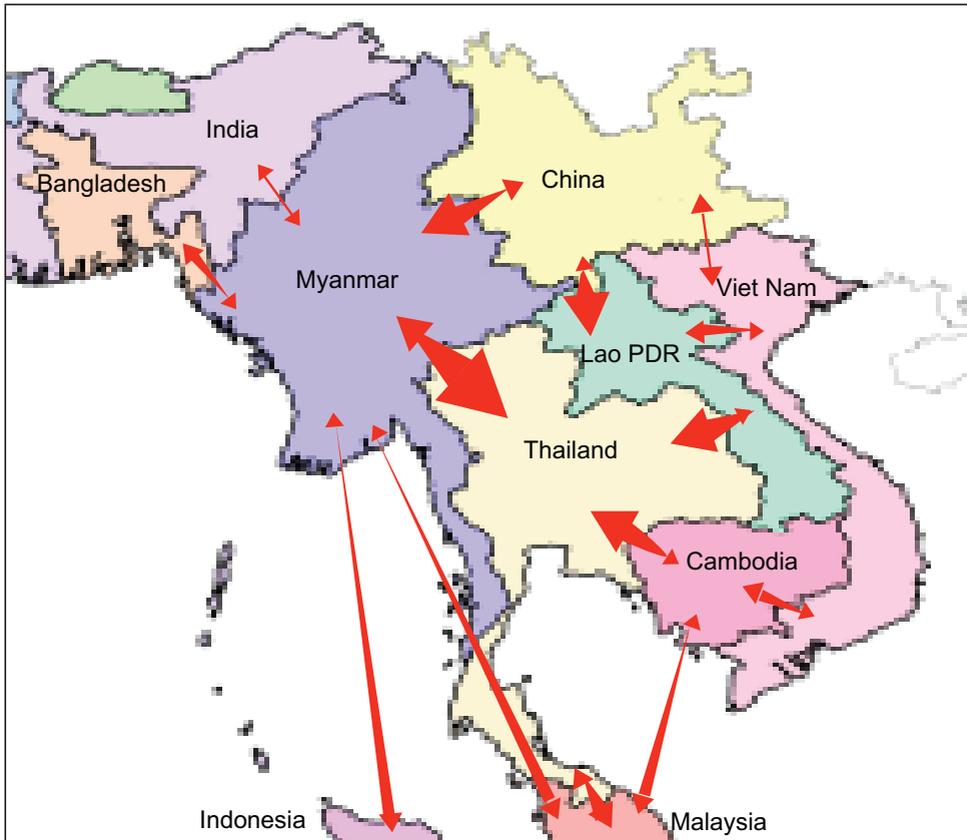


Fig 1—Magnitude of cross-border migration in Greater Mekong Subregion. Caouette *et al*, undated; Adapted from Save the Children, undated; MMN and AMC, 2008; Lewis *et al*, 2010; Huguet and Chamrathirong, 2011.

south of Thailand due to the different time for monsoon at different sides of the peninsular. Other examples of frequent movements include the Khmer ethnic migrants who often move twice a year between their rice fields at home and the factories or plantations where jobs are available in the rainy season when there is no work in the rice fields; or the Chinese working on construction projects in many GMS countries who have to move along the project sites. In addition, migrants can move across categories or employment sectors at different times or have dual status.

In addition to short and longer term migrants, some 250,000 individuals are crossing the border within the GMS daily. Besides the Viet Nam-Guangxi border, the volume of daily crossings seems to be highest at the Cambodian/ Viet Nam border in the Mekong Delta Area, with some 60,000 people crossing daily. A similar magnitude has been observed with some 50,000 people entering Myanmar from Yunnan Province but this tends to be more

seasonal migration than daily crossing. Nevertheless, Thailand is still an epicenter for migration in the GMS (Fig 1). Although the number of daily border crossers in and out of Thailand is reported to be around 50,000, the migration routes between Thailand and its neighbors are more dynamic. As many people cross the border and return on the same day, many do not have a clear plan to return (Caouette *et al*, undated; Khamsiriwatchara *et al*, 2011; Jitthai, 2012, unpublished). It is important to note that for many ethnic and local populations, the border is not an important separation as many local people on two or more sides of the border share the languages and cultures and many of them have families or relatives living on the other side of the border.

It is also worth noting that international migration is not only about crossing one's country border to a neighboring country, and it is not a linear process. Most countries in the GMS are sending, transit, and receiving countries for migrants. For example, some migrants from Myanmar pass through Thailand to migrate to Malaysia and further, while some Yunnan Chinese cross the border through Lao PDR or Myanmar to Thailand and further beyond (Panam *et al*, 2004; Save the Children, undated). Vietnamese travel through Lao PDR and Cambodia before arriving at border provinces of Thailand; many migrate further to inner cities (Jitthai *et al*, 2010; Jitthai, 2011, unpublished). Moreover, it should not be assumed that all migrants will return to their places of origin as they would rather relocate to where jobs or other resources are available (Lowe and Francis, 2006; Khamsiriwatchara *et al*, 2011).

CONTRIBUTING FACTORS TO INTERNAL AND CROSS-BORDER MIGRATION IN THE GMS AND BEYOND

The reasons people move are varied; some movements are voluntary, some not; some move for socio-economic reasons and some are displaced or uprooted. Although moving for economic reasons is the most important driver of migration today, other factors must not be underestimated. Even in peaceful countries, natural and human-made disasters that can cause displacement and influxes of people can take place any time. It is also noteworthy that, in fact, greater numbers of people move within their own countries or travel temporarily every year, either in forms of short-term or circular migration. While internal and transnational migrations have different legal implications in most countries, both types of migrations occur for the same reasons; economy and/or safety. Several common contributing push and pull factors for migration in the GMS, and perhaps elsewhere, are summarized below. As migration is very fluid, it is worth noting that many migrants reported migrating several times for similar or totally different reasons or for a combination of reasons. Commonly, livelihood and economic reasons are both the root causes and the consequences of other factors and some migrants may hold dual or multiple migration statuses.

