



Neglected Tropical Diseases among Migrant Workers: A Malaysian Case Study



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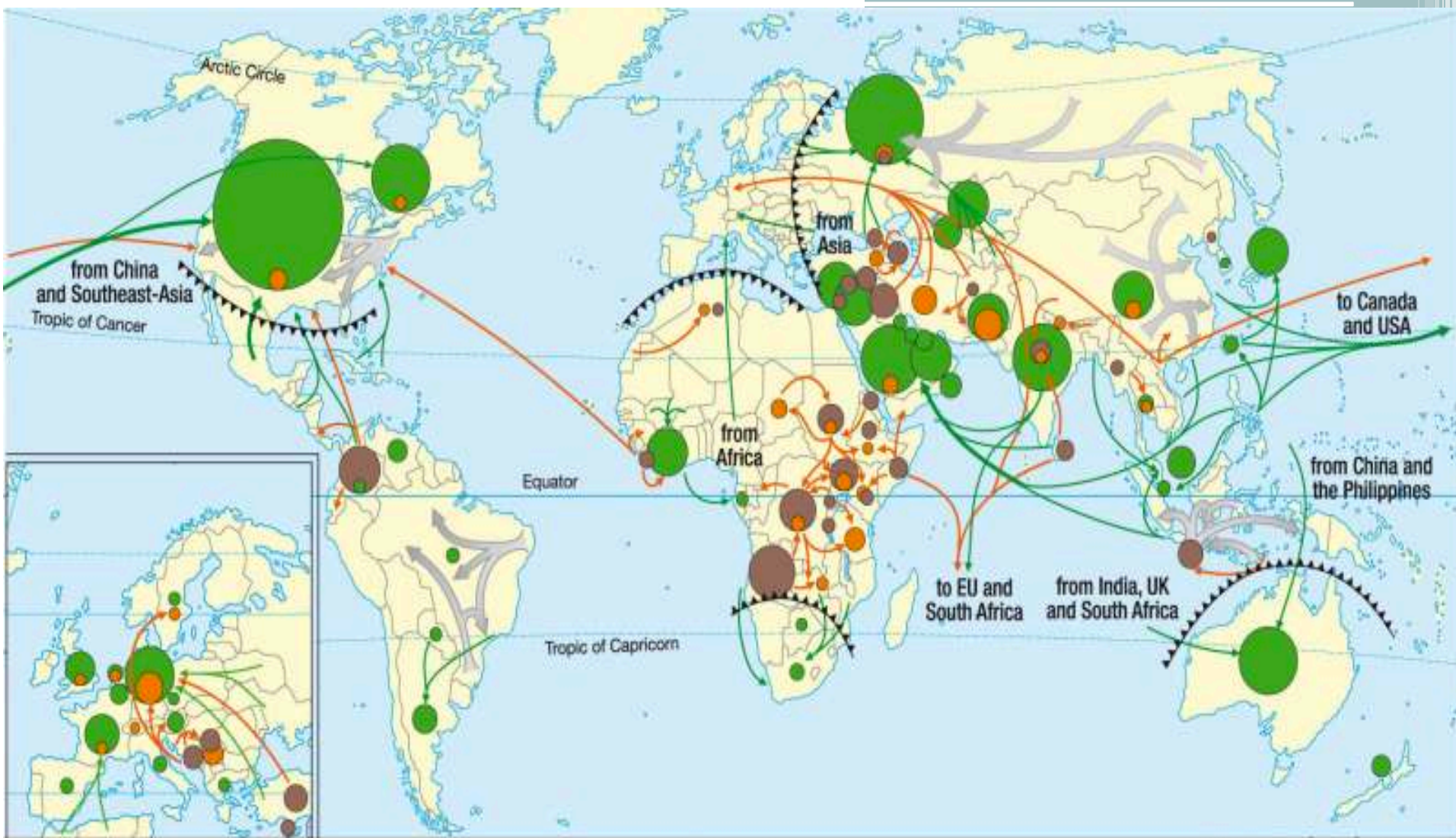
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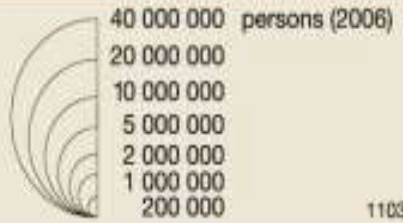
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- Migration**
- Migrant workers with residence permit
 - Refugees
 - Interior refugees

- International migration of migrant workers (2006)
- International migration of refugees (2006)
- Interior migration since 1990
- ▲▲▲ Enforced security boundaries



Southeast Asia

- Better standard of living resulted in the influx of workers from neighbouring countries to Malaysia.



