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COMMON INFECTIOUS AND PARASITIC DISEASES IMPORTED FROM THAILAND: CLINICAL PICTURE, TREATMENT AND PRE-TRAVEL PROPHYLAXIS-A REVIEW

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ABSTRACT

Background: Thailand, being one of the most popular tourist destinations in Southeast Asia, simultaneously represents an area with a high risk of tropical disease infections. Increased tourist traffic, urbanization, and climate change contribute to the growing number of imported infections to non-endemic countries.
Aim of the study: The aim of this review paper is to summarize current knowledge (based on literature from 2016–2026) regarding the most common infectious and parasitic diseases imported from Thailand—dengue, malaria, Zika virus infections, and chikungunya—with particular emphasis on clinical presentation, available therapeutic options, and modern pre-travel prophylaxis.
Methods: A review of current medical literature from the PubMed and Google Scholar databases was conducted, incorporating WHO and CDC guidelines as well as the latest clinical trials.
Results: Arboviral infections (dengue, Zika, chikungunya) present significant difficulties in differential diagnosis due to overlapping early clinical symptoms, which requires great caution in the selection of symptomatic treatment (avoidance of NSAIDs). The epidemiological profile of malaria in Thailand is shifting toward the dominance of Plasmodium vivax and a growing proportion of zoonotic Plasmodium knowlesi.
Conclusions: Although the treatment of most of the discussed viral infections remains exclusively symptomatic, the last decade has brought a breakthrough in pre-travel prophylaxis thanks to the introduction of new vaccines (TAK-003 against dengue, VLA1553 against chikungunya). Despite these achievements, rigorous vector protection and appropriately selected antimalarial chemoprophylaxis remain the foundation of travel medicine.

KEYWORDS

Dengue, Zika, Chikungunya, Malaria, Travel Medicine, Thailand

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1. Introduction

Contemporary international tourism, despite the dynamic development of sanitary surveillance systems, remains one of the main vectors for the spread of tropical diseases [1]. Thailand, which has been a key travel destination for residents of Europe and North America for years, constitutes a unique ecosystem where endemic pathogens coexist with a dense network of human migration. Over the past two years, an alarming increase in arbovirus morbidity has been observed in Southeast Asia, resulting from climate change [2, 3]. The most important vector-borne diseases imported from this region include Malaria, Dengue, Zika, and Chikungunya. They are transmitted mainly by mosquitoes of the genus *Anopheles* (malaria) and *Aedes* (dengue, Zika, chikungunya), which act as biological vectors. Dengue, endemic in Southeast Asian countries and regularly imported by travelers, exhibits variable seasonal epidemiology and cases of severe clinical forms, such as dengue hemorrhagic fever, as confirmed by data from systematic epidemiological reviews from Thailand and other endemic regions [6]. Simultaneously, the co-occurrence and co-circulation of Zika and chikungunya viruses, transmitted by the same mosquito vectors (*Aedes* spp.), require clinicians to consider the potential neurological, teratogenic, and chronic arthropathic complications characteristic of these infections during diagnosis [4]. Although Thailand has achieved significant success in eliminating malaria in central regions, border areas remain active foci of *Plasmodium falciparum*. The increasing drug resistance of parasites is becoming a growing problem, significantly threatening the effectiveness of standard chemoprophylaxis [5]. This paper aims to analyze the current clinical picture of these four disease entities and evaluate the effectiveness of new preventive strategies—including the vaccines against dengue and chikungunya introduced in 2025. Understanding the dynamics of these threats is essential for ensuring the health security of travelers and an efficient response by healthcare systems in non-endemic countries.

