

# Investigation of Fever -from the tropics

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Wave Sound



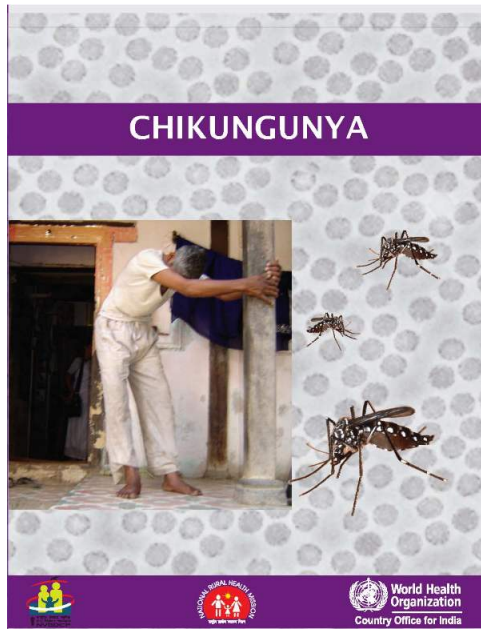
# CME FACULTY DISCLOSURE

Dr. Libman

has no affiliation with the manufacturer of any commercial product or provider of any commercial service discussed in this CME activity.



# Fevers: old and new



# What is fever?

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- “Normal” rarely  $> 37.5^{\circ}\text{C}$ , diurnal, monthly variations
  - Usually defined  $>38^{\circ}\text{C}$
- Mouth temp depends on technique, environment
- Rectal best, axilla=max possible, subjective=nearly useless

小籠飽狂熱

JUICY BUNS FEVER

一鎊一籠 £1 PER PORTION

午市供應 12-4 pm

CONDITION APPLIED

# 587 CONSECUTIVE FEVER CASES

TDC Montreal

Malaria	32%
URI/pharyngitis	7
Hepatitis	6
Pneumonia/bronchitis	5
Colitis (Shigella, Salmonella, Campylobacter)	5
Pyelonephritis	4
Dengue	2
Typhoid/paratyphoid	2
Rickettsia	1
Amoebic liver abscess	1
Tuberculosis	1
Acute retroviral	.3

# Percentage of fever = malaria, dengue

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Region	Malaria	Dengue
Sub-Saharan Africa	42	6
Oceania/Pacific Islands	59	1
SE Asia	7	18
South Asia	7	9
Central & S. america	8	9

# Fever: basic approach

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- ❑ Is it treatable?
- ❑ Should I worry?
  - First rule out malaria
- ❑ The basic workup
  - Important items in the history
  - Physical clues
  - Fever patterns
  - Clues on basic labs
- ❑ The big 3: malaria, dengue, enteric fever





# Undifferentiated Fever:

## -Is it treatable?

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### □ Treatable

- Critical: malaria, enteric fever, some rickettsia
- Spont. Resolution: leptospirosis, bacterial enterocolitis, acute schisto (Katayama)

### □ Common, not treatable

- Dengue

### □ Public health

- Influenza, SARS, TB, hemorrhagic fevers

### □ Everything else!



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Peach Flavored

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and fresh taste.



# Fever and not much else

## -should I worry?

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- Worry about:
  - Malaria, malaria, and...
  - Bacteremia, esp meningo
- Worry a bit less about
  - Enteric fever (typhoid)
  - Rickettsia (In travellers, 75% tick borne)
- Other causes of interest
  - Reassure ± treat: Dengue, hepatitis, relapsing fevers, liver abscess (amebic)
  - Reassure: Mono, CMV, toxo
  - Partners: Acute retroviral
  - Routine: URI, pyelo, pneumonia, etc.

