United Nations
Educational, Scientific and
Cultural Organization

UNESCO Chair on Training and Empowering
Human Resources for Health Development
in Resource-Limited Countries
University of Brescia

Infections with a long incubation period in travelling children

Prof. Francesco Castelli
Chair of Infectious Diseases
UNESCO Chair
University of Brescia (Italy)

WHO Collaborating Center
for TB/HIV co-infection
and TB elimination strategy

Società Italiana di
Medicina Tropicale
e Salute Globale

Background

- Travel-related health problems have been reported in as many as 22-64% travelers to developing countries

- Up to 8% of travelers are ill enough to seek care from a medical provider

- **Incubation periods vary, and symptoms can present months to years after initial infection**

CDC, The Yellow Book, 2014

Hints to consider in a returning traveler?

- Severity of illness
- Travel itinerary
- Underlying medical illness
- Vaccines received and prophylaxis used
- Individual exposure history
- **Timing of illness in relation to travel**

CDC, The Yellow Book, 2014

Incubation period

Short	Medium	Long
1 – 14 days	14 d – 6 w	> 6 weeks

CDC, The Yellow Book, 2014

Common infections by incubation period

Disease	Incubation period	Distribution
INCUBATION < 14 days		
Chikungunya	2-4 days	Tropics, subtropics
Dengue	4-8 days	Tropics, subtropics
Encephalitis, arboviral	3-14 days	Vary by region
Enteric fever	7-18 days	Most from Indian subcontinent
Acute HIV	10-28 days	Worldwide
Influenza	1-3 days	Worldwide
Legionellosis	5-6 days	Widespread
Leptospirosis	7-12 days	Widespread
P. falciparum malaria	6-30 days	Tropics, subtropics
P. vivax malaria	8 days to 12 months, occasionally longer	Widespread in tropics and subtropics
Spotted-fever rickettsiae	2-3 days	Vary by region

CDC, The Yellow Book, 2014, modified

Common infections by incubation period

Disease	Incubation period	Distribution
INCUBATION 14 days to 6 weeks		
Encephalitis, arboviral; enteric fever; acute HIV; leptospirosis; malaria	See above	See above
Amebic liver abscess	Week to months	Most common in developing countries (most from Latin America)
Hepatitis A	15-40 days	Most common in developing countries
Hepatitis E	26-42 days	Widespread (most from Far East)
Acute schistosomiasis (Katayama syndrome)	4-8 weeks	Most common in sub-saharan africa

CDC, The Yellow Book, 2014, modified

Common infections by incubation period

Disease	Incubation period	Distribution
INCUBATION > 6 weeks		
Amebic liver abscess, hepatitis E, malaria, acute schistosomiasis	See above	See above
Hepatitis B	60 - 180 days	Widespread
Leishmaniasis, visceral	2-10 months	Asia, Africa, Latin America, Southern Europe, Middle East
Tuberculosis	Primary, weeks; reactivation, years	Global distribution

CDC, The Yellow Book, 2014, modified

Illness in Children After International Travel: Analysis From the GeoSentinel Surveillance Network

WHAT'S KNOWN ON THIS SUBJECT: Children now routinely travel internationally. It has been suggested that significant proportions of such children develop travel-related illnesses. Previous studies on pediatric travel-related morbidities were from single centers or focused on specific diseases.

WHAT THIS STUDY ADDS: This study offers the first systematic evaluation of the demographic characteristics, health care use, and travel-related morbidities of children after international travel. Profiles of relative likelihoods of travel-related diseases, stratified according to region of travel and age group, are presented.

AUTHORS: Stefan Hagmann, MD, MSc,[a] Richard Neugebauer, PhD, MPH,[b] Eli Schwartz, MD,[c] Cecilia Perret, MD,[d] Francesco Castelli, MD,[e] Elizabeth D. Barnett, MD,[f] and William M. Stauffer, MD,[g] for the GeoSentinel Surveillance Network

[a]Division of Pediatric Infectious Diseases, Bronx-Lebanon Hospital Center, Albert Einstein College of Medicine of Yeshiva University, Bronx, New York; [b]Faculty of Medicine, College of Physicians and Surgeons, Columbia University, New York, New York; [c]Center for Geographic Medicine, Chaim Sheba Medical Center Tel Hashomer and Sakler Faculty of Medicine, Tel Aviv University, Tel Aviv, Israel; [d]Department of Pediatrics and Travel Medicine, Faculty of Medicine, Pontifical Catholic University of Chile, Santiago, Chile; [e]Clinic of Infectious and Tropical Diseases, University of Brescia, Brescia, Italy; [f]Maxwell Finland Laboratory for Infectious Diseases, Boston Medical Center, Boston, Massachusetts; and [g]Department of Medicine and Pediatrics, University of Minnesota, Minneapolis, Minnesota