Figure 1: Malaysia and adjacent countries. Source: WorldAtlas.com, 2016

Table 1: Socio-demographic status between Malaysia and neighbouring countries (Indonesia, India, Bangladesh, Nepal and Myanmar.)

| | Malaysia | Indonesia | India | Bangladesh | Nepal | Myanmar |
|---|---------------------------------------|---------------------------------------|--------------------------------------|--------------------------------------|---------------------------------------|---------------------------------------|
| Population (July 2017 est.) | 31,381,992 | 260,580,739 | 1,281,935,911 | 157,826,578 | 29,384,297 | 55,123,814 |
| Population growth rate (2017 est.) | 1.37% | 0.86% | 1.17% | 1.04% | 1.16% | 0.91% |
| Net migration rate (2017 est.) | -0.30 migrant(s)/ 1,000 population | -1.10 migrant(s)/ 1,000 population | 0.00 migrant(s)/ 1,000 population | -3.1 migrant(s)/ 1,000 population | -2.20 migrant(s)/ 1,000 population | -1.50 migrant(s)/ 1,000 population |
| Urbanization | 76.0% | 55.3% | 34.0% | 36.6% | 19.7% | 30.6% |
| Sanitation facility access | 96% | 60.8% | 39.6% | 60.6% | 45.8% | 77.4% |
| Drinking water resources | 98.2% | 87.4% | 94.1% | 86.9% | 91.6% | 80.6% |

Source: The World Factbook – Central Intelligence Agency (2018).

