

Epidemiological Update on Fever in Returning Travelers to Ontario from the ‘Rapid Assessment of Febrile Travelers’ (RAFT) Programme

Gregory D. Hawley^{1,2,3}, Aisha Khatib¹, Michael Klowak², Emma Hagopian⁴, Shareese Clarke³, Farah Jazuli⁵, Ruwandi Kariyawasam^{6,7}, Rachel Lau⁸, Andrea K. Boggild^{1,2,3*}

¹Faculty of Medicine, University of Toronto, Toronto, Ontario, Canada; ²Institute of Medical Sciences, University of Toronto, Toronto, Ontario, Canada; ³Tropical Disease Unit, Division of Infectious Diseases, UHN- Toronto General Hospital, Toronto, Ontario, Canada; ⁴Faculty of Arts and Science, University of Toronto, Toronto, Ontario, Canada; ⁵Department of Emergency Medicine, McMaster University, Hamilton, Ontario, Canada; ⁶Division of Diagnostic & Applied Medicine, Department of Laboratory Medicine & Pathology, Faculty of Medicine & Dentistry, University of Alberta, Edmonton, Alberta, Canada; ⁷Alberta Precision Laboratories – Public Health Laboratory (ProvLab), Edmonton, Alberta, Canada; ⁸Public Health Ontario Laboratories, Public Health Ontario, Toronto, Ontario, Canada. *Corresponding author: andrea.boggild@utoronto.ca



INTRODUCTION

- Fever is a common presenting complaint in the returned international traveler, occurring in up to 17% of ill-returned travelers and new immigrants presenting for care¹
- Fever may be the initial or sole manifestation of potentially life-threatening illnesses (malaria, Dengue fever, or enteric fever)
- National Canadian guidelines have been adapted into an ED decision-algorithm to standardize the evaluation and disposition of febrile travelers, through creation of the "Rapid Assessment of Febrile Travelers" (RAFT) Programme^{2,3}
- The RAFT programme facilitates collection of epidemiological data regarding fever in the returned traveler

METHODS

- Febrile returned travelers referred via the RAFT algorithm from the Emergency Department between 2016-2018 (Figure 1)
- Demographics, travel history, and final diagnoses collected

INCLUSION CRITERIA

- Patient febrile at triage or reports fever (T > 38° C).
- Travel outside Canada to tropical or resource limited setting within past year.
- Patient assessed Sunday 8 AM to Friday 8 AM; not weekend or holidays[†]

MINIMUM[§] KEY LABORATORY INVESTIGATIONS AFTER FULL HISTORY AND PHYSICAL EXAM

- Malaria screen
- Blood cultures x 2
- Complete blood count; Liver function tests; Electrolytes; Creatinine; Urinalysis +/- Chest radiograph, Nasopharyngeal swab