KEY WORDS
child, travel, morbidity, prevention

abstract

FREE

Pediatrics. 2010 May;125(5):e1072-80. Epub 2010 Apr 5

TABLE 2 Diagnostic Syndrome Groups, Selected Specific Diagnoses, and Rates of Hospitalization for 1591 Ill Returning Pediatric Travelers

Diagnosis	Pediatric Travelers, *n* (%)	Proportion of Children Hospitalized, %
Diarrheal disorders, all	449 (28)	7
Acute diarrhea	357 (22)	8
Bacterial cause[a]	104 (7)	12
Gastroenteritis, unspecified	98 (6)	10
Parasitic cause[b]	88 (6)	2
Chronic diarrhea[c]	92 (6)	4
Dermatologic disorders, all[d]	390 (25)	4
Animal bites	95 (6)	2
CLM	66 (4)	2
Insect bites	46 (3)	2
Systemic febrile illnesses, all[e]	358 (23)	36
Malaria[f]	124 (8)	69
Viral syndromes	99 (6)	1
Febrile illnesses, unspecified	40 (3)	8
Dengue fever[g]	23 (2)	39
Enteric fever[h]	21 (1)	60
Respiratory disorders	167 (11)	15
Upper respiratory tract infections	64 (4)	0
Hyperactive airway disease[i]	33 (2)	16
Acute otitis media[j]	28 (2)	4
Nondiarrheal gastrointestinal disorders[k]	114 (7)	22
Nonspecific symptoms	70 (4)	20
Dental problems	34 (2)	0
Tissue parasites[l]	30 (2)	14
Genitourinary disorders[m]	24 (2)	13
Injuries	21 (1)	5
All children	1591 (100)	14

Columns do not add up to 100% because patients could have >1 diagnosis. Only syndromes that constituted >1% of all

