

Travel related diseases: Forgotten but not gone

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Fever in returning travelers



28%
Reason for seeking care



17%
Preventable infection

26%
Hospitalization

Wilson ME, Weld LH, Boggild A, et al. 2007.

Fever in returning travelers



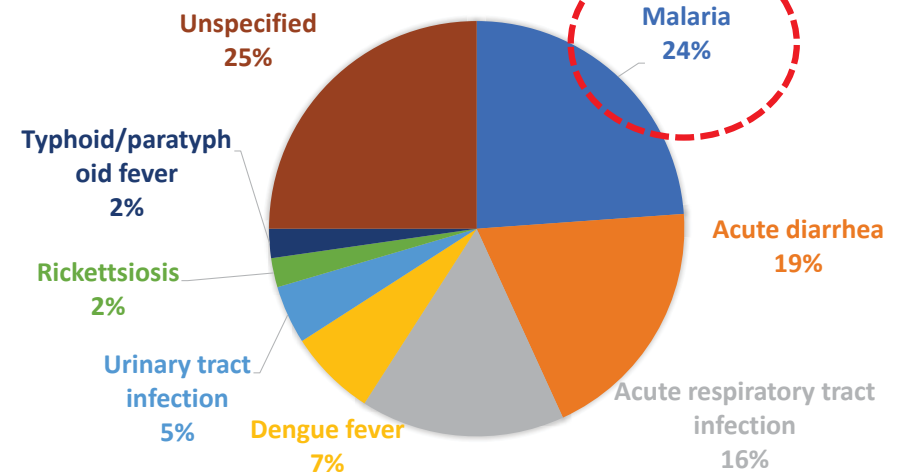
Visiting friends and relatives
(VFRs)



41%
Sub-Saharan Africa

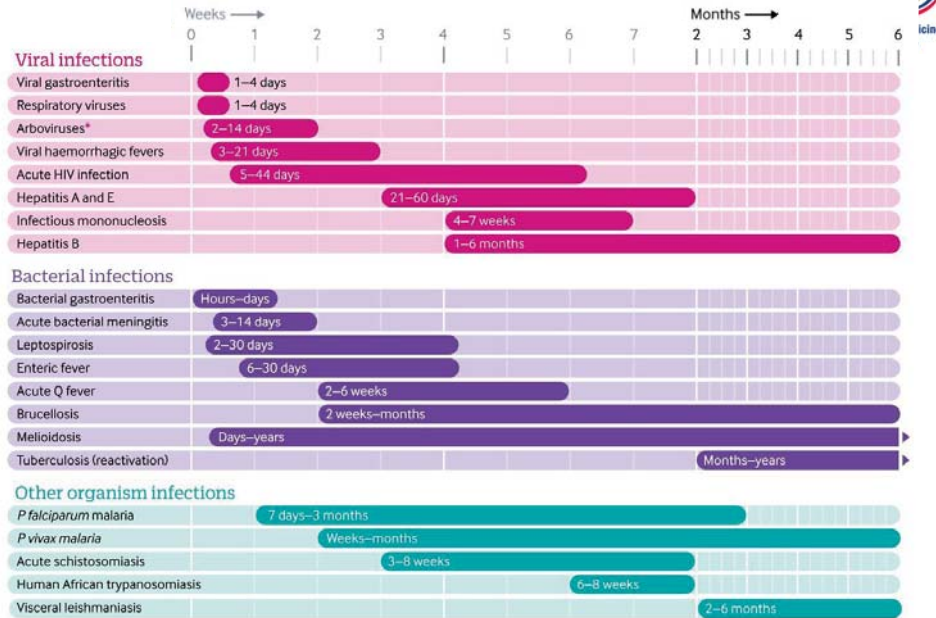
Wilson ME, Weld LH, Boggild A, et al. 2007.

