thebmj Visual summary

Fever identification charts

A quick guide to differentiation and diagnosis in tropical and subtropical regions

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Acute undifferentiated febrile illnesses (AUFIs) are characterised by fever of less than two weeks duration without organ-specific symptoms at the onset. This document provides an approach to the diagnosis of common AUFIs in children older than five years as well as in adults in low resource settings, with a focus on early recognition of the most severe non-malarial illnesses.

Local Disease Prevalence

	North Africa	South Africa	East Africa	West Africa	Central Africa	Latin America and Caribbean	South and South-East Asia	East Asia	Australia and New Zealand	Oceania
Protozoal	Malaria Limited risk	Malaria	Malaria	Malaria	Malaria	Malaria Limited risk	Malaria	Malaria Parts of China		Malaria Some countries
			East African trypanosomiasis	Acute African trypanosomiasis	West African trypanosomiasis	Acute American trypanosomiasis				
Bacterial	Enteric fever	Enteric fever	Enteric fever	Enteric fever	Enteric fever	Enteric fever	Enteric fever	Enteric fever		
	Brucellosis	Brucellosis	Brucellosis	Brucellosis	Brucellosis	Brucellosis	Brucellosis	Brucellosis		
	Q fever		Meningococcal disease (epidemic)	Meningococcal disease (epidemic)	Meningococcal disease (epidemic)	Oroya fever (Bartonellosis)	Melioidosis	Melioidosis	Melioidosis	Melioidosis
Rickettsial	Murine Typhus	Murine Typhus	Murine Typhus	Murine Typhus	Murine Typhus	Murine Typhus	Murine Typhus	Murine Typhus		
					Epidemic Typhus	Scrub typhus	Scrub typhus	Scrub typhus	Australian tick typhus	
		African tick bite fever	African tick bite fever		African tick bite fever	African tick bite fever			Q fever	
	Mediterranean spotted fever					Rocky Mountain spotted Fever				
							In Asia, Scrub typhus is more common than Murine typhus			
Spirochetal	Leptospirosis	Leptospirosis	Leptospirosis	Leptospirosis	Leptospirosis	Leptospirosis	Leptospirosis		Leptospirosis	Leptospirosis
			Tick/louse-borne relapsing fever	African tick bite fever	Tick-borne relapsing fever	Tick-borne relapsing fever				
			Q fever							
Arboviruses	No yellow fever risk, limited risk of other arboviral infections	Dengue	Dengue	Dengue	Dengue	Dengue	Dengue	Dengue		Dengue
		Chikungunya	Chikungunya	Chikungunya	Chikungunya	Chikungunya	Chikungunya		Chikungunya (limited)	Chikungunya
				Zika	Zika	Zika	Zika			Zika
			Yellow fever	Yellow fever	Yellow fever				Ross River virus	Ross River virus
Other viruses			Crimean-Congo Hemorrhagic Fever	Crimean-Congo Hemorrhagic Fever	Crimean-Congo Hemorrhagic Fever	Hantavirus pulmonary syndrome	Crimean-Congo Hemorrhagic Fever	Crimean-Congo Hemorrhagic Fever		
			Rift valley fever	Ebola	Ebola	Hemorrhagic fever with renal syndrome	Kyasanur Forest disease	Hemorrhagic fever with renal syndrome		
				Lassa	Marburg	Other viral hemorrhagic fevers: Junin, Machupo, Sabia, Guanarito		Hantavirus		
Helminthic	Filariasis	Filariasis	Filariasis	Filariasis	Filariasis	Filariasis	Filariasis	Filariasis		Filariasis
	Acute schist-osomiasis	Acute schist-osomiasis	Acute schist-osomiasis	Acute schist-osomiasis	Acute schist-osomiasis	Acute schist-osomiasis	Acute schist-osomiasis (SE Asia)	Acute schist-osomiasis		
		Trichinosis			Trichinosis	Trichinosis				

Clinical features

of common and important causes of acute undifferentiated febrile illnesses

Legend

	Non-severe disease	Severe disease
Frequency of Occurrence Arbitrary cut-offs		
Rare <5%	○	△
Uncommon 6–10%	○	△
Occasional 10–30%	○	△
Common >30%	●	▲