# How to deal with fever (r/o malaria)

- Where did they go?
  - Malarial area? (eg: PNG 1 mo 1:5)
  - Prophylaxis (6% of cases)
- Reasonable incubation period
  - About 6 wks without medication
- Tests: malaria smear (x3?)
- Hints from CBC:– WBC  $\leftrightarrow$  ↓, plt ↓
  - Eosinophilia - not

Spira Lancet 2003  
MMWR 2013 Nov 1;62(5):1-17

CRP	Dengue	Malaria	Enteric F
<8	51%	10.4%	4.8%
>40	9%	75%	73.8%

CRP N + (plt ↓ and/or wbc ↓) = malaria, dengue, rare Cooper J Trav Med 2014

# Physical / exam

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- Must be complete
  - Software, eg: GIDEON, Kabisa, [www.fevertravel.ch](http://www.fevertravel.ch)
- Occasional important clues
  - Tick eschar
  - Hepatomegaly (VL, African tryps, Schisto-Katayama)
- Much less specific
  - Petechiae/purpura
  - Ulcers
  - Splenomegaly
  - Mental status

# Fever Patterns

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- Much tradition, little science
- Classic pattern only after prolonged course
  - Disturbed by medications
  - Poor measurements
  - Diagnosis made before classic pattern
- Malaria: tertian, quartan
  - Tertian in “immune” Pf
- “Saddleback”: dengue, yellow fever, chick
- V. leishmaniasis: double quotidian
- Undulating 1-2 days: Brucella, lymphoma
- Days-weeks: relapsing fever

# Basic Lab Evaluation

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- CBC, malaria smear
  - Smear: Bartonella, relapsing fever
  - Leukopenia: dengue, typhoid, Brucella, Rickettsia, HIV
  - Thrombocytopenia: malaria, dengue, Brucella
  - Eosinophilia: filaria, Katayama, Strongyloides
- LFT
- U/A, Urine/blood culture
- CXR (even without resp symptoms: esp miliary TB; elevated hemidiaphragm: liver abscess)
- Extra tubes for later serology!

# Underdiagnosis #1: Dengue

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## □ Diagnosis

- Incubation about 1 week, upto 2 weeks
- Fever 5-7d, h/a, fatigue, myalgia, arthralgia, mac-pap rash in upto 50%, ↓plt, ↓lymph
  - Still r/o malaria; Ag/PCR, IgM, IgG seroconversion
  - Tourniquet test + in 50%

## □ DHF – rare in travellers

- ↓fever, then capillary leak, ↓ ↓ plt
- Classic=hemoconcentration (20%), effusions
- DSS: decrease pulse pressure, hypotension





Lacunae in scarlatiniform rash  
dengue



Petechiae



# Underdiagnosis #2: Rickettsia

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- Fever, headache, myalgia
  - Often rash, regional nodes, ↓WBC, plt
  - Painless eschar (look!)
    - Spotted fevers: African>Medit>RM
  - Tick bite (mite = scrub typhus, flea = murine)
- Diagnose by serology
  - Treat empirically – complications severe
- Symptoms/geography
  - <http://www.cdc.gov/travel/diseases.htm>