Pediatrics. 2010 May;125(5):e1072-80. Epub 2010 Apr 5

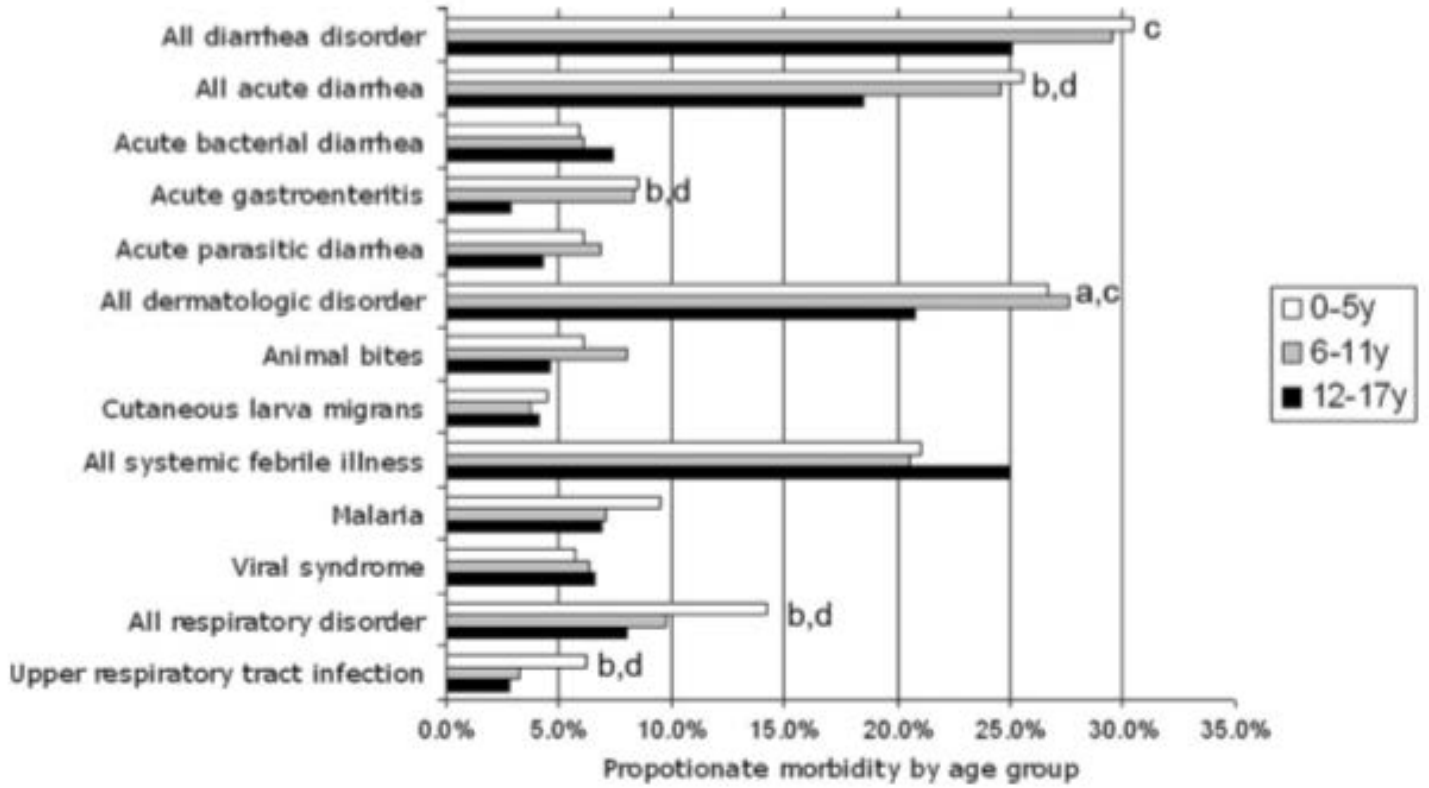


FIGURE 2

Comparison of diagnosis groups and selected specific diagnoses according to pediatric age group (0–5 years, $N = 528$; 6–11 years, $N = 410$; 12–17 years, $N = 653$). [a] $P < .05$, [b] $P < .01$, for comparisons among pediatric age groups. [c] $P < .05$, [d] $P < .01$, for linear trend.