Migrant workers status in Malaysia

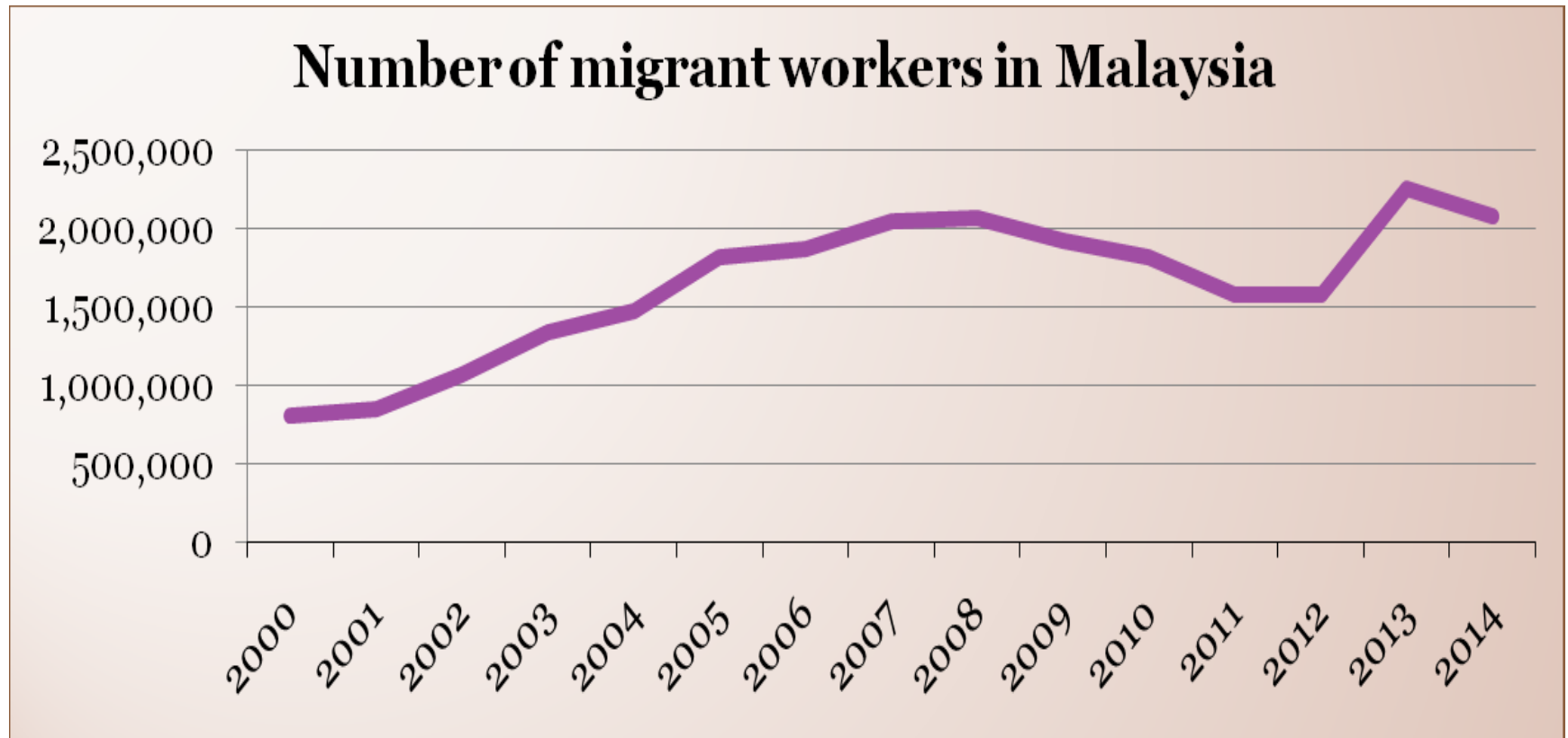