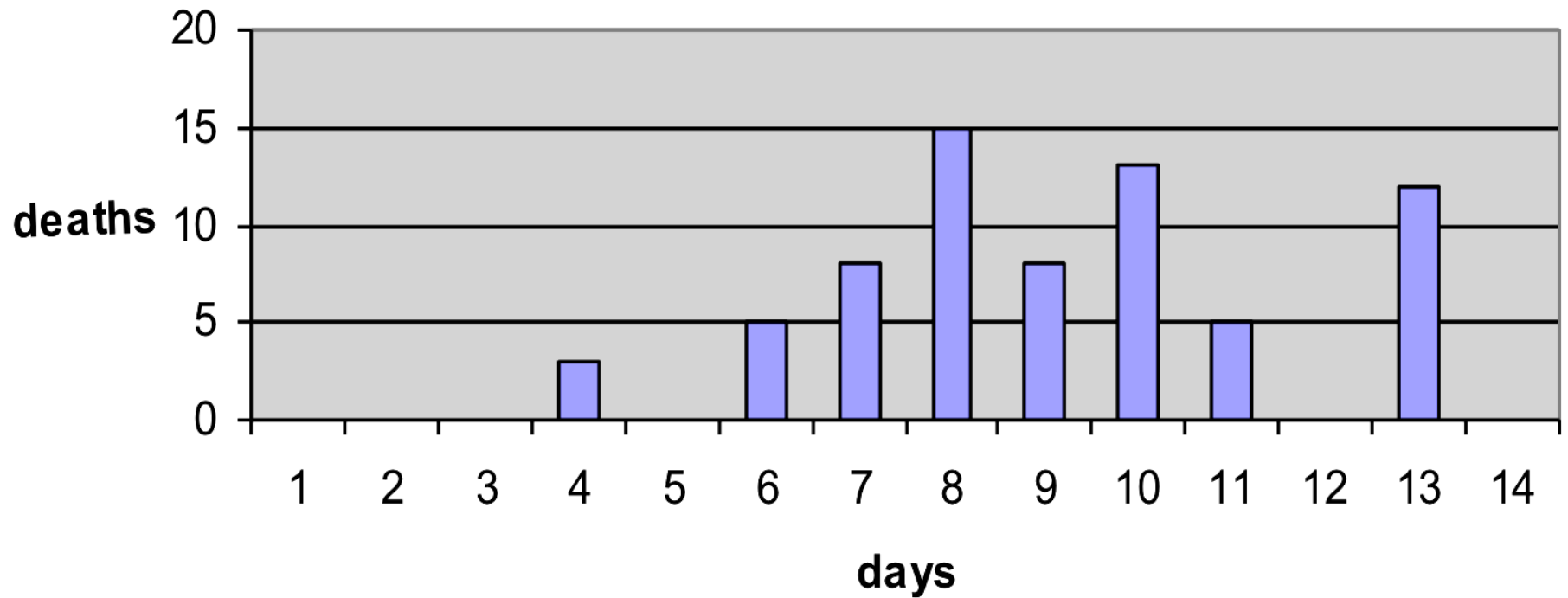


# Imported malaria USA 2003

**N= 783    MMWR 2005;54:25-39**

<b>Category</b>	<b>Percent</b>
<b>VFRs</b>	<b>53.9</b>
<b>Tourism</b>	<b>12.5</b>
<b>Missionary</b>	<b>9.2</b>
<b>Business</b>	<b>7.5</b>
<b>Student</b>	<b>3.8</b>

# Malaria symptom onset to death interval 39 cases



# Quiz - 1

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<b>Any exposure in any area with documented malaria transmission</b>	<b>Fever with or without any other finding</b>	
<b>Most tropical countries</b>	<b>Fever and altered mental status</b>	
<b>Budget travel to India, Nepal, Pakistan, or Bangladesh</b>	<b>Insidious onset high unremitting fever, toxic patient, paucity of physical findings</b>	
<b>Freshwater recreational exposure in Africa</b>	<b>Fever, eosinophilia, hepatomegaly, negative malaria smear</b>	

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<b>Freshwater recreational exposure in Africa</b>	<b>Fever, eosinophilia, hepatomegaly, negative malaria smear</b>	<b>Acute schistosomiasis (Katayama fever)</b>

# Quiz - 2

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**Bitten by *Aedes aegypti* in Central America, Southeast Asia, or the South Pacific**

**Fever, headache, myalgia, diffuse macular rash, mild to moderate thrombocytopenia**

**Hunting or visiting game reserves in southern Africa**

**Fever, eschar, diffuse petechial rash**

**Travel to Southeast Asia**

**Fever, eschar, diffuse petechial rash**

**Hiking, biking, swimming, rafting with exposure to fresh surface water**

**Fever, myalgia, conjunctival suffusion, mild to severe jaundice, variable rash**

**Summertime cruise to Alaska, elderly traveler**

**Influenza like illness**

# Quiz - 2

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<b>Bitten by <i>Aedes aegypti</i> in Central America, Southeast Asia, or the South Pacific</b>	<b>Fever, headache, myalgia, diffuse macular rash, mild to moderate thrombocytopenia</b>	<b>Dengue</b>
<b>Hunting or visiting game reserves in southern Africa</b>	<b>Fever, eschar, diffuse petechial rash</b>	
<b>Travel to Southeast Asia</b>	<b>Fever, eschar, diffuse petechial rash</b>	
<b>Hiking, biking, swimming, rafting with exposure to fresh surface water</b>	<b>Fever, myalgia, conjunctival suffusion, mild to severe jaundice, variable rash</b>	
<b>Summertime cruise to Alaska, elderly traveler</b>	<b>Influenza like illness</b>	

