

Trend Analysis of Travel Medicine Topics Presented at an International Tropical Medicine Conference

Punyisa Asawapaithulsert,¹ Gerard T. Flaherty,^{2,3} and Watcharapong Piyaphanee^{4*}

¹Bangkok Hospital for Tropical Diseases, Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand; ²School of Medicine, National University of Ireland Galway, Galway, Ireland; ³School of Medicine, International Medical University, Kuala Lumpur, Malaysia; ⁴Department of Clinical Tropical Medicine, Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand

Abstract. Prior to the COVID-19 pandemic, there was a rapid increase in international travel. Travel medicine is a branch of preventive medicine focusing on risk assessment pre-travel, during travel and post-travel with the aim of promoting health and preventing adverse health outcomes. Travel medicine specialists inform travelers about potential health risks and mitigate infectious disease risks such as travelers' diarrhea, yellow fever, and malaria. Travel medicine topics were popular in the American Society of Tropical Medicine and Hygiene conferences between 2016 and 2020, and now comprise approximately 2% of all presentations. Most topics related to the post-travel assessment (50%), followed by diseases contracted during travel (26%), and pre-travel assessment and consultation (24%). Our analysis of the 10 sub-domains of travel medicine issues found that malaria (26%) and immunization (12%) were represented to the greatest extent. We anticipate that both travel and tropical medicine fields will regain their popularity after recovery from the pandemic.

Over the last few decades, the volume of international travel has greatly increased.¹ This increasing globalization in travel increases the risk of travel-related illnesses and the need for triage and assessment of ill returned travelers. There is now increasing movement of people all around the world in all directions, and these changes might result in new geographic patterns of infectious disease transmission, including tropical infections such as dengue and Zika virus.² In addition, data on travel numbers are used to forecast demand for immunizations and pre-travel consultations. As a consequence, health care practitioners, including travel medicine specialists, must appropriately advise travelers about these potential risks. Travel medicine is a dynamic and growing specialization that focuses on pre-travel preventative care, illness occurring during travel, and diseases presenting in the returned traveler. The American Society of Tropical Medicine and Hygiene (ASTMH), established in 1903, is the world's largest scientific organization of professionals committed to reducing the global burden of tropical infectious illnesses and improving global health. ASTMH holds an annual conference with a multidisciplinary delegate attendance profile. This study examines the extent to which travel medicine knowledge is disseminated at ASTMH conferences in an attempt to better understand the linkages between these two fields of clinical and research activity.

We analyzed the content of all oral and poster presentations delivered at ASTMH conferences from 2016 through 2020 to determine the temporal trends and educational emphasis placed on travel medicine. Data were retrieved from the past meetings archives on the ASTMH website.³ The travel medicine relevance of invited presentations and research posters and oral sessions was determined by screening their titles and abstracts. Presentations were assigned to two categories: travel and non-travel. The travel categories were separated into three domains: 1) pre-travel assessment and consultation; 2) diseases contracted during

travel; and 3) post-travel assessment.⁴ There were 196 topics which were subcategorized into 10 sub-domains including vaccines, malaria, arthropod-borne diseases, parasite, respiratory tract infections, skin infection in travelers, travelers' diarrhea, immunocompromising conditions, and fever. When a single presentation contained material that reflected more than one sub-domain, it was assigned to multiple sub-domains. When sub-domains categorizing a presentation were not available, the presentation was assigned to the others category.

The scientific program content of the five most recent ASTMH conferences was classified into three domains and 10 sub-domains. A total of 2,918 oral presentations and 9,746 poster presentations were analyzed. Pre-travel assessment and consultation was the most frequently represented domain in the oral presentations, with 44% of presentations ($N = 23$), followed by diseases contracted during travel with 33% ($N = 17$). The post-travel assessment domain included the fewest presentations (23%, $N = 12$). Among the poster presentations, the most frequently represented domain was post-travel assessment, with 58% of presentations ($N = 104$), followed by diseases contracted during travel with 24% ($N = 42$), and pre-travel assessment and consultation, with 18% ($N = 32$).

Between 2016 and 2020, the number of travel medicine topics discussed at ASTMH conferences increased. Travel-related oral presentations presented at the ASTMH meeting have increased to the greatest extent over time, from three in 2016 to 15 in 2020. While the poster presentations showed a decrease in travel medicine emphasis initially, oral presentations showed an increase in travel medicine content throughout the period. As a consequence of the COVID-19 pandemic, poster presentations related to the travel health increased to 39 topics in 2019 before declining to 18 topics in 2020 (Figure 2). Travel medicine was estimated to account for around 2% of all presentations at each year's ASTMH meeting (Figure 1). Our analysis of the 10 sub-domains of travel medicine issues discussed at the ASTM meeting (Figure 3) found that the most frequently presented subjects related to malaria infection (26%, $N = 51$), followed by immunization (12%, $N = 24$), arthropod-borne disease

* Address correspondence to Watcharapong Piyaphanee, Department of Clinical Tropical Medicine, Faculty of Tropical Medicine, Mahidol University, Bangkok 10400, Thailand. E-mail: watcharapong.piy@mahidol.ac.th