Etiology of fever in returning travelers



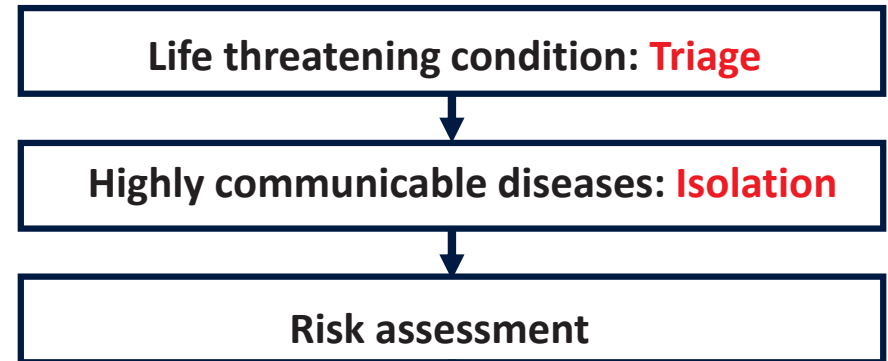
Wilson ME, Weld LH, Boggild A, et al. 2007.

Diseases incubation time

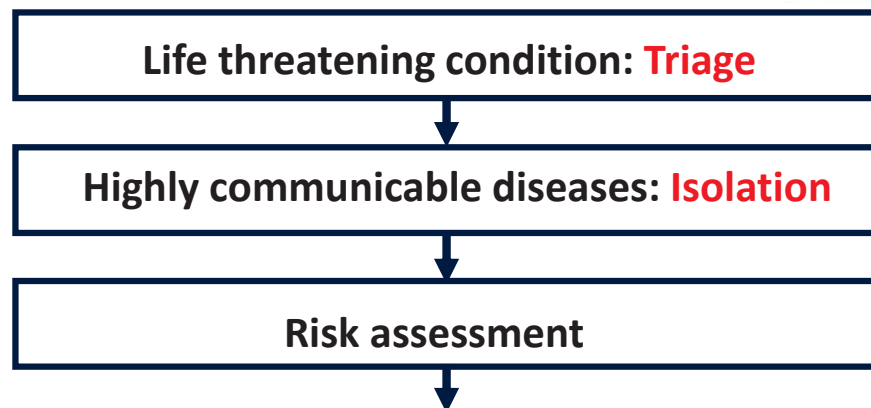


Fink D, Wani RS, Johnston V. 2018.

Approach to fever returning traveler

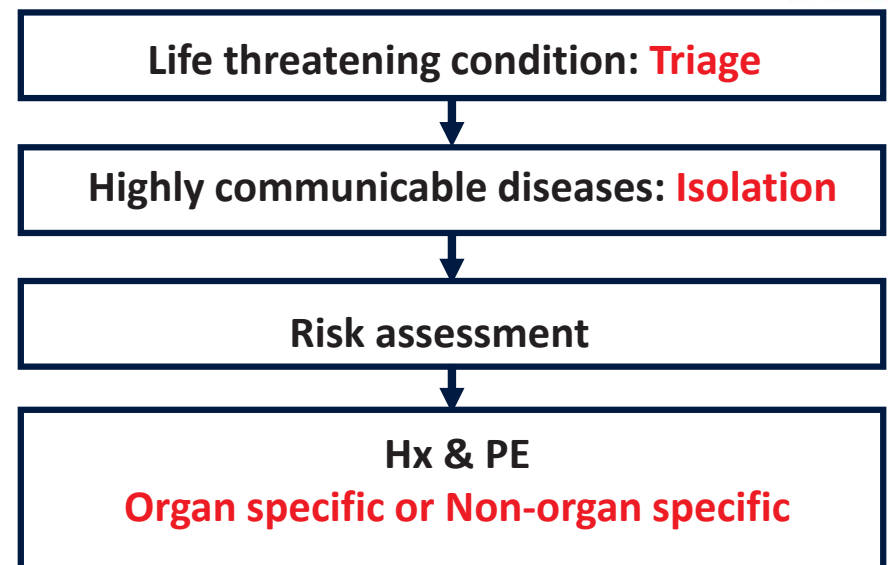


Approach to fever returning traveler



- ✓ Risk of malaria
- ✓ Risk of viral hemorrhagic fever
- ✓ Risk of emerging respiratory illnesses
- ✓ Risk of antimicrobial resistance

Approach to fever returning traveler



Fink D, Wani RS, Johnston V. 2018.