Pediatrics. 2010 May;125(5):e1072-80. Epub 2010 Apr 5

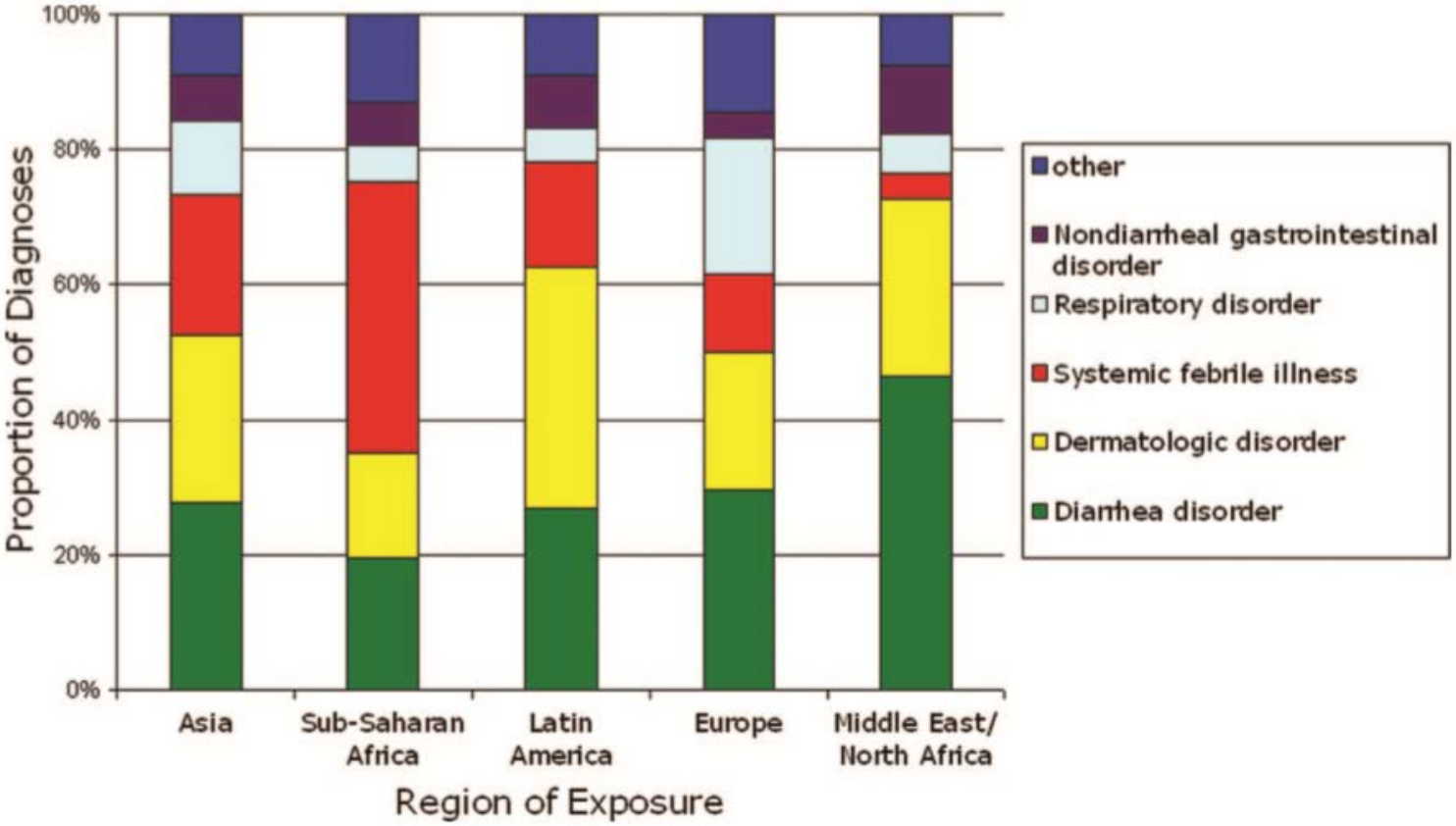
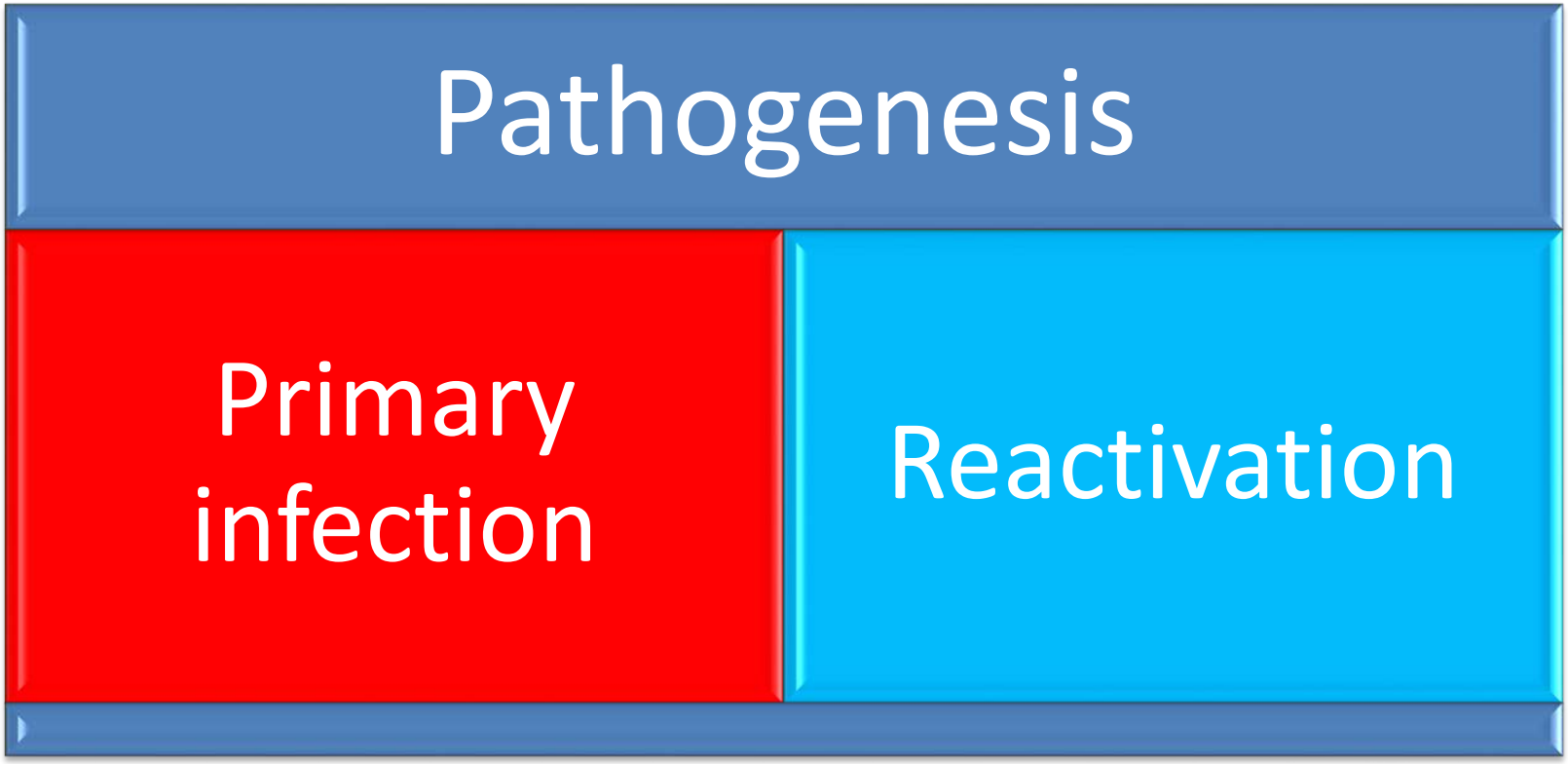