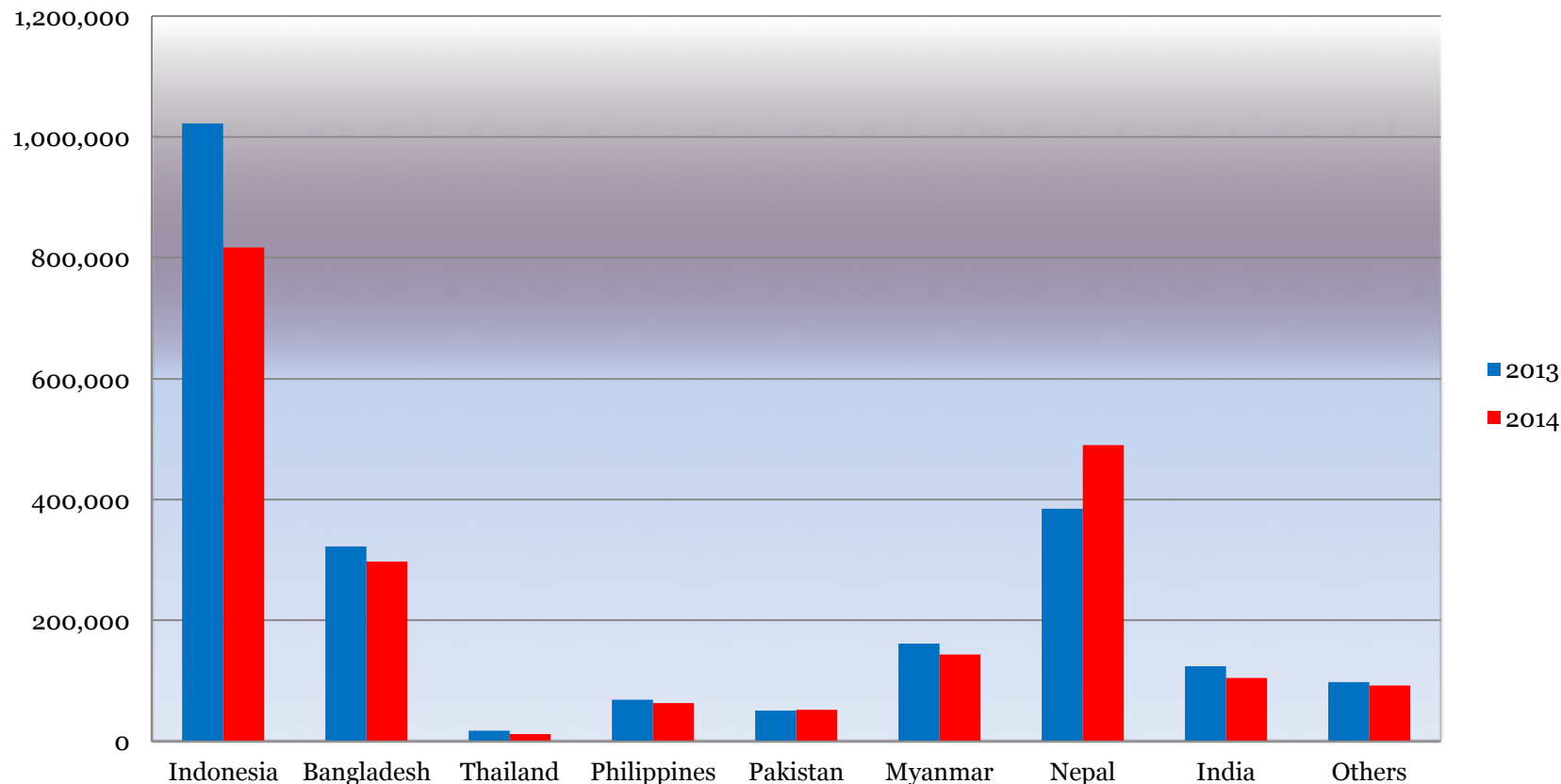