2. Methods

This study was conducted as a narrative literature review aimed at summarizing current knowledge on infectious and parasitic diseases imported from Thailand, with a particular focus on Dengue, Malaria, Zika, and Chikungunya. A comprehensive search of scientific literature was performed using the electronic databases PubMed and Google Scholar. The search covered publications from January 2016 to March 2026. The following keywords and their combinations were used: “dengue,” “malaria,” “Zika virus,” “chikungunya,” “Thailand,” “travel medicine,” “imported infections,” “clinical presentation,” “treatment,” and “pre-travel prophylaxis.” In addition to peer-reviewed articles, official guidelines and reports from international health organizations, including the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC), were included to ensure the most up-to-date and evidence-based recommendations. Eligible studies included systematic reviews, meta-analyses, randomized controlled trials, observational studies, and relevant case reports focusing on travelers returning from Southeast Asia, particularly Thailand. Articles not available in English, studies published before 2016, and those not directly related to the topic were excluded. The selection of studies was based on relevance to the study objectives, with particular emphasis on epidemiology, clinical manifestations, diagnostic approaches, treatment strategies, and preventive measures. Data were extracted and qualitatively synthesized to provide a comprehensive overview of current trends and recommendations in travel medicine.

3. Results

3.1. Dengue

3.1.1. Introduction and Epidemiology

Dengue, caused by viruses of the *Flaviviridae* family (DENV 1-4) transmitted by *Aedes* mosquitoes, is currently the leading cause of febrile illnesses among individuals traveling to tropical and subtropical zones [7]. Thailand and other Southeast Asian countries account for nearly half of all dengue cases imported by returning travelers, making this region an area of exceptionally high epidemic risk [7]. Analyses indicate that global warming, rapid urbanization, and increased international tourist traffic are drastically driving the global spread of the virus beyond its traditional endemic borders [8].

3.1.2. Clinical Presentation

Dengue virus infection is characterized by a very broad spectrum of clinical manifestations, ranging from mild infections to directly life-threatening conditions [9]. In the initial febrile phase of the disease, the clinical picture is highly non-specific and usually includes high fever, severe headaches, retro-orbital pain, severe musculoskeletal pain (historically referred to as "breakbone fever"), and a characteristic maculopapular rash [9, 10]. A particular threat to the patient is the transition from the febrile phase to the critical phase, in which Dengue Shock Syndrome (DSS) may develop, caused by massive plasma leakage from the vascular bed [10]. The most important clinical warning signs indicating such a severe course of infection are usually persistent vomiting, acute abdominal pain, progressive hepatomegaly, and spontaneous bleeding from mucous membranes and the gastrointestinal tract [9, 11].

3.1.3. Treatment

Despite the growing global threat posed by the dengue virus, modern medicine to date does not have any approved and specific antiviral drug targeting this pathogen [9, 11]. Pharmacotherapy in the acute phase of infection is exclusively supportive and symptomatic, relying primarily on combating pain and fever using solely paracetamol [11]. Due to the very high risk of developing profound thrombocytopenia and life-threatening hemorrhagic complications, the administration of acetylsalicylic acid and any other non-steroidal anti-inflammatory drugs (NSAIDs) must be strictly avoided in patients with suspected dengue [11]. The life-saving foundation of treatment for patients entering the critical phase (e.g., with developing shock syndrome) is early, cautious, and extremely rigorously monitored intravenous fluid therapy using crystalloid solutions [10].

3.1.4. Pre-travel Prophylaxis

For many decades, the only and primary method of preventing dengue virus infections remained strict personal protection against vector bites, implemented through the use of proven repellents, mosquito nets, and protective clothing [10]. A significant breakthrough in travel medicine was the recent market introduction of a live, attenuated, tetravalent dengue vaccine, known under the code TAK-003 (trade name Qdenga) [12]. Unlike the older first-generation preparation (Dengvaxia), the new TAK-003 vaccine can be safely administered to travelers regardless of prior dengue virus infection (without the need for prior serological testing), making it a highly useful tool for tourists planning a stay in Thailand [12, 13]. Despite the generally confirmed high safety profile of TAK-003, clinical and observational studies show that transient adverse reactions may occur after its administration, such as injection site reactions, muscle pain, and a rash resembling a mild, natural viral infection [13].