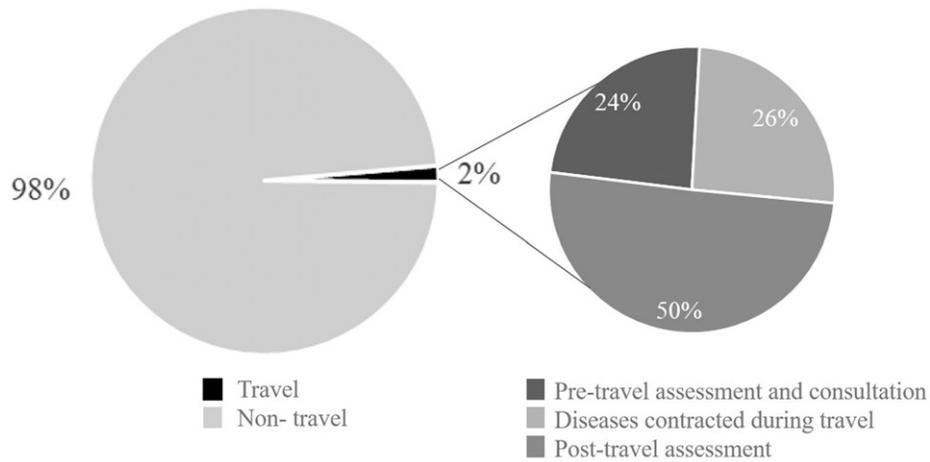


FIGURE 1. Proportion of travel medicine topics in ASTMH conferences between 2016 and 2020.

(12%, *N* = 23), and other topics such as parasitic disease (8%, *N* = 16), food and water-borne disease such as travelers' diarrhea (7%, *N* = 13), fever (5%, *N* = 9), skin infection in travelers (3%, *N* = 5), respiratory tract infections (1%, *N* = 3), and others (26%, *N* = 52) such as general refugee health, travel clinic practices, and other specific infectious disease.

Additionally, the most frequently presented topics were malaria and vaccines, with 51 and 24 topics, respectively. It is notable that the number of topics in the malaria infection sub-domain increased dramatically in 2019. According to WHO, an estimated 229 million malaria cases were reported in 87 malaria-endemic countries in 2019, with 94% occurring in the WHO Africa Region.⁵ The number of malaria episodes in 2019 significantly expanded in Central, Latin America, Central Sub-Saharan Africa, Eastern Sub-Saharan Africa, and Western Sub-Saharan Africa. Furthermore, temperature increases and changes in rainfall patterns have also resulted in an extended malaria season in several Sub-Saharan African locations.⁶ The increase from the 228 million malaria cases reported in 2018⁷ and the trends in malaria incidence in 204 countries from 1990 to 2019 show a dramatic increase in malaria from 2015 to 2019 and demonstrate that the efforts to control or eradicate malaria remain challenging.⁸

The overlap between practice and research in travel and tropical medicine is considerable and a strong working knowledge of tropical infectious disease epidemiology, clinical presentation and prevention is required in the practice of travel medicine. Bibliometric analyses of articles published in leading travel medicine journals found that the highest proportion of published material addressed pre-travel assessment and diseases contracted during travel.^{9,10} Articles relating to infectious diseases acquired by the traveler outnumbered noncommunicable diseases 7-fold in one of the journals studied.⁹ The present study is limited by its focus on a single albeit major international tropical medicine conference and by the fact that there may have been some travel medicine content in ostensibly non-travel-related presentations since only presentation or poster titles or abstracts were available for analysis.

Our descriptive content analysis of oral and poster presentations at ASTMH conferences over the last 5 years sheds light on the dissemination of travel medicine knowledge to the tropical medicine academic and clinical community. COVID-19 has raised awareness of the role of travel in the spread and control of highly infectious viral diseases.¹¹ We predict an even closer integration of travel medicine and tropical medicine in the future with powerful joint educational events and reciprocal conference attendance by clinicians in

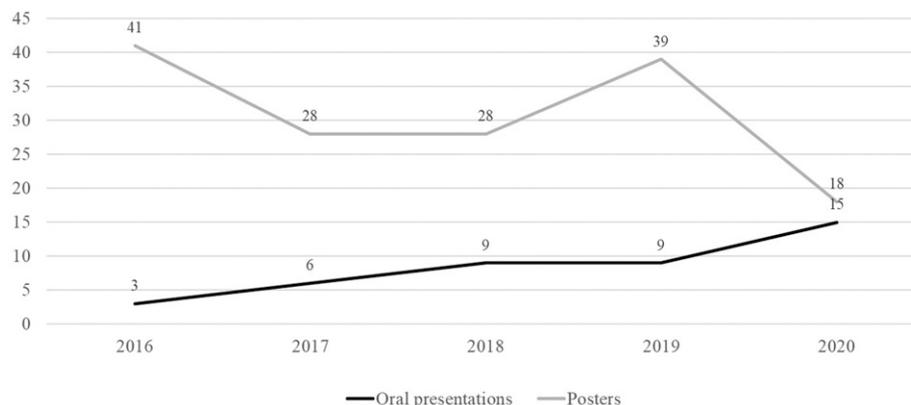


FIGURE 2. Longitudinal trends in travel medicine focus at ASTMH conferences (2016–2020).