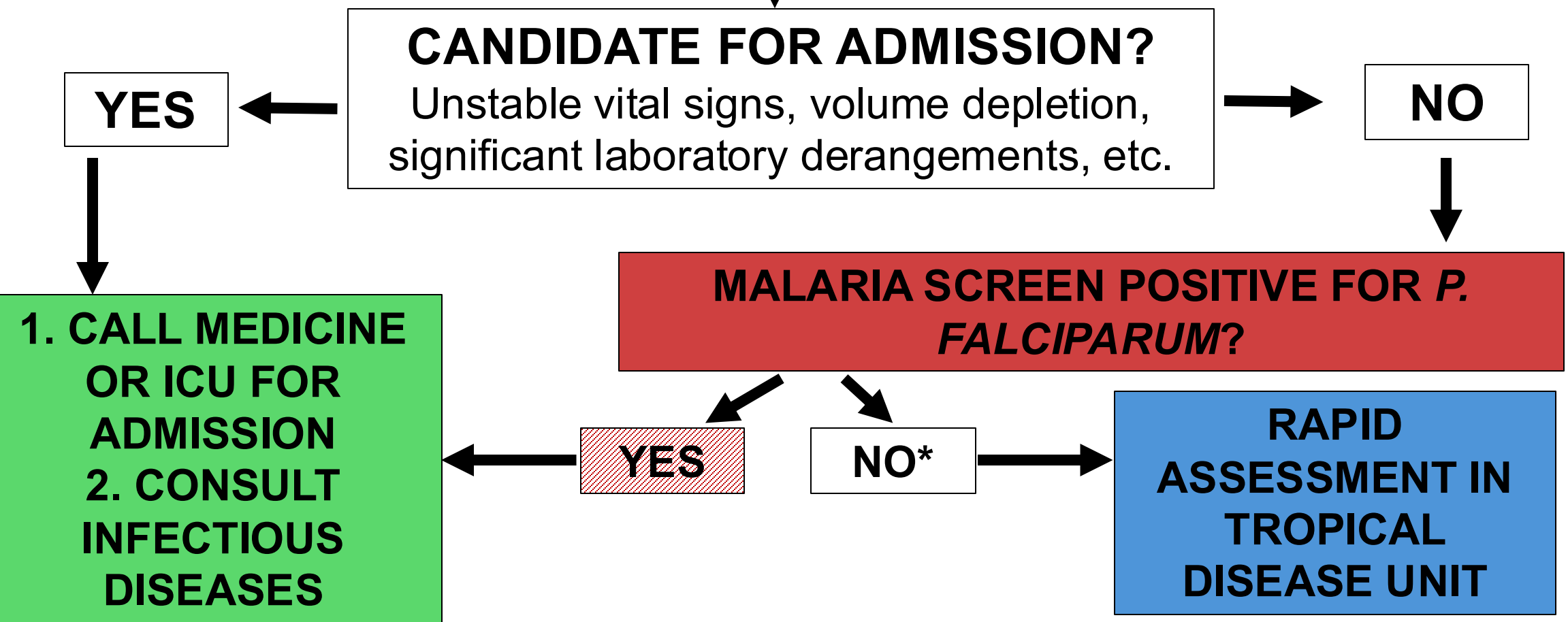


Figure 1: Algorithm for the assessment of fever in the returned traveler presenting to the ED.
†Between Friday after 8 am and Sunday before 8 am, as well as statutory holidays, if the patient does NOT have *P. falciparum* or otherwise fulfill admission criteria, the patient should STILL be referred to GIM or ID for disposition.
§ Additional investigations should be based on clinical judgment.
* If non-P.f. malaria screen is positive, please start appropriate therapy as per region traveled.