1. Infrastructure and rural development

Rural development has long been a trend for improving social equity and fairness through improving local economies. It is a way to improve a nation's economy by creating jobs in poor rural areas as well as by maximizing the use of natural resources. Infrastructure projects are commonly developed as parts of rural development schemes resulting in improved infrastructure that can support the introduction of more advanced technology in rural economies, *eg* agricultural technology, as well as improved living conditions of the local people. Migration flows in the GMS are largely catalyzed by the large-scale development projects, with a strong link to economic growth, especially the drastic increase in the land networks of roads and railways to support the development of the GMS economic corridors (Lyttleton, 2009) (Chapter 1).

Development projects (such as the construction of roads, dams, and hydropower plants) usually cut across the forests and involve deforestation and displacement or relocation of villagers, as well as migration to and from the areas by labor migrants, including cross-border migrants, and relevant personnel involved in development projects (Bosson, 2007; Mon Forum, 2009; Linh, 2011). In addition to people movements, many development projects also affect the physical and ecological environment. This has become a bigger concern across the GMS but more for the countries that have so far experienced less natural resource exploitation *ie*, the mountainous areas in Myanmar, Lao PDR, and Viet Nam. These areas pose a challenge not only for tracing the malaria parasite from and to the forest areas but also for putting vulnerable people, *ie*, those from non-endemic areas with limited knowledge and skills on diseases prevention, in a high risk environment.

In addition to infrastructure and rural development activities that directly affect the migration of people, the results of such development also facilitate easier and more dynamic movements of people. For example, the Asian Highway has now been largely extended to form the East-West and North-South Economic Corridors in the GMS and facilitates a dynamic growth of people's movement (Skidmore and Wilson, 2007; Lyttleton, 2009; MOH and WHO, 2011) (Chapter 1). Coastal roads development projects connecting Koh Chang in Trat Province of Thailand through the beach towns of Cambodia and on to southern Viet Nam and Phu Quoc Island will allow overland travelers to beach hop across Indochina without ever having to leave the coastal roads (Can By Publications.Com, 2011).

2. Deforestation for logging and farming

Forestry and logging can put involved individuals in vulnerable situations for malaria in a similar manner to those employed in development projects in rural areas. While deforestation is on-going, forestry and logging continue. In particular, illegal logging may be more

of a concern since it is usually done by migrant laborers in deep forests with more valuable woods that are normally not accessible to the public. Illegal logging occurs to some extent in all GMS countries. It has been estimated that the natural forests of Myanmar will be gone in 10-15 years if the current cutting rate continues (Caouette *et al*, undated). These can result in different levels of people's movement and their exposure to the risk of malaria, as well as an introduction and/or exchange of the parasites in different areas.

Unlike the infrastructure projects where lands are simply replaced with buildings, reservoirs or the like, (and people have to relocate to other areas with a large volume of labor migrants only staying in the areas during the construction period), much deforestation today gives ways to farming, especially for cash crops such as coffee, cashew nut, rubber and oil palm and some for high-end recreational resorts. These crops not only require a large area to grow the plants but also a constant large number of low-paid workers since many tasks have to be done manually. Migration complexity is brought to these areas since many migrants are seasonal or circular migrants. In addition, a mix of internal and cross-border labor migrants can also be found in the same areas. Some examples of such areas are Kanchanaburi Province in Thailand, Mon State and Tanintharyi Division in Myanmar, Pailin Province in Cambodia, and Central Highland area in Viet Nam (Jones and Im-em, 2011; Maroah, 2011; The New Light of Myanmar, 2006; Dulioust, 2011; National Power Transmission Corporation, 2010).

3. National development plans and demographics

Large movements of people, internally and internationally, often take place as a result of national and population development plans, with or without the government's intention (Huguet and Chamrathirong, 2011; Nguyen, 2011; Kim, 2011). Besides economic and development disparities, demographics also determine demands and supplies of migrants. Most economies in the GMS are now experiencing slowing rates of population growth. In Cambodia and Lao PDR, fertility rates are declining; in Viet Nam fertility rates have fallen significantly. These trends are similar to those experienced by Thailand and the GMS region of the PRC in prior decades. This affects the labor supply in these economies as there is net out-migration from countries with large young populations and net in-migration to countries with aging or older populations. Population growth and land pressure can also result in migration to forest or upland areas as seen in Viet Nam and Cambodia. In Thailand, the large volume of rural-rural migration has been replaced with rural-urban/ semi-urban areas; as the results of government plans for both social and economic development (Jones and Im-em, 2011). In Viet Nam, the government has been resettling many people from non-malaria endemic provinces from the North to the Central Highlands to address the high population density problem in the North (Ministry of Planning and Investment, 2011).

All GMS countries have a plan to develop border towns to promote transnational trading, due to available resources and cheap labor supplies. For example, border trade between Mae Sot (Thailand) and Myawaddy (Myanmar) alone has the value of about USD 100 million per month (Maesot Website, 2011). After the success of this border trade, several other border areas between Thailand and Myanmar have been developed for the same purpose such as Mae Sai-Tachilek and Ranong-Kawthaung. Thailand also develops border trade with Cambodia (eg, Sa Kaeo-Poipet and Trat-Koh Kong) and Lao PDR (eg, Nong Khai-Vientiane and Ubon Ratchathani-Savannakhet). Myanmar is considering the creation of other economic and industrial zones on its borders with Bangladesh (Maungdaw-Chittakong), India (Tamu-Moreh), and China (Muse-Shweli) (Skidmore and Wilson, 2007). Svey Rieng-Thy Ninh is a key border trade area between Cambodia and Viet Nam (Dickson *et al*, 2011), whereas Longsan-Guangxi is a key for overland trading between Viet Nam and China (Roque, 2007). Prospects of border economic and trade zones are large and dynamic as many countries have over 10 main border-trade points with neighboring countries. This will facilitate ample opportunities for even more formal and informal trade, investment, transport, and border crossings in the near future. While this benefits both the locals and labor migrants working in the areas in supporting their livelihoods, this can put them at risk for malaria infection since malaria is still prevalent in the border areas of all GMS countries and regions where forest coverage is still rich (see also Chapter 2).