FIGURE 3

Proportions of broad diagnostic categories according to region of exposure. The data for ill children returning from North America ($n = 13$) and Oceania ($n = 30$) are not presented because of small numbers. The proportionate morbidity rates of diarrheal disorders, dermatologic disorders, systemic febrile illnesses, and respiratory disorders differed significantly ($P < .001$) among the travel regions.

Pediatrics. 2010 May;125(5):e1072-80. Epub 2010 Apr 5

A few examples …



Case report (I)

- A 5-year-old German traveler presented with fever and fatigue
- On physical examination a marked splenomegaly was found.
- Laboratory investigations showed pancytopenia as well as several markers suggesting autoimmune disease.
- Splenomegaly and pancytopenia continued to progress despite treatment with prednisolone and intravenous immunoglobulins.

Ned Tijdschr Geneeskd. 2006 Jul 29;150(30):1662-8.

One and a half years after presentation...

- the spleen had grown to such an extent that it was causing mechanical problems. Splenectomy was performed for diagnostic and therapeutic purposes

Ned Tijdschr Geneeskd. 2006 Jul 29;150(30):1662-8.

What the likely diagnosis?

Haematological Disease?

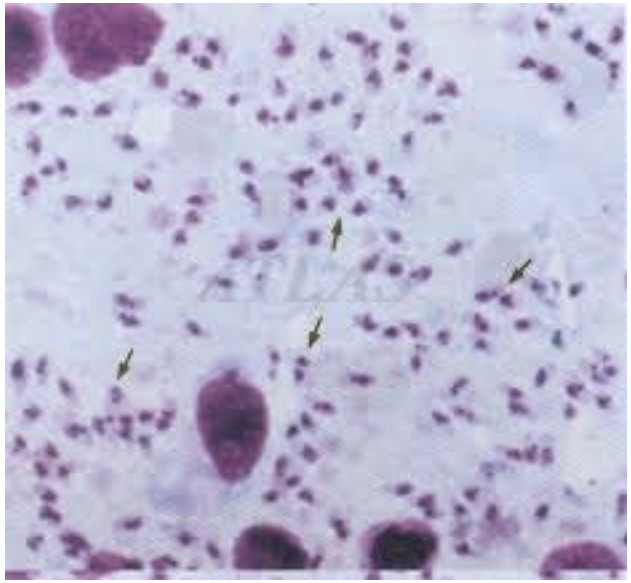
Waldenstrom Disease?
Myeloma?

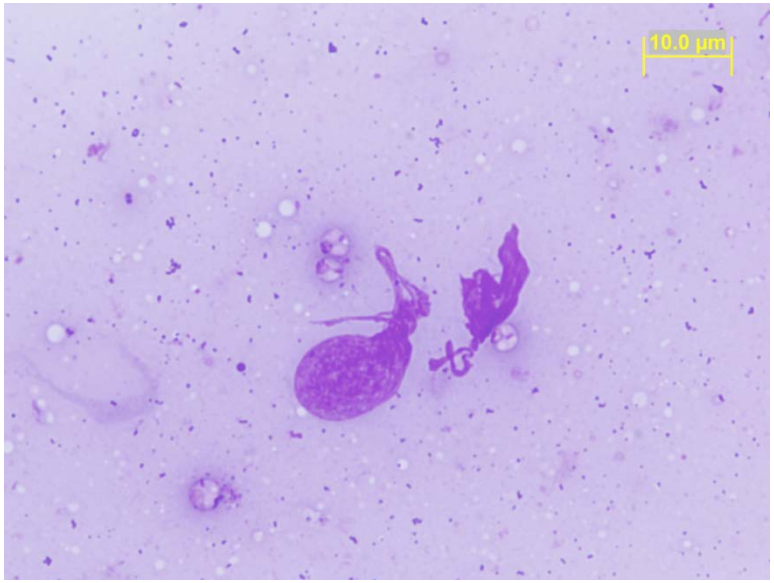
Parasitic disease?