Organ specific infection



Fever with respiratory symptoms

- Pneumonia
- Influenza
- Tuberculosis

Fever with abdominal pain

- Cosmopolitan causes
- Enteric fever
- Giardiasis
- Liver abscess

Fever with jaundice

- Dengue fever
- Yellow fever
- Malaria
- Viral hepatitis
- Acute cholangitis

Fever with diarrhea

- Traveler's diarrhea
- Bacterial infection
- Intestinal amebiasis

Thwaites GE, Day NPJ. 2017

Clinical recommendation



- Malaria should be suspected in patients who have visited a malaria-endemic area
- Advice travelers to use repellents that contain 30% to 50% diethyltoluamide (DEET)
- Pretravel immunization or prophylaxis is mandatory



Feder HM Jr, Mansilla-Rivera K. 2013.

Malaria in human



Zoonotic malaria

Plasmodium falciparum
Plasmodium vivax
Plasmodium malariae
Plasmodium ovale curtisi
Plasmodium ovale wallikeri

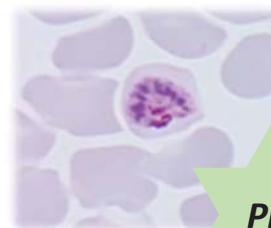
Plasmodium knowlesi
 (*Plasmodium cynomolgi*)

Ta TH, et al. 2014
 Fornace, et al. 2016

Malaria in human

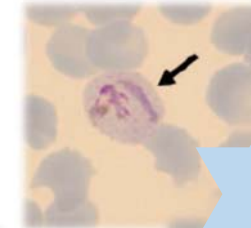


Plasmodium knowlesi



Pm

Plasmodium cynomolgi



Pv

Courtesy Dr. Wanlapa Roobsoong, Mahidol Vivax Research Unit. GN Hartmeyer, et al. 2019

Malaria in travelers



- Risk in endemic \neq Risk in travelers
- Relative risk by destination
- 1.2% per month in East Africa
- Visiting Friends and Relatives (VFRs)
- The geographic distribution of drug resistance
- $Pf \gg \gg Pv > Po$

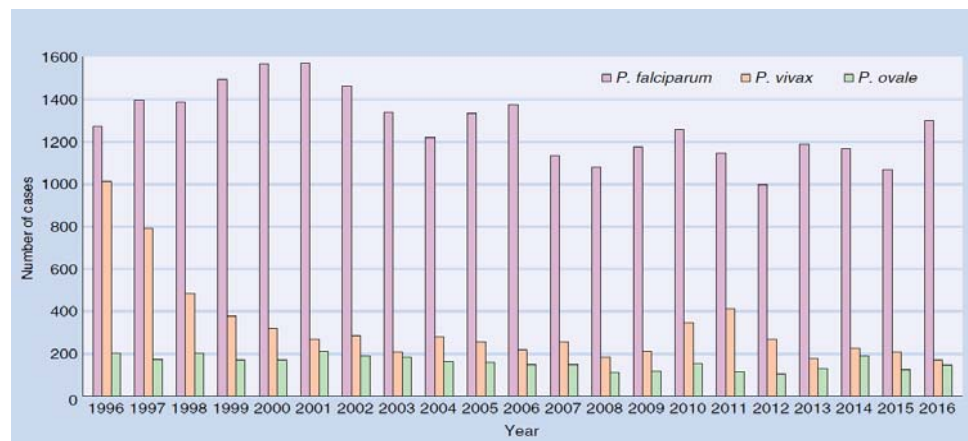
Mosquito bite prevention



Chemoprophylaxis

Jay Keystone et al. Travel Medicine 4th edition. 2018

Imported malaria cases into the UK



Jay Keystone et al. Travel Medicine 4th edition. 2018

Maximizing protection from mosquitoes and ticks



- ✓ Wear appropriate dress
- ✓ Bed net or permethrin-treated clothing/net
- ✓ Apply repellent to skin/clothing
- ✓ Check yourself during/after outdoor activity
- ✓ 20-50% DEET containing repellent or EPA approved