4. Political factors affecting migration

While political conflicts causing large scale displacement in the GMS have been largely reduced since the end of the Indochina War and the fall of the communism in the past few decades, both internal and cross-border conflicts still remain in the Subregion – such as those in Myanmar and the southern provinces of Thailand. Transnational conflicts also occur from time to time due to territorial disputes, for example between Thailand and Cambodia and Thailand and Myanmar. These disputes occur mostly in the forest areas. Periodic armed conflict within and between nation states does not only result in a rapid and large volume of temporary or permanently displaced civilians, but also increased mobility in and out of the areas of those directly involved in the operations. A recent report stated that if the armed conflict between Thailand and Cambodia continued, more lives of Khmer soldiers and civilians would be lost due to malaria and other health issues than from the armed operation itself (CUEID Website, 2008).

Political movements and development policies in fact have a strong impact on migration. The official visit of a senior US diplomat to Myanmar at the end of 2011 (after over half a century of sanctions), for example, could have a significant impact on the migration situation

in the GMS as it clearly indicated a shift in US policy towards Myanmar. In addition, many signs for improvement of democracy in Myanmar have been demonstrated since the election in 2010. If the situation in Myanmar continues to improve, we may not have to wait for too long to see an economic boom in Myanmar which could result in a large influx of returned migrants. And if so, Thailand would be heavily affected by the lack of labor force and the country will have to fill the gaps with new waves of labor migration, probably from younger countries like Viet Nam and/or from outside of the Subregion.

5. Natural disasters

Many IDPs and cross-border migrants have also been uprooted by natural disasters. For example, Cyclone Nargis that hit the Ayerwaddy and Yangon Divisions in 2008 wiped out entire villages and affected approximately 2.4 million people in addition to an estimated 138,000 deaths or missing (COHRE, 2007). This resulted not only in the damaged environment but also in the displacement of people and the destruction of their livelihoods. The 2003 Tsunami provides another example of the nexus between natural disasters and migration. As a result of the Tsunami, some 7,000 labor migrants and their dependents were affected, deceased or injured or evacuated (UN Joint Assessment Team, 2005), but the areas were flooded with migrants soon afterwards due to the demand for laborers in rebuilding and rehabilitation activities. The recent flood in Thailand in 2011 provides a different example of how natural disasters can increase the vulnerability of migrants to malaria infection. The Thailand floods pushed hundreds of thousands of Myanmar migrants who lost their jobs to evacuate from various parts of Thailand to Mae Sot and surrounding areas (Mae Sot Immigration, 2011). These areas are known as malaria endemic areas and the rapid influx of migrants increased vulnerability to malaria as service providers might not have surge capacity to provide preventive measures to the suddenly overcrowded areas.

6. Socio-economic situation

Poverty and socio-economic disparities are both root causes for migration and consequences of other factors listed above. The most recent 2007-2009 financial crises had a crucial effect on the return of rural migrants in the GMS. In Viet Nam, as a consequence of the economic recession, many factories and companies dismissed thousands of migrant workers. An average of 22% of migrant laborers from cities returned to the rural areas in every province and more than 17% of overseas workers had to return to Viet Nam before their contracts' end date. Some 400,000 internal and cross-border migrant workers lost their jobs during this period and most of them returned home. This also included some internal migrants who returned from their work on farms. In Thailand, the proportion of migrants who returned home also increased during these financially turbulent years (Jones and Im-em,

2011) and this is considered evidence that at least some of this return migration was in response to the economic crisis in 2008. (Boonyamanond and Punpuing, 2010).

MIGRATION AND ARTEMESININ RESISTANCE

According to the World Health Organization's Global Malaria Program, several malaria endemic areas in the GMS have been monitored for drug resistance through the routine surveillance systems (WHO, 2010). As shown in Fig 2, hotspots for potential artemisinin resistant malaria in the GMS can be largely categorized into three groups:

- 1) Those in mountainous areas, *eg*, Sagaing and Kachin in Myanmar, Mae Hong Son and Trat in Thailand, Ratanakiri in Cambodia, and Binh Phuoc in Viet Nam;
- 2) Those in urban or semi-urban areas on the main road networks, *eg*, Mandalay in Myanmar and Ubon Ratchathani in Thailand; and
- 3) Those in "twin cities" across international borders, *eg*, Kayin and Mon States and Thanintharyi Division of Myanmar and Kanchanaburi Province of Thailand; Thanintharyi Division in Myanmar and Ranong Province in Thailand; Pailin Province of Cambodia and Trat Province of Thailand, and Kratie Province of Cambodia and Binh Phuoc Province of Viet Nam.

This, along with evidence gathered when tracking hotspots down to township or village level, suggests that malaria is no longer a forest-dependent disease and may be significantly affected by population movements, mostly to agricultural areas. Most of the hotspots in each country are located right on or in close proximity to the national road networks. This is probably due to the fact that agricultural farms/ plantations may be located in remote areas but not necessarily be isolated and need to have good connections with road networks for convenient transportation of the products to the markets and/or manufacturing sites. Most of the key hotspots with higher potential for drug resistance are located on or in close proximity to the Asian Highway that connects the most eastern part of Asia in Japan with the European continent (Fig 3), as well as its annexes (Fig 4). The higher levels of potential drug resistant malaria are also reported to be at locations with more dynamic population movements (*eg*, between the border provinces of Thailand and Myanmar and Cambodia), than those with lower levels of movement (*eg*, Sagiang Division in Myanmar).