3.2. Malaria

3.2.1. Introduction and Epidemiology

Malaria in Thailand remains a significant public health challenge, especially in forested border regions (including the borders with Myanmar and Cambodia), which is closely linked to massive labor migrations and the presence of hard-to-reach forest transmission foci [14]. Over the past decade, the epidemiological profile of malaria in Thailand has drastically changed due to the success of national eradication programs, leading to a significant decrease in *Plasmodium falciparum* infections in favor of the growing dominance of *Plasmodium vivax* [15]. For tourists and travelers returning from Southeast Asia, this implies a shift in the risk profile, as *P. vivax* is characterized by the ability to form dormant liver stages (hypnozoites), which can cause relapses months or even years after leaving the endemic zone [16]. Furthermore, in Thai rural areas and national parks, there is an increasing proportion of zoonotic infections caused by *Plasmodium knowlesi*, a direct result of human encroachment into macaque habitats [17].

3.2.2. Clinical Presentation and Diagnostics

Infection with the malaria parasite usually manifests as an acute febrile illness (often with an irregular pattern), accompanied by severe chills, profuse sweating, intense headaches, myalgia, and profound exhaustion [18]. Due to the complete lack of pathognomonic symptoms in the early phase of infection, the disease is frequently diagnosed late in travelers returning to low-risk countries [19]. The incubation period varies significantly depending on the pathogen species; for *P. falciparum*, it is usually 9 to 14 days, whereas for *P. vivax*, initial symptoms may appear months after exposure to the vector mosquito bite [20]. The basis for clinical diagnosis remains direct parasitological blood examination (thick and thin smears), which allows for precise identification of the parasite species and assessment of the parasitemia level [21]. In outpatient settings and emergency rooms, Rapid Diagnostic Tests (RDTs), which detect specific parasitic antigens such as HRP-2 protein (for *P. falciparum*) or pLDH enzyme, play a crucial supporting role [21]. Severe malaria, caused mainly by *P. falciparum*, constitutes a direct life-threatening medical emergency and manifests, among others, with altered consciousness (cerebral malaria), acute respiratory distress syndrome (ARDS), metabolic acidosis, severe anemia, and renal failure [22].

3.2.3. Treatment

Any confirmed case of malaria imported from tropical regions must be treated as a medical emergency requiring the urgent initiation of targeted antimalarial therapy [23]. The gold standard for pharmacotherapy in uncomplicated *P. falciparum* malaria is oral Artemisinin-based Combination Therapy (ACT), such as artemether with lumefantrine [24]. A serious and growing clinical problem in the Mekong River basin (including the Thai-Cambodian border) is the spread of mutated *P. falciparum* strains (mutations in the Kelch13 gene) exhibiting resistance to artemisinin, which necessitates continuous monitoring of treatment efficacy and the use of extended therapeutic regimens [25]. In the case of infection caused by *P. vivax*, in addition to standard blood-stage treatment, it is necessary to apply a radical cure, consisting of the administration of primaquine or tafenoquine to eliminate liver hypnozoites and prevent subsequent relapses [26]. Before initiating 8-aminoquinoline drugs (primaquine, tafenoquine), the physician has an absolute obligation to rule out genetic glucose-6-phosphate dehydrogenase (G6PD) deficiency in the patient, as administering these preparations to individuals with this enzymatic defect risks massive and life-threatening hemolysis [26]. The management of severe malaria requires treatment in an intensive care unit, where the first-line drug, according to the latest WHO guidelines, is intravenous artesunate administered in repeated doses, or intravenous quinine if artesunate is unavailable [24, 27].

3.2.4. Pre-travel Prophylaxis

Preventing malaria infections in individuals traveling to rural and forested regions of Thailand must be supported by a detailed risk analysis, considering the exact itinerary, seasonality, and planned outdoor activities [28]. The foundation of prophylaxis is mechanical and chemical protection against bites from *Anopheles* mosquitoes, implemented by using repellents with a high concentration of DEET (30-50%) or picaridin (20%), treating clothing with permethrin, and strictly sleeping under mosquito nets [29]. For travelers exposed to a high risk (e.g., sleeping in the jungle), pharmacological prophylaxis is recommended, most commonly utilizing the continuous intake of a fixed-dose combination of atovaquone/proguanil or doxycycline, given the widespread resistance of parasites to chloroquine in Thailand [28]. Chemoprophylaxis must be strictly adhered to by the patient, which means it must be initiated before the trip and continued for a specified period after leaving the endemic zone (e.g., for 4 weeks in the case of doxycycline) [29]. In specific situations, when a tourist plans to stay in extremely isolated regions of Thailand with limited access to medical care, travel medicine physicians may recommend equipping the patient with a Stand-By Emergency Treatment (SBET) kit, along with instructions for its self-administration in the event of fever if medical consultation is not possible within 24 hours [30].