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<b>Hunting or visiting game reserves in southern Africa</b>	<b>Fever, eschar, diffuse petechial rash</b>	<b>African tick typhus, due to <i>R. africae</i></b>
<b>Travel to Southeast Asia</b>	<b>Fever, eschar, diffuse petechial rash</b>	
<b>Hiking, biking, swimming, rafting with exposure to fresh surface water</b>	<b>Fever, myalgia, conjunctival suffusion, mild to severe jaundice, variable rash</b>	
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<b>Travel to Southeast Asia</b>	<b>Fever, eschar, diffuse petechial rash</b>	<b>Scrub typhus due to <i>Orientia tsutsugamushi</i></b>
<b>Hiking, biking, swimming, rafting with exposure to fresh surface water</b>	<b>Fever, myalgia, conjunctival suffusion, mild to severe jaundice, variable rash</b>	
<b>Summertime cruise to Alaska, elderly traveler</b>	<b>Influenza like illness</b>	

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<b>Hiking, biking, swimming, rafting with exposure to fresh surface water</b>	<b>Fever, myalgia, conjunctival suffusion, mild to severe jaundice, variable rash</b>	<b>Leptospirosis</b>
<b>Summertime cruise to Alaska, elderly traveler</b>	<b>Influenza like illness</b>	



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<b>Summertime cruise to Alaska, elderly traveler</b>	<b>Influenza like illness</b>	<b>Influenza</b>

# Quiz - 3

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<b>New sexual partner during travel</b>	<b>Fever, rash, mono-like illness</b>	
<b>Travel to any developing country</b>	<b>Coryza, conjunctivitis, buccal spots, rash</b>	
<b>Resort hotel in southern Europe <math>\pm</math>/- exposure to whirlpool spas</b>	<b>Pneumonia</b>	
<b>Explored a cave in the Americas</b>	<b>Fever, cough, retrosternal chest pain, hilar adenopathy</b>	
<b>Ingestion of unpasteurized goat cheese</b>	<b>Chronic fever, fatigue</b>	
<b>Safari to game parks of East Africa</b>	<b>Fever, non-genital chancre, fine macular rash</b>	
<b>Travel to Australia</b>	<b>Fever, fatigue, polyarthritis</b>	

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<b>New sexual partner during travel</b>	<b>Fever, rash, mono-like illness</b>	<b>Acute HIV</b>
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<b>Explored a cave in the Americas</b>	<b>Fever, cough, retrosternal chest pain, hilar adenopathy</b>	<b>Histoplasmosis</b>
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<b>Safari to game parks of East Africa</b>	<b>Fever, non-genital chancre, fine macular rash</b>	<b>East African trypanosomiasis</b>
<b>Travel to Australia</b>	<b>Fever, fatigue, polyarthritits</b>	



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<b>Travel to Australia</b>	<b>Fever, fatigue, polyarthritits</b>	<b>Ross River virus</b>

# Quiz -4

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<b>Forested areas of central and eastern Europe and across Russia</b>	<b>Fever, altered mental status, paralysis</b>	
<b>Rodent exposure in West Africa</b>	<b>Fever, sore throat, jaundice, hemorrhagic manifestations</b>	
<b>Returning Hajj pilgrim or family contact</b>	<b>Fever, meningitis</b>	
<b>Ingestion of undercooked meat of any animal in any country</b>	<b>Fever, facial edema, myositis, increased CPK, massive eosinophila, normal ESR</b>	
<b>Unvaccinated, returning from sub-Saharan Africa or forested areas of Amazonia</b>	<b>Fever, jaundice, proteinuria, hemorrhage</b>	