Some studies have suggested that transmission has been greatly reduced in forest-fringe villages, but remains active in forests, and is primarily maintained between the forest vector and ethnic inhabitants (Dysoley *et al*, 2008; Abe *et al*, 2009). However, a lack of thorough migration studies in relation to malaria infection in the GMS obstructs the possibility to trace and forecast the migration and malaria situation. For example, while population movements

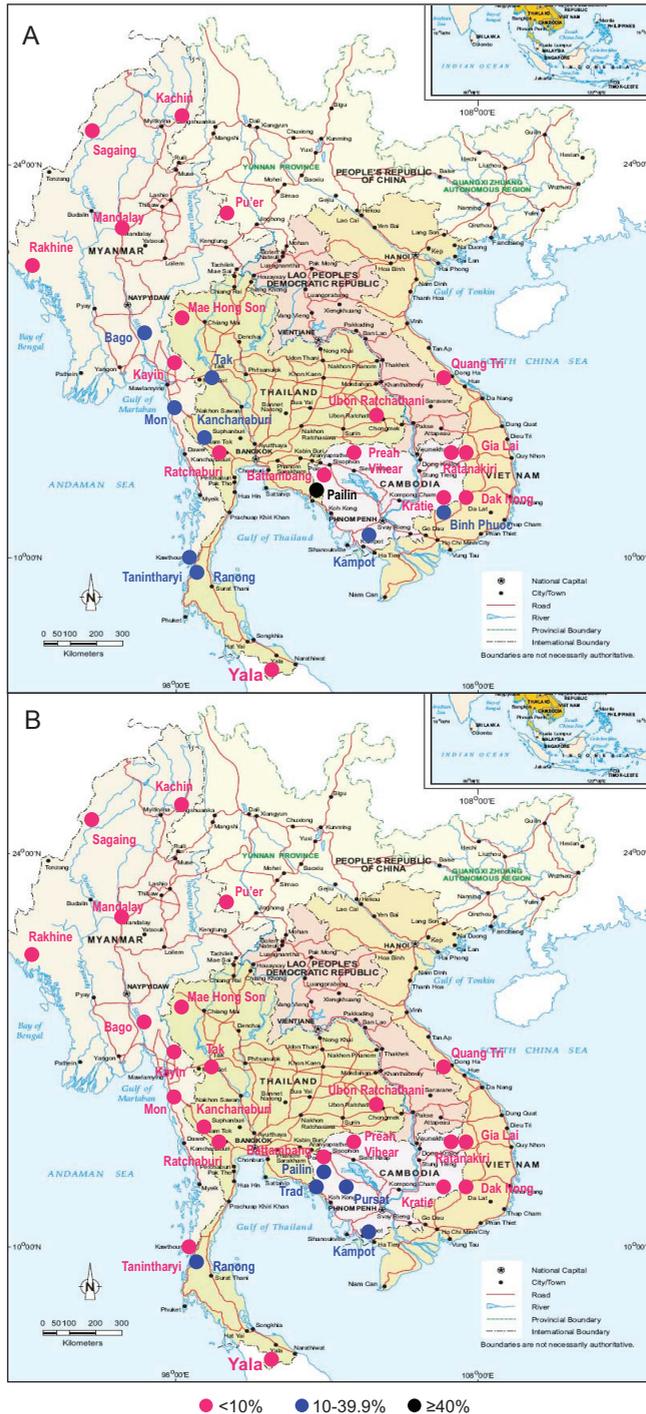


Fig 2—Treatment outcomes of malaria patients in GMS, 2006-2010. (Adapted from ADB, 2007 and WHO, 2010). A. Percentage of patients with day 3 positivity after artemisinin combination therapies (ACTs)^a. B. Percentage of patients with treatment failure.

^aCombinations of artemisinin-based combination therapies vary.

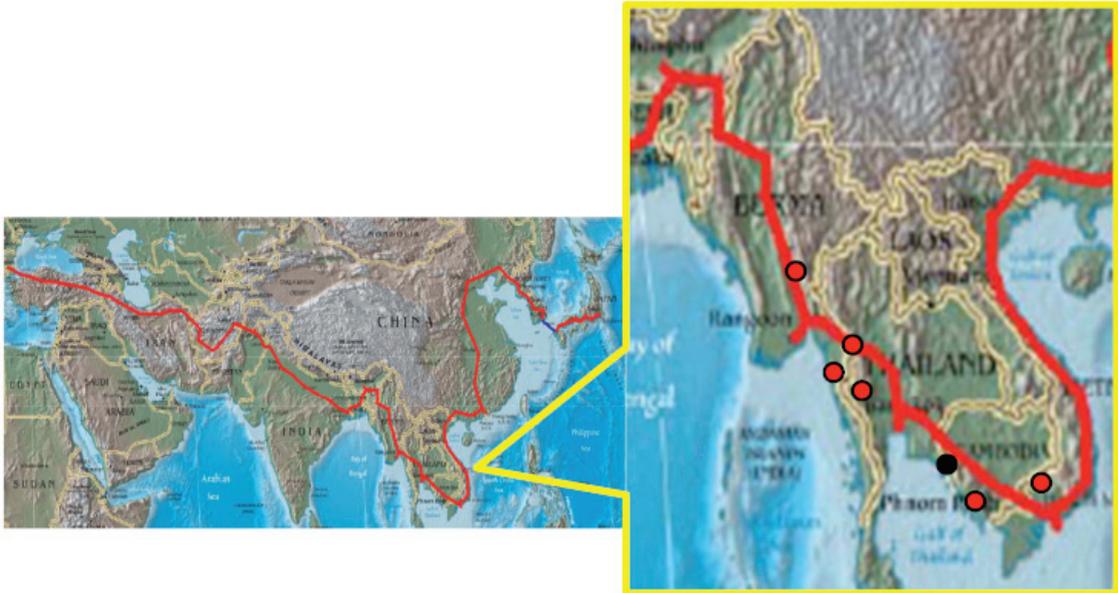


Fig 3—Original Asian highway route and key malaria hotspots with high percentage of positive cases after 3-day treatment with artemisinin combination therapies.