3.3. Zika Virus (ZIKV)

3.3.1. Introduction and Epidemiology

Zika virus (ZIKV) is an RNA virus belonging to the *Flaviviridae* family, primarily transmitted by mosquitoes of the genus *Aedes*, particularly *Aedes aegypti* and *Aedes albopictus* [31]. Although Zika virus infections were rarely identified in travelers in the past, contemporary molecular and epidemiological studies confirm the constant, endemic circulation of this virus in Thailand over the last decade or more [32]. Cases imported from this country constitute a growing challenge in travel medicine due to the possibility of very severe fetal complications [33].

3.3.2. Clinical Presentation

It is estimated that approximately 80% of Zika virus infections are completely asymptomatic, which significantly complicates the early identification of the infection in patients [34]. In symptomatic patients, following an incubation period of 3 to 14 days, a mild and self-limiting illness typically develops [35]. The most frequently reported symptoms in tourists returning from endemic regions are a descending maculopapular rash (occurring in the majority of symptomatic patients), low-grade fever, muscle and joint pain (sometimes with swelling), and non-purulent conjunctivitis [32, 34]. The clinical picture of ZIKV infection is highly non-specific and overlaps with the symptoms of other arboviral diseases present in Thailand, such as dengue and chikungunya, which absolutely requires a thorough differential diagnosis based on RT-PCR tests [36]. Although the infection is usually mild in adults, the virus exhibits strong neurotropism and, in rare cases, can lead to the development of life-threatening Guillain-Barré syndrome (GBS) [35]. However, the most severe consequences of infection concern pregnant women, as the Zika virus has the ability to cross the placental barrier [37]. Vertical transmission can result in intrauterine fetal death or the development of Congenital Zika Syndrome (CZS), which includes severe microcephaly and other irreversible structural defects of the central nervous system [33, 37].

3.3.3. Treatment

Currently, medicine does not have any registered antiviral drug with clinically proven efficacy against the Zika virus [38]. Consequently, the main therapeutic management relies exclusively on symptomatic and supportive care [39]. Basic recommendations for infected patients include bed rest, ensuring adequate hydration, and pharmacological alleviation of pain and fever using paracetamol [39]. According to universally accepted guidelines, the use of non-steroidal anti-inflammatory drugs (NSAIDs), such as acetylsalicylic acid or ibuprofen, is strictly contraindicated until dengue virus infection is definitively ruled out, due to the significant risk of hemorrhagic complications [31]. Advanced *in vitro* and *in vivo* studies are underway to develop targeted antiviral therapies (e.g., utilizing NS3/NS2B viral protease inhibitors) and to repurpose drugs used in the treatment of other flaviviruses; however, none of these experimental methods have yet entered standard clinical practice [38, 40]. In the case of pregnant travelers diagnosed with the infection, treatment effectively comes down to close monitoring of fetal development using serial ultrasound examinations [37].

3.3.4. Pre-travel Prophylaxis

Currently, there is no commercially available protective vaccine for the prevention of Zika virus infections, although several promising mRNA-based and viral vector-based candidates are in clinical trials [40]. The main and most important element of pre-travel prophylaxis for Thailand remains patient education regarding rigorous protection against mosquito bites around the clock, with particular emphasis on morning and afternoon hours [39]. Travel medicine physicians recommend the consistent use of repellents containing proven active substances, such as DEET (in a concentration of 20-50%), picaridin, or IR3535, as well as wearing light-colored clothing with long sleeves and trousers, and using mosquito nets in non-air-conditioned bedrooms [36, 39]. Because it has been proven that the Zika virus can be transmitted through sexual contact (the virus persists in semen much longer than in plasma), travelers returning from endemic areas should use barrier methods (condoms) or maintain complete sexual abstinence for 2 to 3 months upon return, regardless of whether they have developed symptoms of the disease [35, 39]. The World Health Organization (WHO) and national disease control centers strongly recommend that pregnant women completely refrain from traveling to Thailand and other regions of active ZIKV transmission unless absolutely necessary [33, 37].