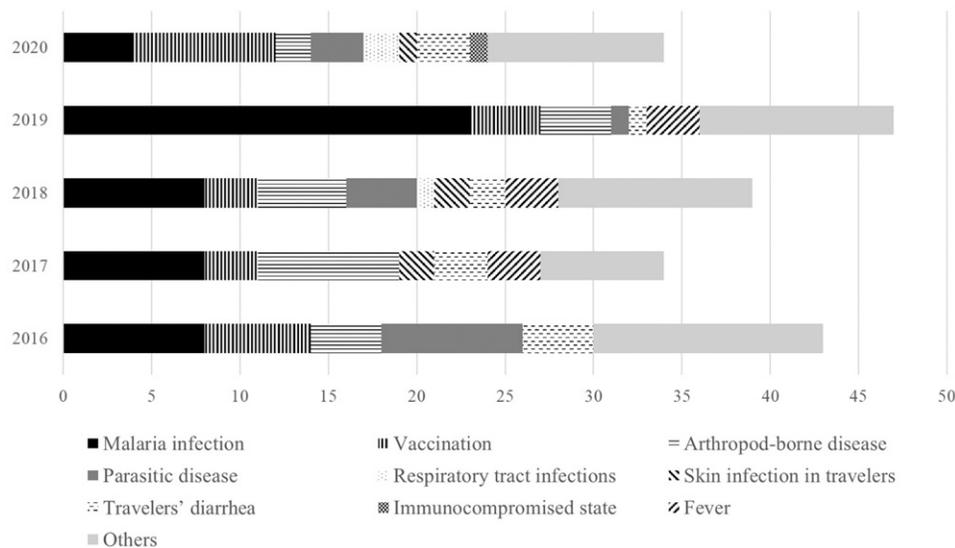


FIGURE 3. Analysis of ASTMH conference presentations by sub-domain (2016–2020).

these respective fields. We propose to repeat our conference analysis at 5-yearly intervals to track progress toward the closer integration of travel and tropical medicine.

Received March 7, 2022. Accepted for publication April 12, 2022.

Published online July 5, 2022.

Authors' addresses: Punyisa Asawapaithulsert, Bangkok Hospital for Tropical Diseases, Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand, E-mail: punyisa@thaitravelclinic.com. Gerard T. Flaherty, School of Medicine, National University of Ireland Galway, Galway, Ireland, and School of Medicine, International Medical University, Kuala Lumpur, Malaysia, E-mail: gerard.flaherty@nuigalway.ie. Watcharapong Piyaphanee, Department of Clinical Tropical Medicine, Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand, E-mail: watcharapong.piy@mahidol.ac.th.

REFERENCES

- World Tourism Organization, 2022. *Tourism Statistics-Country Fact Sheet*, 2022. Available at: <https://www.unwto.org/statistics/country-fact-sheets>. Accessed March 2, 2022.
- Wilder-Smith A, 2017. Closing the gap in travel medicine. *J Travel Med* 24. doi: 10.1093/jtm/tax027.
- American Society of Tropical Medicine & Hygiene, 2022. *ASTMH-Past Meetings*, 2022. Available at: <https://www.astmh.org/annual-meeting/past-meetings>. Accessed April 6, 2022.
- Coyle DJ, Flaherty GT, 2018. An educational journey in travel medicine: content analysis of CISTM conferences, 1988–2017. *J Travel Med* 26: tay121.
- World Health Organization, 2020. *World Malaria Report 2020: 20 Years of Global Progress and Challenges*. Available at: <https://apps.who.int/iris/bitstream/handle/10665/337660/9789240015791-eng.pdf?sequence=1&isAllowed=y>. Accessed March 2, 2022.
- Tanser FC, Sharp B, le Sueur D, 2003. Potential effect of climate change on malaria transmission in Africa. *Lancet* 362: 1792–1798.
- World Health Organization, 2019. *World Malaria Report 2019*. Available at: <https://apps.who.int/iris/rest/bitstreams/1262394/retrieve>. Accessed February 28, 2022.
- Liu Q, 2021. Trends of the global, regional and national incidence of malaria in 204 countries from 1990 to 2019 and implications for malaria prevention. *J Travel Med* 28. doi: 10.1093/jtm/taab046.
- Flaherty GT, Lim Yap K, 2017. Bibliometric analysis and curriculum mapping of travel medicine research. *J Travel Med* 24. doi: 10.1093/jtm/tax024.
- Oh KE, Flaherty GT, 2020. Travel medicine research in the new millennium: a bibliometric analysis of articles published in *Travel Medicine and Infectious Disease*, 2003–2019. *Travel Med Infect Dis* 33: 101549.
- ArcGIS, 2022. *Coronavirus Disease (COVID-19) Situation Dashboard*. Available at: <https://www.arcgis.com/apps/dashboards/bda7594740fd40299423467b48e9ecf6>. Accessed March 3, 2022.