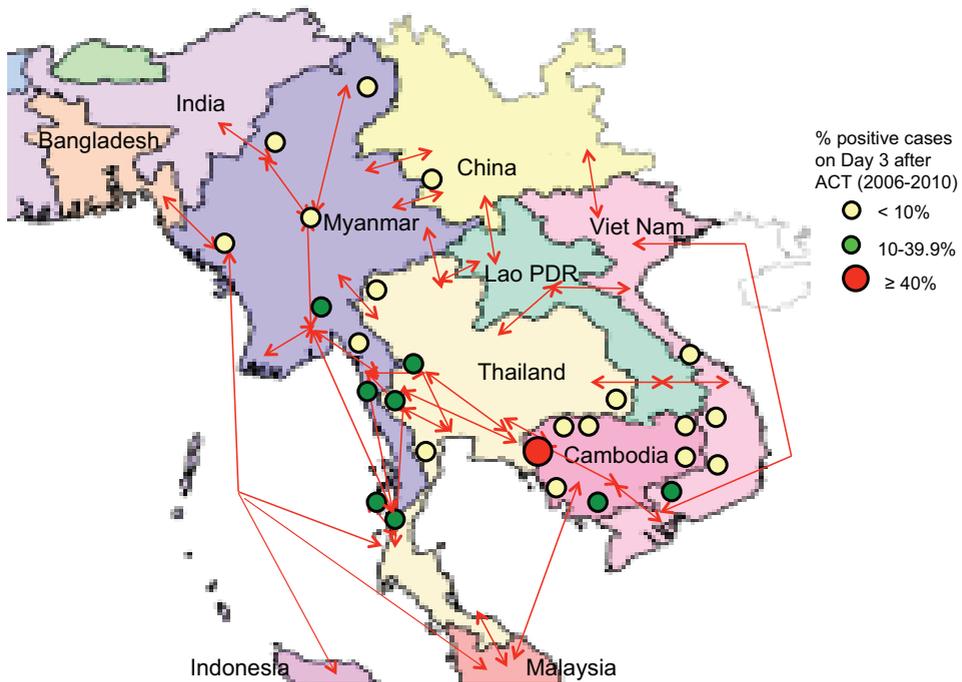


Fig 4—Key internal and cross-border migration routes and malaria resistance hotspots. (Caouette *et al*, undated; Save the Children, undated; MMN and AMC, 2008; WHO, 2010; Adapted from Wikipedia, 2011).

between Nyaunglepin Town (Bago Division) and Mon State of Myanmar have been reported (Independent Mon News, 2009), their associated risks and vulnerabilities to malaria infection and to development of drug resistance are unknown, although both areas reported relatively high percentages of patients with positive test results after three-day treatment with ACTs. Similarly, there are some reports on migration of people from the north and Khmer migrants to Binh Phuoc Province in Viet Nam where a relatively high percentage of patients with positive test results after three-day treatment with ACT is reported. Also, there are Vietnamese migrants in Chumkiri District of Kampot Province (NCDD, 2009) where a high percentages of both positive test results after three-day treatment and ACT treatment failure have been reported. The migration patterns of these migrants combined with their associated risks and vulnerabilities to malaria are least known. While Chiang Mai Province in the north of Thailand meets the criteria for a malaria hotspot (see details below) (Jitthai, 2011 unpublished; BVBD, 2011), the province is not included in WHO's GMP monitoring sites.

Due to the passive nature of disease surveillance that usually reports cases according to locations where patients seek healthcare but not necessarily where infections actually take place, this could generate misleading information in relation to malaria hot spots, especially when the patients are highly mobile or when they are irregular migrants and fail to provide correct information related to their migration for fear of accusation or arrest. For example, Khmer migrants in Binh Phuoc Province who returned home to An Giang for malaria treatment would be reported as An Giang's cases, although they were infected while working in the farms or plantations in Binh Phuoc. Further, some patients may seek healthcare at the regional hubs where medical services are more advanced and of higher quality. Therefore these patients may present at the regional crossroads while migrating but have been infected elsewhere. Likewise, Myanmar residents who cross the border to receive health services at the border health facilities in Thailand or China would not be captured by the Myanmar surveillance system even if they were infected in Myanmar. The worst scenario is that the cross-border patients might not be reported by any system at all since the host countries might not have developed a functioning migrant health information system. As many cross-border patients seek healthcare not only in the government but also in the private sector, those who seek care at private health facilities are less likely to be included in the government's surveillance system (Srithamrongsawat *et al*, 2009; Cawthorne and Schapira, 2010). Long experience from HIV/AIDS interventions for migrants in the GMS also revealed that HIV prevalence tended to be higher in some border provinces only because migrants who fell sick intended to return home but were too sick or could not afford to travel further, while some felt guilty to return home with illness and no money as these would only add more burden to their poor families. These reasons caused many of them to remain at the border

towns where they were detected as border patient cases in places where little or no risks existed (Bardon and Im-em, 2000; Lowe and Francis, 2006). This is especially very likely to happen with diseases with long incubation periods, including malaria. Lack or limited availability of and/or accessibility to appropriate health services in rural areas where malaria is common, could also result in self-medication and delayed diagnosis and treatment elsewhere (see also Chapter 7).