RESULTS

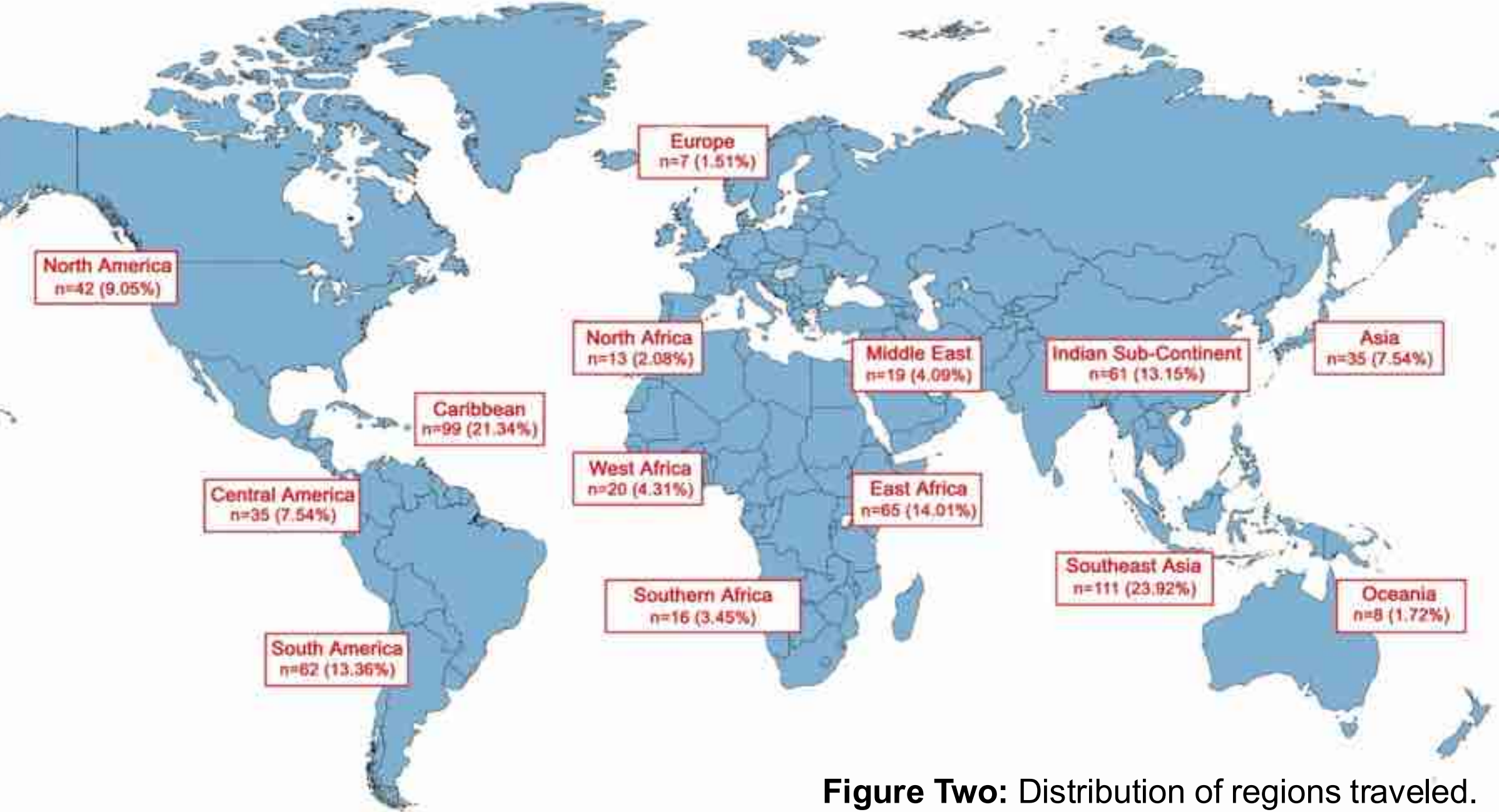


Figure Two: Distribution of regions traveled.

RESULTS

Table One: Final diagnoses of 464 febrile returned travelers evaluated in the RAFT Clinic between 2016-2018 (n=482; F = 241, M = 223).