Figure 2. Source: Temporary Work Visit Pass (PLKS), Immigration Department (Ministry of Home Affairs)

Number of migrant workers in Malaysia (2013-2014) according to nationality



* Others: Cambodia, China, Vietnam, Laos, Sri Lanka.

Figure 3. Source: Temporary Work Visit Pass (PLKS), Immigration Department (Ministry of Home Affairs)

Employment of migrant workers by sectors (2000-2014)

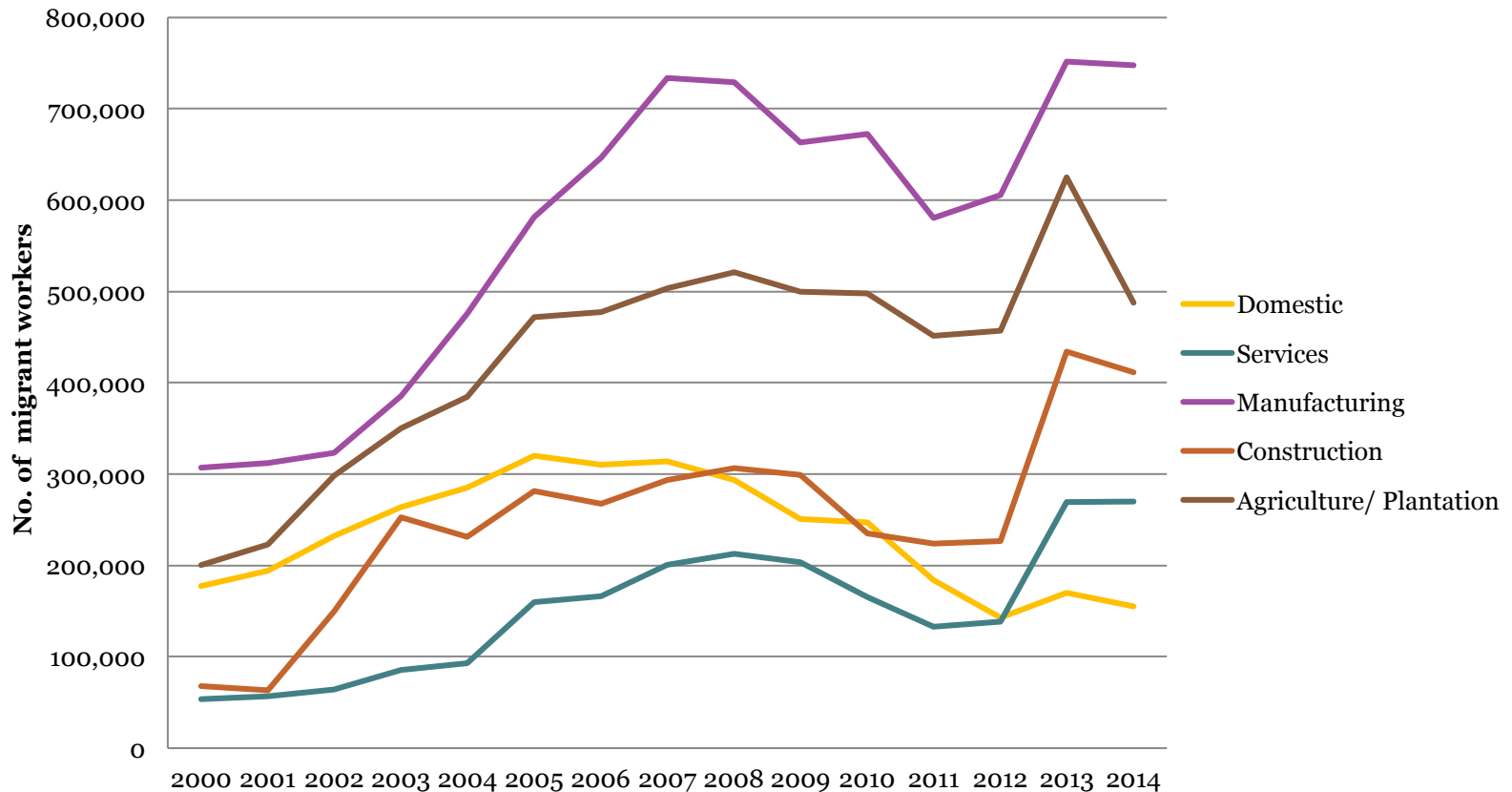


Figure 4. Source: Temporary Work Visit Pass (PLKS), Immigration Department (Ministry of Home Affairs)