CONCLUSION AND NEXT STEPS

The GMS is exceptionally dynamic (see Chapter 1). Strong economic growth and demographic pressures driven by unequal development, as well as conflicts are the main drivers of the migration dynamic in the subregion, and all these can affect the malaria situation by exposing non-immune populations to malaria transmission as well as potentially spreading malaria parasites and strains to new areas. Different types of movements are linked and difficult to differentiate because they often overlap and involve many of the same people. How the dynamics of migration in the GMS will change in the future is difficult to predict, especially considering the weak evidence and the rapid pace of change in the subregion. Based on the review of relevant sources, we can, however, speculate on a number of probable developments. Firstly, the GMS development strategy towards increased regionalization will continue to facilitate exchanges of commodities as well as labor forces. In the short-term, with the relatively stable economy and society in Thailand combined with its great demand for labor and the large unemployed productive-age populations in other GMS countries, labor migration is likely to continue to increase in Thailand, unless an unexpected phenomenon takes place. In the longer term, other countries may begin to attract greater numbers of GMS migrants. The two Chinese provinces of Yunnan and Guangxi, may become attractive transit communities to migrants as gateways to and from other provinces in China. More of the disadvantaged ethnic populations in China's border areas may look for opportunities across the borders if they are not integrated into the Chinese society and economy. As the Chinese business expands, and in view of the preferred practice of the Chinese firms to bring workers from their own country, it is expected that larger numbers of workers and businessmen from China will be working in the GMS. This trend is already visible in Myanmar, Lao PDR, and Cambodia. In addition, Thailand, Viet Nam, and other GMS countries will face increasing wage competition from other Asian labor-supplying countries such as Bangladesh and Indonesia, which could reduce local labor deployment but increase labor migrants from these highly populated countries.

A review of available literature has revealed that several studies related to the malaria epidemic among migrants in different locations and several studies related to migration pat-

terns and flows are also available. However, it is unfortunate that these studies are usually conducted separately and the relationship between migration and the malaria situation are mostly unexplained. When health issues are integrated into migration studies or vice versa, they usually include only sexual and reproductive health issues, especially HIV/AIDS, and tuberculosis to a lesser extent. According to the fragmented information in relation to malaria and migration, some immediate actions and longer term recommendations could be drawn as follows:

I. Enhancing understanding of the migration situation to appropriately identify risk groups and risk environments

Migrants can be defined differently and they may be vulnerable to malaria infection due to several factors. It is important to realize the fact that migration in itself is not a definitive risk for contracting malaria, and that not all migrants affect the malaria situation. However, human movement and subsequent variation in exposure can be more important than vector density per se because heterogeneity in contact patterns has a large influence of the rate of pathogen transmission, and variation in exposure rates due to individual movement patterns could have considerable impact on disease dynamics (Stoddard *et al*, 2009). Understanding population movement, therefore, is very critical for malaria control, containment, and elimination. While many twin-cities across international borders have characteristics that are critical for future monitoring, it is important to note that not all the borders are created equally both in terms of risk environment and behaviors, and therefore, a thorough analysis of the risk behaviors and risk environment is essential, in addition to the routine surveillance and response system.

Studies that address the two issues in a comprehensive manner are extremely limited, resulting in a blurred picture of the situation. To determine the risk and vulnerability of migrants to malaria infection, it is essential to understand the environment, the vectors, the host and other circumstances at each stage of the migration process. The migration process can simply be defined in four stages: source, transit, destination, and return. However, the associated risks and vulnerabilities at each stage may be very different and complicated, especially since the malaria incubation period can be relatively long and the period of the migration process can be as fast as a matter of hours or days. It is also worth reiterating that migration is not a single linear process and can involve multiple means and mechanisms, as well as different levels of malaria risks. Irregular migrants, including smuggled and trafficked persons and some IDPs may have more opportunities to expose themselves to malaria infection while on the move or in hiding/ resettling, since they usually have to hide themselves from the authorities – mostly in the jungles or deep forests for a period of time or permanently. Some

of them spend a certain period of time at transit communities to earn cash to support their travel to other destinations, including working at farms or plantations along the border. On the other hand, migration status may not have much of an effect on malaria infection at the migration destination as both regular and irregular migrants living or working at the same location will share similar level of risk environment. It is their personal level of malaria risk that could be different since the infection is highly behavior-driven.

Recommendations

To obtain better understanding of migration and the associated risks for malaria infection in order to improve the development of appropriate interventions, the following actions are recommended:

1. Conduct a study on typologies of migrants in relation to malaria infection. Although migrants can be defined differently, their typologies can be synchronized in the context of malaria control and containment programming as it involves specific characteristics and behaviors, regardless of their migration status.

2. Conduct a mapping of migration routes (land, air, sea), their magnitudes, and associated malaria risk environment and behaviors at each migration stage or community. This is crucial for obtaining essential information for the development of targeted interventions. Periodic update of the mapping is also important since migration patterns, flows, and typologies can be changed over time.

3. Monitor closely the risk environment or factors for migration and malaria infection in a systematic manner. While many disasters are difficult to predict, their consequences in relation to human migration and environmental changes can be timely determined. The government policies and development projects usually require a medium or long-term plan, and therefore, forecasting of migration and environmental changes is achievable.

4. Conduct pre-departure orientation for potential migrants in addition to the current post-arrival interventions. Many studies have identified key source communities for both internal and cross-border migrations, and some also found that migrants from non-endemic areas have little or no malaria knowledge, but not much effort has been made to educate potential or circular migrants on malaria prevention at their source communities. As many migrants, especially the irregular ones, are in hiding and difficult to reach, it is critical to equip them with the malaria knowledge and information related to available services at migration destinations before they travel to the risk zone. Since the reasons for migration vary markedly, it is unlikely that addressing the issue of malaria alone, will have a strong impact on migrants. Therefore, it is critical that service providers understand the circumstances of their migration and implement the malaria activities in the context of the broader "safe migration" concept.