		Malaria		Enteric fever		Scrub typhus		Leptospirosis		Dengue	
Signs on examination	Rash	Rash suggests alternative diagnosis		○	△	○	▲	○	△	●	▲
	Eschar					●	▲				
	Jaundice	○	▲		△		▲		▲		△
	Conjunctival suffusion					○	▲	●	▲	○	▲
	Lymphadenopathy	Lymphadenopathy suggests alternative diagnosis		○	△	●	▲	○	▲	○	▲
	Muscle tenderness							○	▲	○	▲
	Enlarged spleen	●	▲	●	▲	○	▲	○	△	○	△
Systemic complications	Dyspnoea		△		△		▲		▲		△
	Encephalopathy		▲		▲		▲		▲		▲
	Acute renal failure		▲	○	△		▲		▲		▲
	Shock		▲		△		▲		▲		▲
	Bleeding		△		▲		△		▲	○	▲
Diagnostics	White blood cell count	Normal	High	Normal or low	High	Normal or low	High	Normal	High	Normal or low	Low
	Thrombocytopenia (< 150,000)	●	▲		△	●	▲	●	▲	●	▲

Excluders and predictors

in clinical findings and basic laboratory tests

	Malaria	Enteric fever	Scrub typhus	Leptospirosis	Dengue
Rule out features Presence of these features suggest alternative diagnosis	Rash and lymphadenopathy	Generalised rash or generalised lymphadenopathy			Fever >12 days, combination of normal tourniquet test and normal leucocyte count (LR- 0.12)
Rule in features Associated with an increase in probability of disease	Fever >40 degrees. Splenomegaly, thrombocytopenia and hyperbilirubinemia are associated with moderate to large increase in probability of disease	Fever in endemic areas >3 days duration & presence of abdominal tenderness is associated with moderate increase in probability of disease	Eschar virtually pathognomonic for scrub typhus (OR 46). Eschar seen in 17–86% of patients in recent series	Combination of suffusion, icterus and conjunctival hemorrhage is characteristic of leptospirosis.	Leukopenia and thrombcytopenia. Positive tourniquet test is a good predictor of infection (OR: 4.86) and ascites is a good predictor of severe dengue (OR:13.91)

Confirming a diagnosis

Accuracy and interpretation of specific tests

Serological tests based on antibody detection are confirmatory only on demonstration of fourfold rise in titre in IgG or seroconversion in IgM in paired specimens

	Malaria	Enteric fever	Scrub typhus	Leptospirosis	Dengue
Rapid tests Request malarial testing and routine blood tests in all patients	**Malarial antigen test** (ICT format) **Sensitivity** 95% **Specificity** 95% for *P. falciparum* Minutes	**Antibody test** **Sensitivity** 47-98% **Specificity** 58-100% 2-4 hours	**Specific Immunoglobulin M test** (ICT format) **Sensitivity** 66% **Specificity** 92% Rapid **ELISA for specific Immunoglobulin M using recombinant antigens** **Sensitivity** variable **Specificity** 90-100% $$ Medium	**Immunoglobulin M test** **Sensitivity** 13-22% in 1st week ~60% in 2nd week ~80% afterward **Specificity** low Hours	**NS1 antigen test** **Sensitivity** 66% **Specificity** 98% Minutes **Immunoglobulin M test** **Sensitivity** 83% **Specificity** 86% Minutes
Confirmatory tests The results of blood culture or serological tests may confirm the diagnosis and guide further therapy	**Microscopy** Detects as few as 5-10 parasites per µl of blood 20-30 Minutes $ Inexpensive	**Culture** **Sensitivity** 40-87% **Specificity** 100% 3-6 days **Widal test** **Sensitivity** depends on local prevalence **Specificity** 100% (paired specimens) $ Inexpensive	**Immunofluorescent or Immunoperoxidase assay for antibodies** **Sensitivity** variable (100% with paired specimens) $$$ Expensive **Weil-Felix Test** **Sensitivity** variable **Specificity** high (paired specimens) low (single specimens) $ Inexpensive	**Microscopic agglutination test for antibody** **Sensitivity** 41% in 1st week 82% in 2nd-4th week **Specificity** variable $$$ Expensive **Nucleic acid amplification** **Specificity** >95%, even in 1st week $$$ Expensive **Culture** **Sensitivity** low **Specificity** 100% Very slow $$$ Expensive	**Culture** **Sensitivity** ~40% **Specificity** 100% 1-2 weeks $$$ Expensive **Nucleic acid amplification** **Sensitivity** 60-100% **Specificity** >95% Same day $$$ Expensive **Serology** **Specificity** 100% in severe cases Retrospective $$ Medium