Health screening requirements

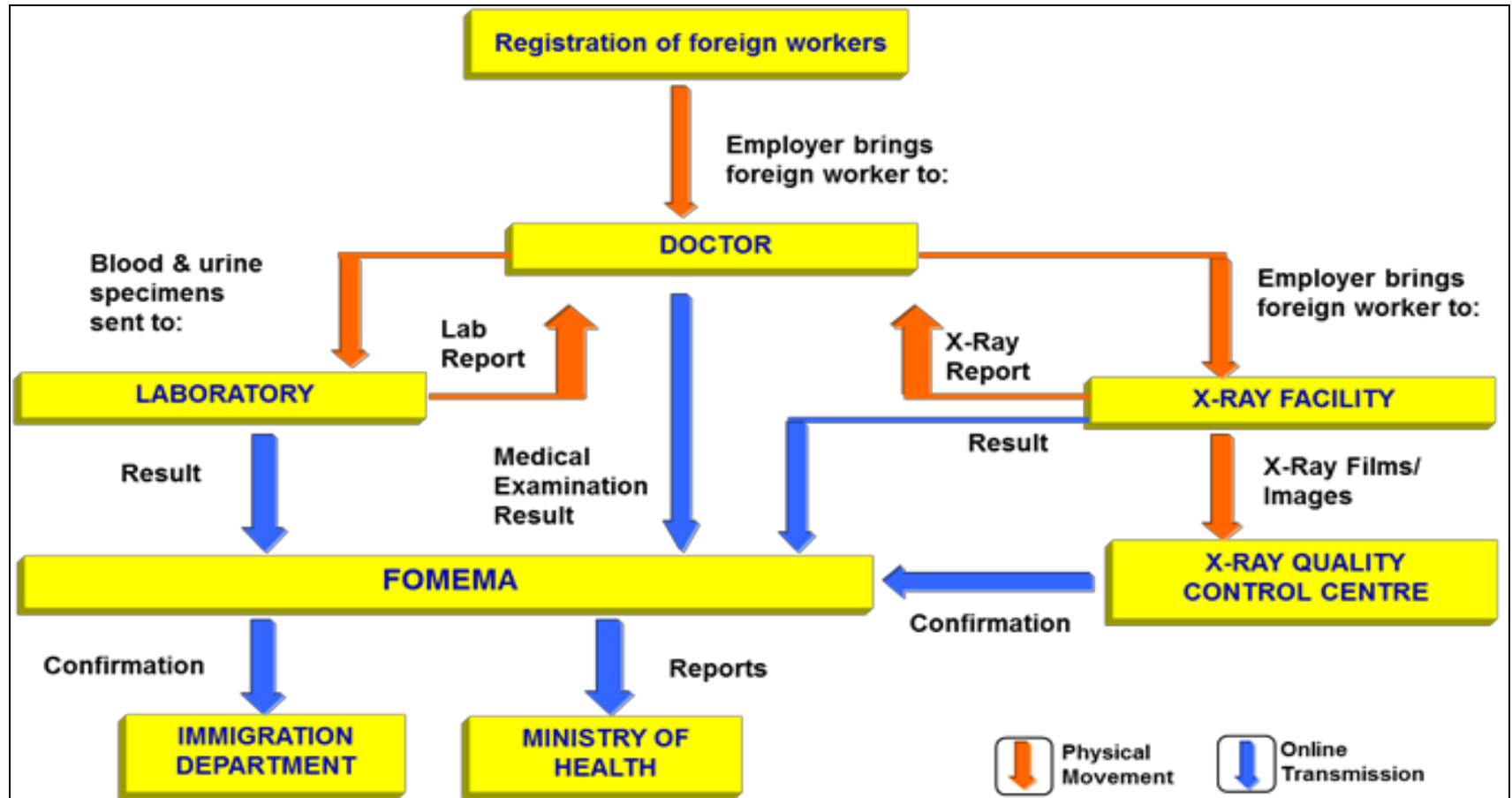


Figure 5: Medical screening process of migrant workers in Malaysia. Source: FOMEMA

Table 2: Categories of medical examination as stipulated by Ministry of Health.

| Category | Examination |
|-----------------------------|---|
| Medical History | <ul style="list-style-type: none"> • HIV/AIDS • TuberculoAsis • Leprosy • Viral Hepatitis • Peptic Ulcer • Epilepsy • Cancer • Kidney Disease • Malaria • Hypertension • Heart Diseases • Bronchial Asthma • Diabetes Mellitus • Phsyciatric Illnesses • Sexually Transmitted Diseases (STD) • Others |
| Physical Examination | <ul style="list-style-type: none"> • Height and Weight • Pulse Rate and Blood Pressure • Last menstrual Period (female) • Chronic Skin Rash • Anaesthetic Skin Patch • Deformities of Limbs • Anaemia • Jaundice • Lymph Nodes Enlargement • Vision Test • Hearing ability • Others |
| System Examination | <ul style="list-style-type: none"> • Cardiovascular System • Respiratory System • Gastrointestinal System • Nervous System • Mental Status • Genitourinary System |
| Laboratory Tests | <p>Blood Test:</p> <ul style="list-style-type: none"> • For Blood Grouping (A,B,AB or O and Rh). • For HIV, Hepatitis B, VDRL and Malaria. <p>Urine Tests:</p> <ul style="list-style-type: none"> • For colour, specific gravity, sugar, albumin and microscopic examination. • For opiates, cannabis and pregnancy (for female). |
| Chest X-ray | Physical examination of the foreign worker must be carried out first before chest X-ray examination. |