John-Paul Mutebi, CDC yellow book 2020

Prophylaxis assessment (1)



Types of travelers

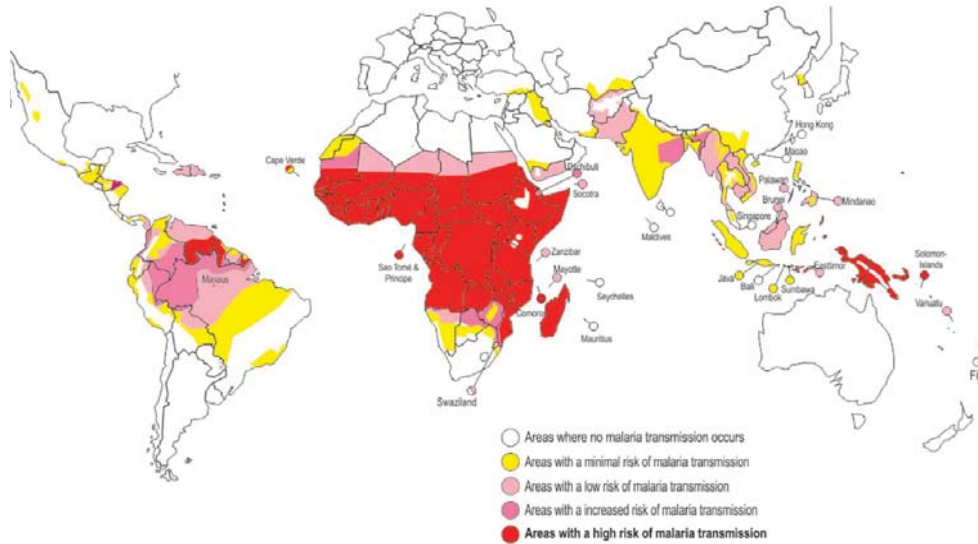
Activity/accommodation

Duration of trip

Destination

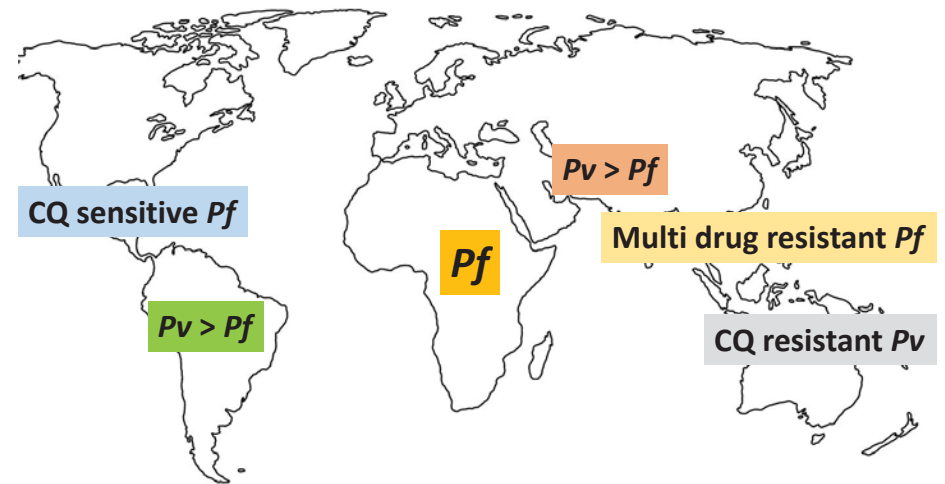
Jay Keystone et al. Travel Medicine 4th edition. 2018