II. Strengthening the surveillance and migrant health information systems

Usually, disease surveillance is conducted in a routine, passive manner and this is also the case for malaria, including monitoring of drug resistant malaria, in all the GMS countries. While this has proven to be a cost-effective method for long-term monitoring of the situation, it can be misleading for many reasons, especially when it comes to migrant health issues. Routine surveillance systems usually report the cases according to the locations where the patients seek healthcare but not necessarily the locations where the parasites exist or where the infections actually take place. This could indicate that some locations are the hotspots while in fact very limited transmission occurs, especially when the patients are highly mobile. In order for malaria infections in human to exist, maintain, and expand, including the drug-resistant malaria, four key factors are required: large enough number of malaria parasite infected vector population; climates and environment suitable for the vectors to breed and survive (*ie*, risky environment); large enough number of human host population exposed to the areas; and risk behaviors of the host. However, in the context of containment, and moving towards elimination – as is the case in Thailand, for example, high volumes of infected mosquitoes and human host populations may not be so relevant, because even if only a few infections occurred, these have to be addressed to ensure that the parasites are contained and/or eliminated.

Recommendations

To better capture migration information in the routine surveillance system that can be useful for the development of appropriate interventions, the following actions are recommended:

1. Include reports on known and suspected infection sites in the routine malaria case reporting system.
2. Include ethnographic methods in the case investigation to appropriately explore migration history and the associated risks of the migrant patients, as well as their future migration plans. Integrating a skilled counselor to the conventional medical investigation team will also be of benefit, not only to the medical history taking, but also to enable better understanding of the array of factors which combine together to lead the patient or his/her family to decide to continue migrating or return home to avoid incomplete treatment that could lead to drug resistance.
3. Implement the integrated biological and behavioral surveillance survey (IBBS) that also covers issues related to migration and associated risks and vulnerabilities.
4. Triangulate data/ information on population movements, their associated risks, and biological and ecological factors at local level. Based on the recommendations above, existing

and emerging “risk zones” and “at risk populations” as well as their associated risk behaviors can be more clearly identified. Then, a triangulation of the said data/ information should be conducted to determine the current situation and/or future trends in a comprehensive manner. Since the malaria situation in one location can affect others through population movements, a harmonized strategy at national and international levels is very important. However, since different locales may share some common characteristics and are unique for others, it is important that the triangulation be conducted at the local level. The data triangulation can also help confine interventions to prioritized settings when the funding is limited; *eg*, it can help determine whether to target interventions at the “hotspots” or the “risk zones”, or whether to target specific population groups, or to apply “area-based” or “population-based” approach.

5. Areas with a combination of the following characteristics are key for future monitoring and interventions as they are high-risk areas for malaria outbreaks:

- a. Areas where deep forests or large scale plantations exist;
- b. Areas where malaria cases, including (potential) drug resistance, are still consistently reported;
- c. Areas where high volumes of population movements take place; and
- d. Areas where levels of malaria knowledge and preventive behaviors of local and migrant populations are low.

III. Improving access to appropriate health services among migrants

Although there are many positive aspects of migration, migrants are frequently marginalized, live and work in poor conditions, and lack access to health information and quality healthcare. Since many migrants in the GMS are displaced as a result of political and economic reasons, many of them have poor health condition and health selectivity that is found in voluntary migrants elsewhere, *ie*, when migrants are healthier than local people, may not/necessarily be applicable (Srivirojana and Punpuing, undated). Providing health coverage to migrants is a complex ongoing challenge because the health needs of migrants are influenced by the health situation in their countries and their past health histories, often off the record at the destinations. Cross-border migrants cannot be reached by service providers at their countries of origin, while at the same time the majority of them are ineligible for health services in the transit and destination countries due to their irregular status and being highly mobile. This lack/ limited access to health services can also be found among internal migrants where health service systems are tied up with household registration such as in the case of China, Thailand and Viet Nam (Huynh, 2009; Srithamrongsawat *et al*, 2009; Ho, 2010; China Daily, 2012). Many people in Myanmar, Cambodia and Lao PDR have limited access to health services despite the proclaimed free health

care system in these countries, since the government health facilities often face shortages of supplies and/or skilled healthcare providers.

Frequently, the concepts of citizenship and nationality prevent service providers from providing health services to cross-border migrants for fear that doing so might be illegal or against the practitioner's code of conduct. However, even when the healthcare providers are willing to provide health services to migrants regardless of their migration status or ability to pay for the fee such as the case of Thailand, many undocumented migrants opt to avoid accessing the services due to fear of arrest (Srithamrongsawat *et al*, 2009; Jitthai, 2012 unpublished). On the other hand, many documented migrants choose not to receive the services they are entitled to mainly because of their low level of knowledge and health awareness and ignorance of their rights to health. In addition, the lack of national budget support restricts the services to be provided to only those who are eligible, and therefore, most of the providers of health services to migrants have to rely heavily on external donor support that is limited both in terms of the funding amount, period, and its utilization. Cross-border migrants may be more vulnerable due to limited social networks, restriction of movement by the host country, limited health knowledge and information, and cultural and language barriers. These factors often result in migrants across the GMS practicing self-medication (of both modern and traditional medicines) and using private clinics where there is no or limited expertise. Ethnic populations, especially those who are not considered a citizen of any nation, usually have no access to health services. Importantly, provision of health services does not explicitly mean medical care but rather a continuum of accessible health information, prevention, treatment, care, and support. While cross-border migrants may face more problems related to cultural and language barriers, internal migrants can also face the same issues since all the GMS countries host diverse ethnic populations with over 100 languages and dialects. Both cross-border and internal migrants also have limited participation in the host community. All of these factors increase a person's vulnerability to several health problems including malaria.