3.4. Chikungunya

3.4.1. Introduction and Epidemiology

Chikungunya virus (CHIKV) is an arbovirus belonging to the *Togaviridae* family, transmitted primarily by day-biting vectors—mosquitoes of the genus *Aedes*, with particular emphasis on the species *Aedes aegypti* and *Aedes albopictus* [41, 42]. Thailand is a highly endemic area for the virus, where significant epidemics caused by the East/Central/South African–Indian Ocean lineage (ECSA-IOL) were recorded in 2018–2020 and later, making CHIKV one of the most significant threats to individuals traveling to Southeast Asia [43, 44].

3.4.2. Clinical Presentation

The incubation period of the disease following the bite of an infected mosquito is usually 3 to 7 days (ranging from 1 to 12 days) [45]. The acute phase of infection is characterized by a sudden onset with high fever (often exceeding 39°C), accompanied by very severe, bilateral, and symmetrical joint pain (polyarthralgia) or full-blown arthritis [45, 46]. Other commonly reported symptoms of the acute phase include muscle pain, severe headaches, nausea, vomiting, conjunctivitis, and a maculopapular skin rash [43, 47]. In the differential diagnosis with the dengue virus, CHIKV infection more frequently correlates with highly pronounced lymphopenia and joint pain, and less frequently leads to the development of severe thrombocytopenia, hemorrhagic shock, and death [45, 46]. Although systemic symptoms usually resolve within 7 to 10 days, a significant and characteristic feature of CHIKV infection is the high risk of disease progression to a chronic phase [45, 47]. In a substantial percentage of patients, debilitating, recurrent, or persistent joint pain may last for months or even years after the acute episode of infection, leading to significant impairment of mobility and a decrease in the patients' quality of life [46, 47].

3.4.3. Treatment

According to the current state of medical knowledge, there is no effective and specific antiviral therapy directed against Chikungunya virus infection [47, 48]. Clinical management in the acute phase of infection is exclusively symptomatic and supportive; it relies on rest, intensive oral or intravenous hydration, and pharmacological alleviation of fever and pain using paracetamol (acetaminophen) [46, 47]. The World Health Organization (WHO) and international guidelines strictly advise against the use of acetylsalicylic acid and other non-steroidal anti-inflammatory drugs (NSAIDs) in the first days of the illness until dengue virus infection is definitively ruled out, due to the increased risk of severe hemorrhagic complications [46, 47]. For patients developing chronic rheumatological symptoms (such as prolonged polyarthritis), it is sometimes necessary to implement therapy using low doses of corticosteroids or disease-modifying antirheumatic drugs (DMARDs), for example, hydroxychloroquine in combination with other rheumatological pharmacotherapies [46].

3.4.4. Pre-travel Prophylaxis

For many years, the primary and only form of prophylaxis against CHIKV infections remained rigorous personal protection against vector bites through the use of repellents (containing DEET, picaridin, or IR3535), wearing permethrin-treated clothing, and using mosquito nets [41, 49]. A true breakthrough in travel medicine was the approval at the turn of 2023 and 2024 by the U.S. Food and Drug Administration (FDA) and the European Medicines Agency (EMA) of the world's first single-dose, live-attenuated Chikungunya virus vaccine, known under the code VLA1553 (trade name: Ixchiq) [48, 50]. In clinical trials, this preparation proved to induce an immune response and seroprotection in nearly 99% of vaccinees; however, reports of rare adverse events in the form of severe symptoms resembling natural viral infection (CLI – Chikungunya-like illness) forced some countries, including the USA, to temporarily suspend or verify its administration to individuals over 60 years of age with comorbidities [48, 50]. According to recommendations from institutions such as the U.S. Centers for Disease Control and Prevention (CDC), the use of the pre-travel vaccine should be highly targeted and considered for individuals traveling to areas with currently ongoing, confirmed epidemiological outbreaks of the virus, as well as for travelers planning a multi-month stay in endemic areas, such as Thailand [48, 49].