Malaria risk zone

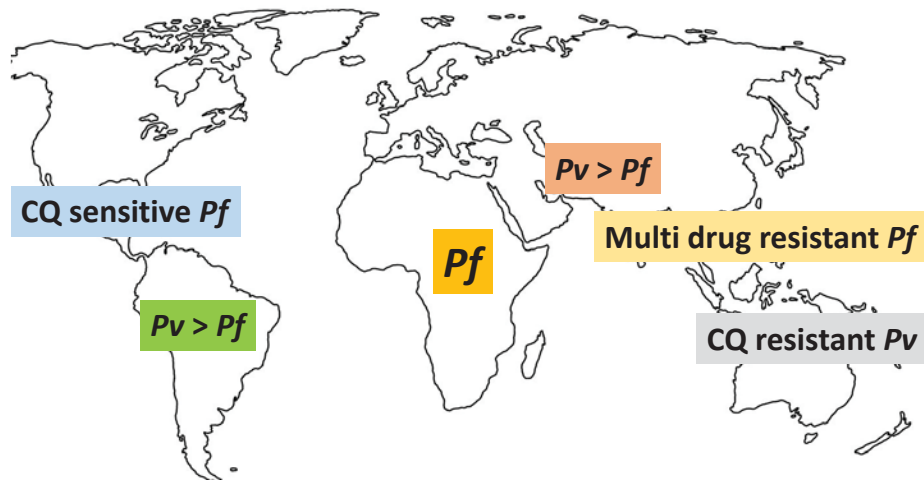


Jay Keystone et al. Travel Medicine 4th edition. 2018

Malaria epidemiology



Malaria epidemiology



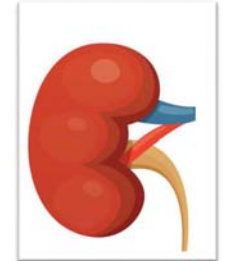
Prophylaxis assessment (2)



Budget



Pregnancy or planning



Health status

Preference

Malaria prophylaxis



Medications	Area for use	Timing begin and discontinue	Contraindications
Tafenoquine (Arakoda, 100 mg)	All area	<ul style="list-style-type: none"> 200 mg daily 3 days before travel 200 mg weekly during travel 200 mg once after travel 	<ul style="list-style-type: none"> < 18 years old Pregnancy G6PD deficiency (<70% normal activity) Breastfeeding
Atovaquone-proguanil (250/100 mg)	All areas	<ul style="list-style-type: none"> 1 tab OD with food 1-2 day before travel until 7 days after leaving 	<ul style="list-style-type: none"> GFR < 30 Pregnancy Breastfeeding
Doxycycline	All areas	<ul style="list-style-type: none"> 1 tab OD 1-2 days before travel until 4 weeks after leaving 	<ul style="list-style-type: none"> < 8 years Pregnant women Chronic IIP
Mefloquine	MQ sensitive area	<ul style="list-style-type: none"> 1 tab once a week ≥ 2 weeks before travel until 4 weeks after leaving 	<ul style="list-style-type: none"> Allergic to MQ psychosis

Malaria prophylaxis



Medications	Area for use	Timing begin and discontinue	Contraindications
Tafenoquine (Arakoda, 100 mg)	All area	<ul style="list-style-type: none"> Last minute travelers 	<ul style="list-style-type: none"> < 18 years old Pregnancy G6PD deficiency (<70% normal activity) Breastfeeding
Atovaquone-proguanil (250/100 mg)	All areas	<ul style="list-style-type: none"> Last minute travelers 	<ul style="list-style-type: none"> GFR < 30 Pregnancy Breastfeeding
Doxycycline	All areas	<ul style="list-style-type: none"> Last minute travelers 	<ul style="list-style-type: none"> < 8 years Pregnant women Chronic IIP
Mefloquine	MQ sensitive area	<ul style="list-style-type: none"> 1 tab once a week ≥ 2 weeks before travel until 4 weeks after leaving 	<ul style="list-style-type: none"> Allergic to MQ psychosis