Recommendations

1. Promote universal access to a continuum of health care from malaria prevention to service among local people and migrants, both internal and cross-border, especially at the hotspots and the risk zones for drug resistant malaria. This will require political and financial support, and needs to involve both the migrants and the service providers to ensure a balanced demand and supply for the service.

2. Promote Meaningful Involvement of Migrants (MIM) strategy. Involving migrants throughout the process from the program/ activity design, implementation, to monitoring and evaluation in a meaningful way has proved to be of great benefit as they know best about

their communities and needs and can overcome cultural and language barriers (Jitthai, 2009). However, this requires strong technical, coordination, and management experience since involving migrants who are mostly irregular, highly mobile, and have limited educational backgrounds and work skills is a big challenge and the misuse of their involvement can result in adverse outcomes.

3. Create an enabling environment for improving positive behavior change or a “migrant-friendly” malaria service. In addition to increasing malaria related knowledge and coverage of protective measures, a friendly clinical service that meets quality standards in a safe environment is essential to gain trust and utilization among migrants.

4. Improve access to and quality of malaria related service in the GMS countries. This can be prioritized in the malaria-prone and migrant-populated areas as an immediate action. In addition to the benefit to internal migrants, this will ultimately reduce the number of cross-border patients who are harder to manage and follow-up, and may have more potential for drug resistance since many of the hotspots are on the border.

IV. Promoting partnership and advocating for policy changes

It is essential to realize that governmental policies on decentralization, urbanization, industrialization, and population and human resource development affect migration, directly or indirectly, even when migration is not explicitly taken into account in the formulation of these policies. Engaging in mobility and malaria work is impossible without a strong multi-sectoral partnership as it can facilitate access to hard-to-reach people and places. Working collectively can bring about policy improvements and help to create a more supportive environment for migrants. Perhaps more than anything else, partnership is a key component of successful interventions (Hsiang *et al*, 2010; Tatem and Smith, 2010). Partners are as diverse as the migrants themselves, and can include health authorities and service providers, NGOs, community groups, media, the private sector, police/ immigration officers and other line ministries, entrepreneurs, migrants themselves, and others. In particular, police/ immigration officers and employers of migrants should be made key partners as they can ultimately allow or restrict movement of or access to migrants but they are often neglected because it is a challenge to gain their buy-in. While the role of an officer is to arrest undocumented migrants, some employers, especially those who are employing irregular migrants or treating their workers harshly, may be reluctant to collaborate. As long as border crossing is involved, creating linkages through cross-border interventions is essential but still not happening in most of the GMS borders.

Recommendations

1. Advocate for collaboration from the police/ immigration authorities. This should be

considered as a role of the health authorities, service providers, and/or project managers to enhance understanding of these authorities in relation to public health threats if migrant patients cannot access the health services required. This has to be conducted with caution to avoid the misperception that migrants are sources of diseases.

2. Advocate for collaboration from employers or managers of migrants. It is important for project implementers to gain an understanding about the business environment, and to learn what may motivate employers to undertake social action. Many NGOs tend to include other rights-based activities such as labor law and labor rights into migrant health interventions that can obstruct the employers' cooperation, thus, health and other rights-based activities should not be mixed but rather to be implemented at different occasions, and if possible by different groups of implementers.

3. Promote involvement of other ministries or other government departments outside of the health sector to take action in reducing the vulnerability of migrants to malaria risk. For example, primary schools in source communities can educate students about the realities of migration and how to make it safer; malaria prevention schemes can be integrated into major infrastructure projects such as road, dam, or hydropower plant construction as deemed appropriate through the Ministry of Transportation and other relevant governing bodies; legal recognition of cross-border migrants by the Ministry of Labor can help reduce their isolation and marginalization, and so on.

4. Foster regional collaboration with countries in low-transmission settings as they will face difficulties in achieving elimination and maintaining a malaria-free status if they face a steady stream of incoming malaria cases from neighbors that continue to have high transmission (Tatem and Smith, 2010). National Malaria Programs in source and destination countries need to work together. Adjoining cross-border communities need to be considered as a single, extended town due to the interaction between the populations on both sides. Regional connections can be made by linking services, using consistent materials and messages, developing a branded communications strategy, and conducting joint outreach activities. If possible, malaria treatment guidelines should also be harmonized. Otherwise, a guideline on how to adjust the treatment regimen should be developed to ensure a consistent and effective treatment among mobile patients. However, regional collaboration should not be limited to the "twin-city" at the border areas but also along other points of migration routes; *ie*, at major source, transit, destination, and return communities within a country and beyond the border. The implementation of interventions in multiple sites is complex and challenging. Often the level of difficulty is not anticipated, and therefore, it is recommended that implementers should try to anticipate and respond to the challenges at the earliest opportunity.

5. Advocate for allocation of funding for malaria prevention program among international

aid agencies. Experience from HIV/AIDS advocacy initiatives, demonstrates a good example of successful advocacy strategies. For example, the ADB developed a policy requiring any State that wished to receive an ADB loan or grant money for infrastructure projects, to allocate a certain percentage of the total loan or grant amount for HIV/AIDS interventions around the construction sites. Similar policies have also been adopted by other agencies such as the JBIC and the World Bank. Since many development projects result in deforestation and relocation and/or migration of people that are linked to the changing malaria situation, it will be justifiable for international aid agencies as well as the host governments to develop policies to allocate an appropriate amount of funding, grant, or bilateral agreement or loan money to assess the impact of such projects on migration and malaria as well as to implement malaria services as deemed appropriate.

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