4. Discussion

The growing number of cases of tropical diseases imported from Thailand and other Southeast Asian countries poses a significant challenge for healthcare systems in temperate zone countries. As demonstrated in this review, the main health threats to travelers are evolving under the influence of climate change, which expands the distribution range of vectors (mosquitoes of the *Aedes* and *Anopheles* genera), and local determinants, such as human interference in natural forest ecosystems [2, 8, 14]. One of the most important clinical problems raised in the literature from 2016–2026 is the overlapping of early-phase symptoms of arboviral infections (dengue, Zika, chikungunya). The co-circulation of these three pathogens in Thailand

makes diagnosis based solely on medical history and physical examination (fever, rash, joint and muscle pain) highly unreliable [4, 36, 45]. This entails serious therapeutic implications. The use of non-steroidal anti-inflammatory drugs (NSAIDs) to alleviate symptoms—a standard practice in respiratory tract infections—in a patient with unrecognized dengue can lead to tragic hemorrhagic complications. For this reason, in any fever following a return from Thailand, paracetamol remains the drug of choice until DENV infection is ruled out via molecular or serological tests [11, 31, 46].

Significant evolution is also observed regarding parasitic diseases. Successes in the eradication of *Plasmodium falciparum* in Thailand have exposed new threats in the form of *Plasmodium vivax* infections, characterized by the ability to form hypnozoites and cause relapses many months after return [15, 16]. This requires travel medicine physicians to consider radical cure (primaquine, tafenoquine) and initial screening for G6PD deficiency [26]. The increasing resistance to artemisinin derivatives in the Mekong River basin region further complicates therapeutic regimens [25].

The last decade (2016–2026), however, is primarily a time of revolution in specific prophylaxis. The market introduction of vaccines against dengue (Qdenga/TAK-003) and the first vaccine against the chikungunya virus (Ixchiq/VLA1553) radically changes the paradigm of pre-travel counseling [12, 48, 50]. While in the past tourists were reliant solely on barrier protection and repellents, travel medicine currently has tools capable of preventing severe forms of these debilitating diseases. It should be emphasized, however, that these innovations do not diminish the importance of patient education—in the case of the Zika virus, which can cause dramatic fetal defects, the only effective form of prevention remains vector protection and the modification of travel plans by pregnant women [33, 37, 39].

5. Conclusions

Based on the conducted analysis of current literature, the following key conclusions can be drawn regarding infectious and parasitic diseases imported from Thailand: Dengue, Zika, and Chikungunya are the main causes of febrile illnesses in travelers, and their initial clinical presentation is highly non-specific, making rapid laboratory diagnostics (RDT, RT-PCR) crucial for the appropriate management of the patient upon return. Due to the lack of specific antiviral therapies in the treatment of arboviruses, the foundation remains symptomatic treatment, while the use of acetylsalicylic acid and other NSAIDs must be strictly avoided due to the risk of hemorrhagic complications, particularly in the course of dengue. Furthermore, the epidemiology of malaria is changing, as imported infections are increasingly associated with the species *Plasmodium vivax* and *Plasmodium knowlesi*, meaning that individuals exposed to mosquito bites in forested and border areas require strict chemoprophylaxis and readiness for targeted treatment that also includes the elimination of the liver stages of the parasite. Concurrently, the availability of new, safer vaccine preparations, such as the tetravalent dengue vaccine (TAK-003) and the single-dose chikungunya vaccine (VLA1553), represents a significant breakthrough in travel medicine and should be an integral part of pre-travel consultations for individuals planning a trip to Southeast Asia. Despite these advancements, personal prophylaxis—namely, mechanical and chemical protection against vector bites (repellents containing DEET or picaridin, mosquito nets, appropriate clothing)—continues to play a key role and remains the cornerstone of preventing tropical diseases, including Zika virus infections, for which a vaccine is still unavailable.

Conflicts of Interest: The authors have no conflicts of interest to report.

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