Malaria prophylaxis



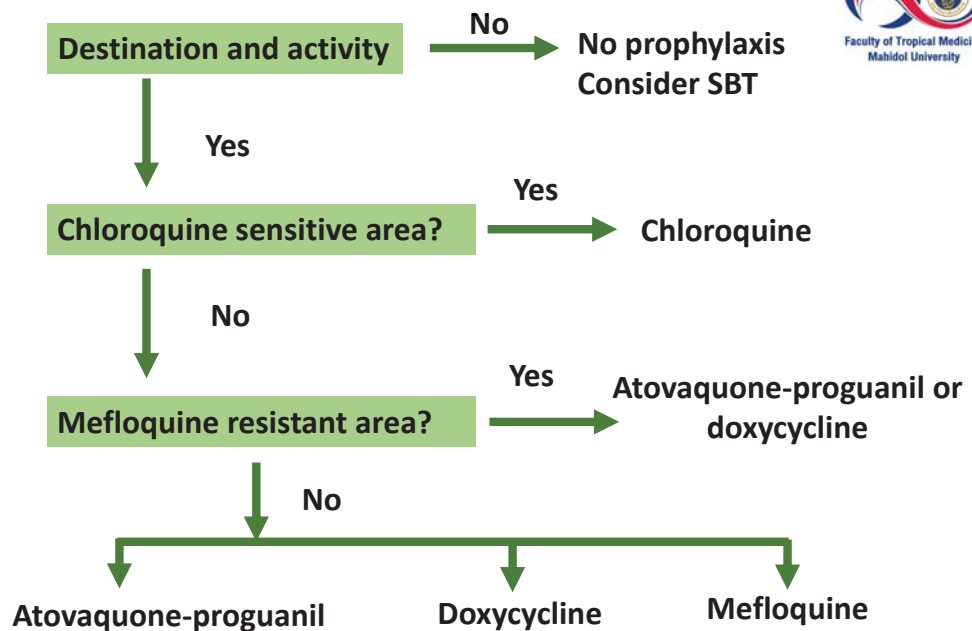
Medications	Area for use	Timing begin and discontinue	Contraindications
Tafenoquine (Arakoda, 100 mg)	All area	<ul style="list-style-type: none"> 200 mg daily 3 days before travel 200 mg weekly during travel 200 mg once after travel 	<ul style="list-style-type: none"> < 18 years old Pregnancy G6PD deficiency (<70% normal activity) Breastfeeding
Atovaquone-proguanil (250/100 mg)	All areas	<ul style="list-style-type: none"> 1 tab OD with food 1-2 day before travel until 7 days after leaving 	<ul style="list-style-type: none"> GFR < 30 Pregnancy Breastfeeding
Doxycycline	All areas	<ul style="list-style-type: none"> Long duration trip 	<ul style="list-style-type: none"> < 8 years Pregnant women Chronic IIP
Mefloquine	MQ sensitive area	<ul style="list-style-type: none"> Long duration trip 	<ul style="list-style-type: none"> Allergic to MQ psychosis

Malaria prophylaxis



Medications	Area for use	Timing begin and discontinue	Contraindications
Tafenoquine (Arakoda, 100 mg)	All area	<ul style="list-style-type: none"> 200 mg daily 3 days before travel 200 mg weekly during travel 200 mg once after travel 	<ul style="list-style-type: none"> < 18 years old Pregnancy G6PD deficiency (<70% normal activity) Breastfeeding
Atovaquone-proguanil (250/100 mg)	All areas	<ul style="list-style-type: none"> Best adherence 88% 	<ul style="list-style-type: none"> GFR < 30 Pregnancy Breastfeeding
Doxycycline	All areas	<ul style="list-style-type: none"> 83% adherence 	<ul style="list-style-type: none"> < 8 years Pregnant women Chronic IIP
Mefloquine	MQ sensitive area	<ul style="list-style-type: none"> 62% adherence 	<ul style="list-style-type: none"> Allergic to MQ psychosis

Malaria prophylaxis choices



Jay Keystone et al. Travel Medicine 4th edition. 2018

South Sudan Malaria



All areas with malaria

High risk for travelers

Malaria species:

P. falciparum 90%

P. vivax 5%–10%

P. malariae and *P. ovale* rare

Recommended chemoprophylaxis:

Atovaquone-proguanil, doxycycline, mefloquine, or tafenoquine

<https://wwwnc.cdc.gov/travel/yellowbook/2020/>

Treatment



หลักการให้การรักษารักษาโรคไข้มาลาเรียตามนโยบายการวินิจฉัยและดูแลรักษารักษาโรคไข้มาลาเรียภายใต้ยุทธศาสตร์การกำจัดการรักษาโรคไข้มาลาเรียประเทศไทย พ.ศ. 2560 – 2569

ให้ทำการจ่ายยารักษาโรคไข้มาลาเรีย ในผู้ป่วยที่มีผลการตรวจวินิจฉัยทางห้องปฏิบัติการยืนยันทุกรายโดยเร็วที่สุด และติดตามการรักษาเพื่อให้มั่นใจว่าผู้ป่วยได้รับยาครบถ้วนตามขนาดยา ไม่มีอาการข้างเคียงจากยาที่ร้ายแรง และหายจากอาการป่วย รวมทั้งตรวจเลือดไม่พบเชื้อซ้ำ หลักการจ่ายยาดังตารางที่ 1

ตารางที่ 1 หลักการให้การรักษารักษาโรคไข้มาลาเรียในประเทศไทยกรณีผู้ป่วยโรคไข้มาลาเรียที่ไม่มีภาวะแทรกซ้อน

ขนาดยา	<i>P. falciparum</i>	<i>P. vivax</i> และ <i>P. ovale</i>	<i>P. malariae</i>	<i>P. knowlesi</i>
ยาขนาดที่หนึ่ง (first line drug) ใช้ในการรักษารักษาโรคไข้มาลาเรียที่ไม่มีภาวะแทรกซ้อน*	ยาผสม Fixed-dose combination ของ Dihydroartemisinin-Piperaquine (DHA-PP) 3 วัน ร่วมด้วย Primaquine 1 วัน *ยกเว้น ผู้ป่วยในจังหวัดศรีสะเกษและอุบลราชธานี ให้ใช้ Artesunate-Pyronaridine 3 วัน เป็นยาขนาดที่หนึ่ง	Chloroquine 3 วัน ร่วมด้วย Primaquine 14 วัน	Chloroquine 3 วัน	- กรณีผู้ป่วยสงสัยให้ Chloroquine 3 วัน - กรณีผู้ป่วยยืนยัน ให้ DHA-PP 3 วัน หมายเหตุ ผู้ป่วย P.k. มีอาการรุนแรงได้จ่าย หากอาการเลวลง ให้รักษาแบบผู้ป่วยอาการรุนแรงทันที

แนวทางเวชปฏิบัติในการรักษาผู้ป่วยโรคไข้มาลาเรีย ประเทศไทย พ.ศ. 2562

Creeping eruption



Migration of Larvae
(Cutaneous Larva Migrans)

- ✓ Zoonotic hook worm
- ✓ Gnathostomiasis
- ✓ Larva currens

Migration of Parasite

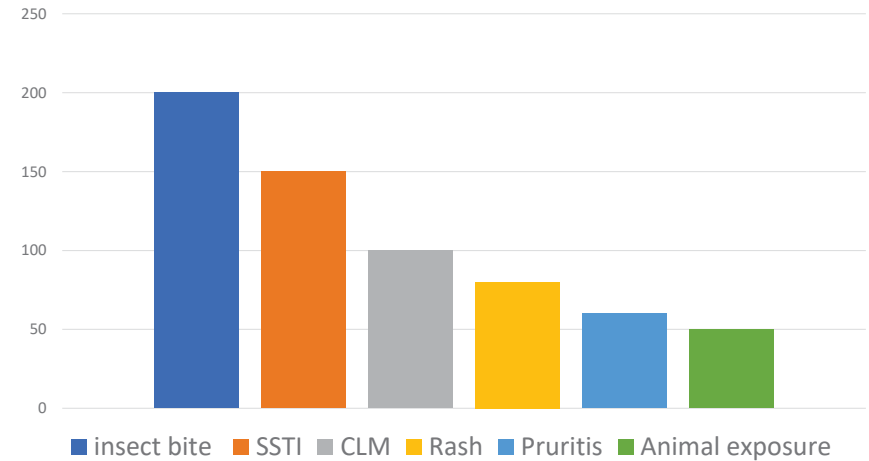
- ✓ Scabies
- ✓ Dracunculiasis
- ✓ Loiasis
- ✓ Myiasis