Syndrome/Etiology	#	%	Syndrome/Etiology	#	%	Syndrome/Etiology	#	%
Gastrointestinal Syndrome	121	26.1	Non-Specific Viral Syndrome	122	26.3	Vector-borne Illness	62	13.4
Travelers' Diarrhea	45	9.7	Viral Syndrome	110	23.7	Flavivirus infection	36	7.8
Enteric Fever	17	3.7	Epstein-Barr Virus	4	0.9	Dengue Fever	27	5.8
<i>Salmonella typhi</i>	15	3.2	Cytomegalovirus	4	0.9	Zika	6	1.3
Serovar not specified	2	0.4	Post-infectious Fatigue	3	0.6	Japanese Encephalitis	1	0.2
Post Infectious IBS	12	2.6	Mononucleosis-like illness	1	0.2	West Nile	1	0.2
Gastritis	8	1.7				Flavivirus, unspecified	1	0.2
Salmonellosis, non-typhoidal	4	0.9	Respiratory syndrome	101	21.8	Chikungunya	3	0.6
Campylobacteriosis	5	1.1	Viral URTI	39	8.4	Malaria	10	2.2
Cryptosporidiosis	5	1.1	Influenza	29	6.3	<i>P. falciparum</i>	5	1.1
<i>Escherichia coli</i> infection	3	0.6	Pneumonia	19	4.1	<i>P. vivax</i>	4	0.9
Shigellosis	3	0.6	Pharyngitis	9	1.9	<i>P. malariae</i>	1	0.2
<i>Blastocystis hominis</i>	2	0.4	<i>Group A Streptococcus</i>	7	1.5	Rickettsioses	7	1.5
<i>Dientamoeba fragilis</i>	2	0.4	<i>Haemophilus influenzae</i>	1	0.2	African tick bite fever	5	1.1
Giardiasis	2	0.4	Pathogen not specified	1	0.2	Mediterranean spotted fever	1	0.2
<i>Helicobacter pylori</i>	2	0.4	Sinusitis	2	0.4	Rickettsioses, unspecified	1	0.2
Hepatitis A	2	0.4	Bronchitis	1	0.2	Insect bite, unspecified	3	0.6
Cholelithiasis	1	0.2	Otitis Media	1	0.2	Leishmaniasis	2	0.4
<i>Clostridium difficile</i>	1	0.2	Legionellosis	1	0.2	Tick bite	1	0.2
<i>Clostridium perfringens</i>	1	0.2						
<i>Enterococcus faecalis</i>	1	0.2	Fever + Lymphadenopathy	7	1.5	STI/Genitourinary	18	3.9
Food Poisoning	1	0.2	Tuberculosis	4	0.9	Acute Herpes Simplex Virus-1	5	1.1
Liver Injury	1	0.2	Coccidioidomycosis	1	0.2	Cystitis	5	1.1
Norovirus	1	0.2	Mumps	1	0.2	Pyelonephritis	4	0.9
Strongyloidiasis	1	0.2	Parotitis	1	0.2	Bacterial vaginosis	1	0.2
Ulcerative Colitis	1	0.2				Chlamydia	1	0.2
			Skin/Soft Tissue Infection	22	4.7	Prostatitis	1	0.2
Other/Environmental	8	1.7	Cellulitis	6	1.3	Yeast infection	1	0.3
Altitude Sickness	1	0.2	Unspecified	5	1.1			
Arthritis	1	0.2	MRSA	1	0.2	Bacterial Zoonoses	4	0.9
Ciguatera	1	0.2	Non-specific Rash	3	0.6	Leptospirosis	2	0.4
Drug reaction	1	0.2	Shingles	3	0.6	Brucellosis	1	0.2
Endocarditis	1	0.2	Myiasis	3	0.6	Rat Bite Fever	1	0.2
Malaria insomnia	1	0.2	<i>Staphylococcus aureus</i> SSTI	2	0.4			
Lymphadenitis	1	0.2	Lice	1	0.2	No Diagnosis	7	1.5
Needlestick injury	1	0.2	Dermatitis	1	0.2			
			Non-TB mycobacterium	1	0.2			
Screening	10	2.2	Perianal abscess	1	0.2			
Schistosomiasis	10	2.2	Varicella	1	0.2			

URTI = upper respiratory tract infection
IBS = irritable bowel syndrome
STI = sexually transmitted infection
SSTI = skin and soft tissue infection

SUMMARY AND CONCLUSIONS

- Understanding epidemiology of travel-related febrile illness informs clinical evaluation, diagnostics, and management
- Three most common diagnoses were non-specific viral syndrome, traveler's diarrhea, and viral upper respiratory tract infection → all lack a confirmed pathogen
- Serious travel-related illnesses (malaria, dengue, typhoid) remain well-represented and should always remain on the differential diagnosis of febrile travelers
- A key diagnostic gap exists stemming from the lack of pathogen-level diagnoses
- There is a need for novel, high level platforms for microbiologic testing to improve epidemiological surveillance and diagnosis

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Contact: Dr. Andrea K Boggild
Email: andrea.boggild@utoronto.ca
Website: www.boggildlab.ca