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<b>Forested areas of central and eastern Europe and across Russia</b>	<b>Fever, altered mental status, paralysis</b>	<b>Tickborne encephalitis</b>
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<b>Rodent exposure in West Africa</b>	<b>Fever, sore throat, jaundice, hemorrhagic manifestations</b>	<b>Lassa fever</b>
<b>Returning Hajj pilgrim or family contact</b>	<b>Fever, meningitis</b>	
<b>Ingestion of undercooked meat of any animal in any country</b>	<b>Fever, facial edema, myositis, increased CPK, massive eosinophila, normal ESR</b>	
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<b>Returning Hajj pilgrim or family contact</b>	<b>Fever, meningitis</b>	<b>Meningococcal meningitis</b>
<b>Ingestion of undercooked meat of any animal in any country</b>	<b>Fever, facial edema, myositis, increased CPK, massive eosinophila, normal ESR</b>	
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<b>Returning Hajj pilgrim or family contact</b>	<b>Fever, meningitis</b>	<b>Meningococcal meningitis</b>
<b>Ingestion of undercooked meat of any animal in any country</b>	<b>Fever, facial edema, myositis, increased CPK, massive eosinophila, normal ESR</b>	<b>Trichinosis</b>
<b>Unvaccinated, returning from sub-Saharan Africa or forested areas of Amazonia</b>	<b>Fever, jaundice, proteinuria, hemorrhage</b>	

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<b>Rodent exposure in West Africa</b>	<b>Fever, sore throat, jaundice, hemorrhagic manifestations</b>	<b>Lassa fever</b>
<b>Returning Hajj pilgrim or family contact</b>	<b>Fever, meningitis</b>	<b>Meningococcal meningitis</b>
<b>Ingestion of undercooked meat of any animal in any country</b>	<b>Fever, facial edema, myositis, increased CPK, massive eosinophila, normal ESR</b>	<b>Trichinosis</b>
<b>Unvaccinated, returning from sub-Saharan Africa or forested areas of Amazonia</b>	<b>Fever, jaundice, proteinuria, hemorrhage</b>	<b>Yellow fever</b>

# Quiz -5

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**Farming areas of India and Southeast Asia**

**Fever, altered mental status, paralysis**

**Exposure to farm animals**

**Pneumonia, mild hepatitis**

**Possible tick exposure almost anywhere**

**Fever, headache, rash, conjunctival injection, hepatosplenomegaly**

**Poor hygienic conditions with possible body louse exposure in Ethiopia or Sudan**

**Fever, headache, rash, conjunctival injection, hepatosplenomegaly**

**Travel to western India, mosquito bites**

**Fever, severe small joint pain, rash**



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**Japanese encephalitis**

# Quiz -5

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**Farming areas of India and Southeast Asia**

**Fever, altered mental status, paralysis**

**Japanese encephalitis**

**Exposure to farm animals**

**Pneumonia, mild hepatitis**

**Q fever**

**Possible tick exposure almost anywhere**

**Int fever, headache, rash, conjunctival injection, hepatosplenomegaly**

**Poor hygienic conditions with possible body louse exposure in Ethiopia or Sudan**

**Int fever, headache, rash, conjunctival injection, hepatosplenomegaly**

**Travel to western India, mosquito bites**

**Fever, severe small joint pain, rash**

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**Pneumonia, mild hepatitis**

**Int fever, headache, rash, conjunctival injection, hepatosplenomegaly**

**Int fever, headache rash, conjunctival injection, hepatosplenomegaly**

**Fever, severe small joint pain, rash**

**Japanese encephalitis**

**Q fever**

**Tickborne relapsing fever**

# Quiz -5

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**Tickborne relapsing fever**

**Poor hygienic conditions with possible body louse exposure in Ethiopia or Sudan**

**Int fever, headache, rash, conjunctival injection, hepatosplenomegaly**

**Louse-borne relapsing fever**

**Travel to western India, mosquito bites**

**Fever, severe small joint pain, rash**

# Quiz -5

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**Chikungunya**