Cutaneous Larva Migrans (CLM)

GeoSentinel Surveillance of skin disease in returned travelers, 2007– 2011

Causative agents	Cutaneous track	Other cutaneous signs
Zoonotic hookworm (<i>Ancylostoma caninum</i> , <i>Ancylostoma braziliense</i>)	<ul style="list-style-type: none"> 1–10 burrows Feet or buttock Highly pruritic, vesiculobullous Slow-moving (2–5 cm/day) 	Highly pruritic, veiculobullous lesion
<i>Strongyloides stercoralis</i>	<ul style="list-style-type: none"> Usually 1 burrow Abdomen or buttocks Lasts for hours only Fast-moving (larva currens) 	Pruritus, urticaria
<i>Gnathostoma</i> spp	<ul style="list-style-type: none"> Usually 1 burrow Located anywhere Lasts for days Medium-fast-moving 	Cutaneous migratory edema (eosinophilic panniculitis)

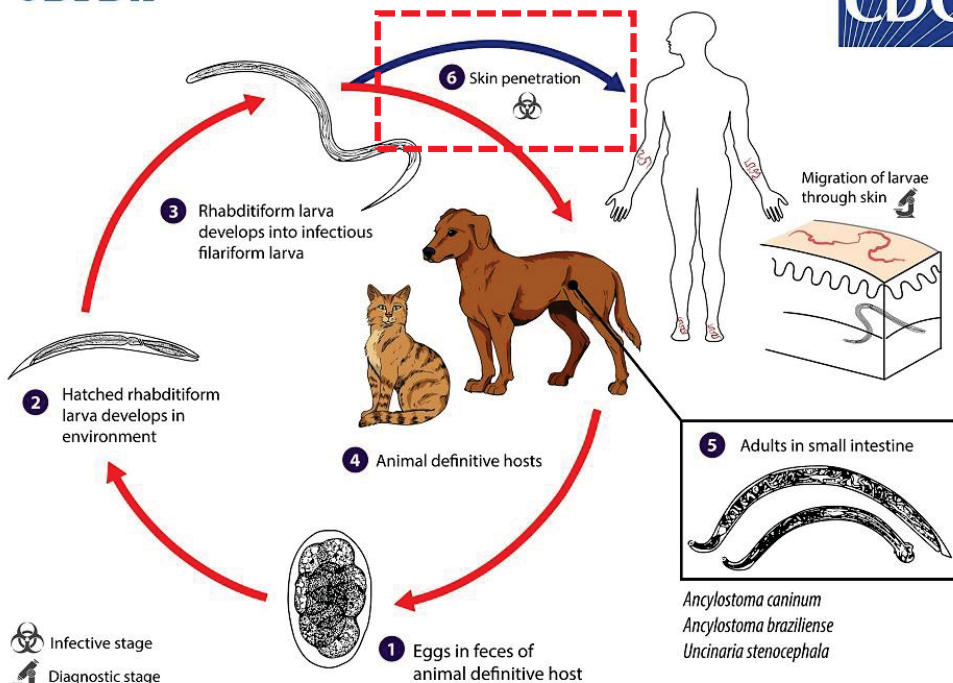
Eric Caumes, et al. 2004



Karin Leder et al. 2013

4DPDx

Cutaneous Larva Migrans



Take home message

- Malaria is common cause of fever returning travelers
- Several considerations before giving malaria prophylaxis
- Thai guideline for malaria treatment 2019
- Geographic distribution of infectious diseases

Travel history is mandatory for patients presented with fever

Travel related diseases: **Forgotten but not gone**

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