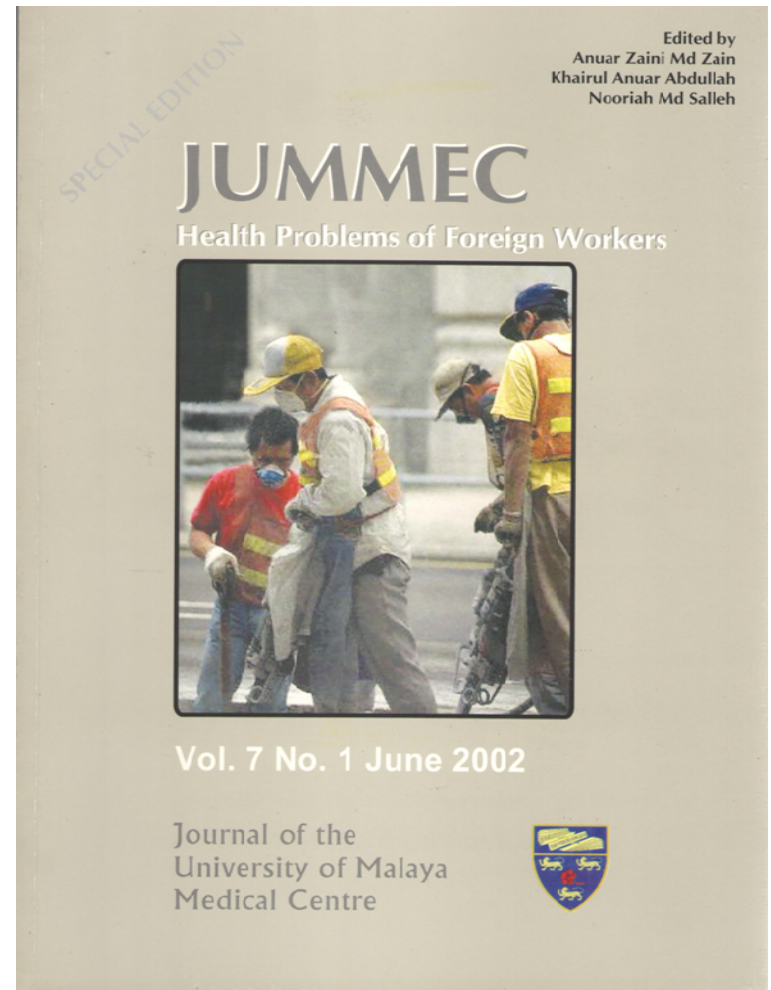
Source: FOMEMA

Table 3: Historical timeline of parasitic infections studies among migrants in Malaysia

| References | Samples | Migrant population | Parasitic analysis | No. of samples | No. positive (%) |
|------------------------------------|---------|---------------------------------------|---|----------------|------------------|
| Zainul <i>et al.</i> , 1992 | Blood | Women with still births | Toxoplasmosis | 144 | 51 (35.7) |
| Suresh <i>et al.</i> , 2002 | Stool | Clinical samples/ Workers | STH and Protozoa | 173 | 62 (36) |
| Rajah <i>et al.</i> , 2002 | Stool | Clinical samples/ workers | Blastocystis | 173 | 10 (5.8) |
| Kamarulzaman & Khairul Anuar, 2002 | Blood | Clinical suspected case (worker) | Leishmaniasis | A case report | 1 |
| Khairul Anuar <i>et al.</i> , 2002 | Blood | Clinical samples/ workers | Blood parasites | 241 | 2 (0.83) |
| Zurainee, 2002 | Blood | Workers | Serological detection: Amoebiasis, Echinococcosis, Filariasis (<i>Brugia malayi</i> and <i>Wuchereria bancrofti</i>), Leishmaniasis, Malaria, Schistosomiasis, Trypanosomiasis | 698 | 266 (38.1) |
| Nissapatorn <i>et al.</i> , 2002 | Blood | HIV-AIDS/HBD | Toxoplasmosis | 303 | 152 (50.0) |
| Nissapatorn <i>et al.</i> , 2003a | Blood | HIV/AIDS, HKL | Toxoplasmosis | 301 | 75 (25.0) |
| Nissapatorn <i>et al.</i> , 2003b | Blood | AIDS, HKL | Toxoplasmosis | 406 | 6 (1.4) |
| Chan <i>et al.</i> , 2008a | Blood | Plantation workers/ Detention camp | Toxoplasmosis | 501 | 171 (34.1) |
| Chan <i>et al.</i> , 2008b | Blood | Plantation workers/ Detention camp | Toxoplasmosis | 501 | 171 (34.1) |
| Amal <i>et al.</i> , 2008 | Blood | Plantation workers/ Detention camp | Toxoplasmosis | 501 | 171 (34.1) |
| Chan <i>et al.</i> , 2009 | Blood | Plantation workers/ Detention camp | Toxoplasmosis | 336 | 138 (42) |

Justification for study

- Last study was more than a decade ago (Zaini, *et.al.* 2002).
- Mainly clinical patients coming in for treatment at University of Malaya Medical Centre (UMMC)



Methodology

A total of 610 migrant workers were recruited between September 2014 and August 2015, employed in five sectors; construction, manufacturing, agriculture and plantations, food services and domestic services

388 workers returned stool samples

Screened for helminth and protozoa by formalin ethyl acetate concentration technique and modified Ziehl-Neelsen staining

Molecular screening for hookworm and *Strongyloides* species

485 workers returned blood samples

Serological screening from 485 serum samples for anti-*Strongyloides* IgG

Serodiagnosis of cystic echinococcosis from 135 serum samples

RESEARCH ARTICLE

Migrant Workers in Malaysia: Current Implications of Sociodemographic and Environmental Characteristics in the Transmission of Intestinal Parasitic Infections


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Intestinal Parasitic Infections

A high proportion of the workers (**n=244/388, 62.9%**) were **positive** for at least one parasite species.

Infections were significantly influenced by:

- ✓ **Nationality (Nepalese)**
- ✓ **Length of working years in the country (Less than 1 year)**
- ✓ **Employment sector (food service sector)**
- ✓ **Educational level (high school level)**

Results showed that most workers with

- ✓ **Poor personal hygiene practice**
- ✓ **Lack of health awareness**

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Hookworm infections among migrant workers in Malaysia: Molecular identification of *Necator americanus* and *Ancylostoma duodenale*



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Hookworm Infections

A total of **51 samples (13.1%)** were positive by microscopy for hookworm infections.


PCR amplicons were successfully obtained from 82.4% of 51 samples

- 81.0% (34 of 42) identified as ***Necator americanus***
- 16.7% (7 of 42) as ***Ancylostoma spp.***
- 2.4% (1 of 42) as mixed infections of both species; ***N. americanus* and *Ancylostoma spp.***

- ✓ All eight *Ancylostoma spp.* were confirmed to be ***Ancylostoma duodenale***.
- ✓ This is the first time ***A. duodenale* was reported in Malaysia.**

Strongyloides stercoralis infections

The overall seroprevalence of *S. stercoralis* using the ELISA commercial kit for immunoglobulin G (IgG) was **35.8%** (n=173; 95% CL: 31.5-40.1%). Seroprevalence using the rSs1a-ELISA was **13.0%** (n=63; 95% CL: 10.0-16.0%).



Subsequent testing by a nested PCR against DNA from stool samples showed successful DNA amplification from three male samples (**0.8%; 3/388**).


Despite the low prevalence of *S. stercoralis* infection and seroprevalence of the antibodies in the study population, the results highlight the importance of :

- ✓ **Improvements in personal hygiene** and **sanitation standards** among migrant workers in Malaysia
- ✓ Call for implementation of relevant control strategies.

Serodiagnosis of Cystic echinococcosis (CE)

A total of 135 serum samples were tested for antibodies to *Echinococcus*.

Screening for Cystic echinococcosis (CE) and compared by adopting **two commercial IgG ELISA kits** and a **prototype IgG4 lateral flow dipstick test**.



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- Among the three tests, **concordant results were observed among 38 samples** and discordant results among 97 samples.
 - Statistical analysis showed fair agreement among them.

- ✓ This study highlights the **presence of CE infections among migrant workers**.
- ✓ This information is **crucial for public health officials** when offering diagnosis and treatment for these workers.

Recommendations

Results highlight the requirements to refine current health policies particularly for workers entering Malaysia for employment to include:

- ❑ Implementation of mass drug administration for newly arrive workers as stated by WHO (2001).
- ❑ Health awareness programs aimed at;
 - **Increasing the importance of personal hygiene and sanitation**
 - **Disease transmission**
 - **Healthy behaviors in controlling parasitic infections**

Other similar works

- Studies on parasitic infections amongst migrant workers have been conducted worldwide particularly in Asia;
 - ❖ **Thailand** (Saksirisampant *et al.*, 2002; Nuchprayoon *et al.*, 2009; Ngrenngarmkert *et al.*, 2012)
 - ❖ **Taiwan** (Lo & Lee, 1996; Wang, 1998; 2004; Meng-Hsuan *et al.*, 2011)
 - ❖ **Taipei** (Cheng & Shieh, 2007)
 - ❖ **Kingdom of Saudi Arabia** [Abha district (Al-Madani & Mahfouz, 1995), Riyadh (Kalantan, 2001), Al-Khobar (Abahussain, 2005), Makkah (Wakid *et al.*, 2009), Al-Baha (Mohammad & Koshak, 2011), and Medina (Taha *et al.*, 2013)]
 - ❖ **Qatar** [Abu-Madi *et al.* (2008; 2010; 2011)]

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