Where the boy was coming from?

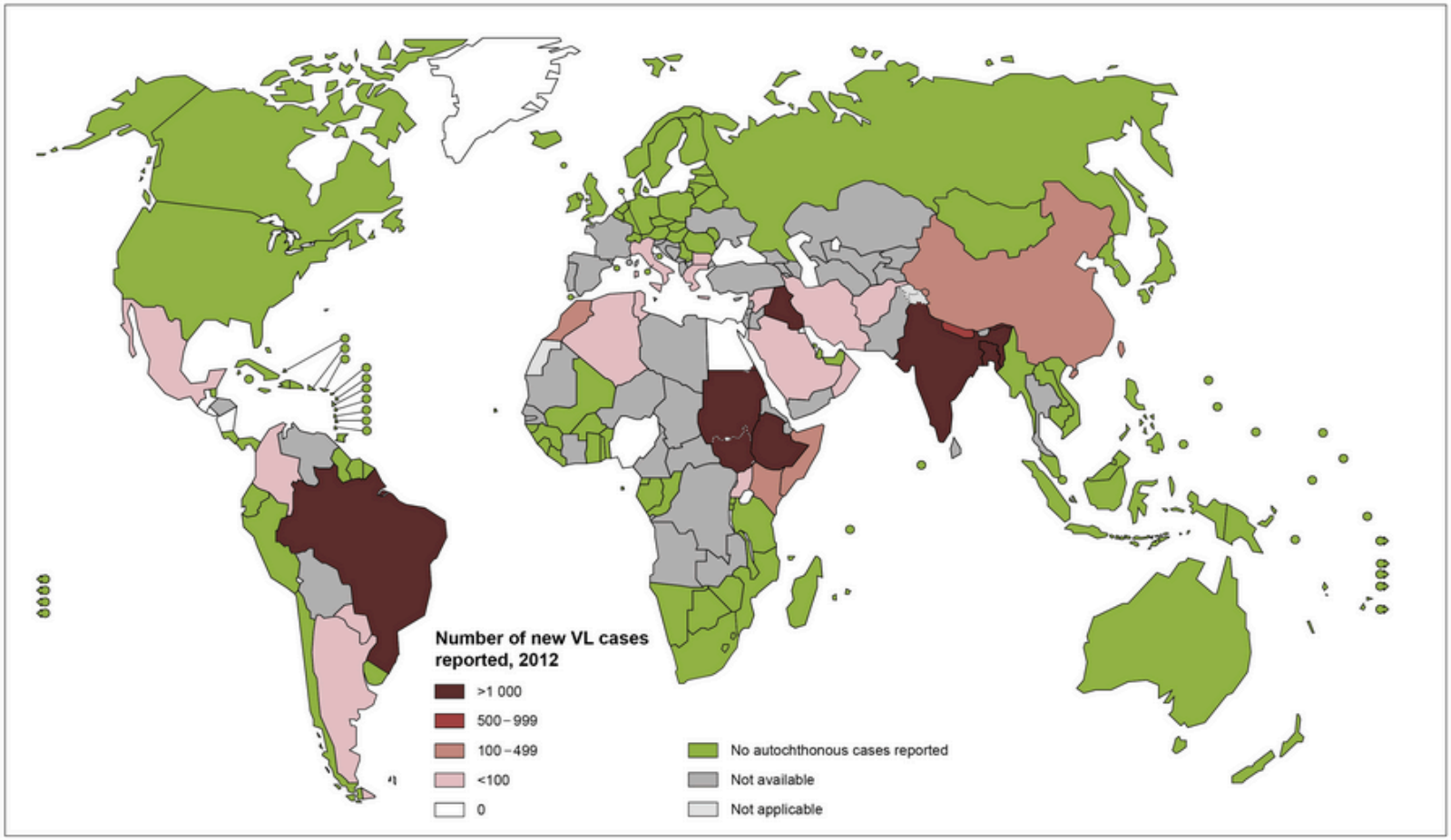
At last..

- Histological investigation of the spleen showed amastigotes of Leishmania.
- PCR confirmed the diagnosis of **visceral leishmaniasis**





Status of endemicity of visceral leishmaniasis, worldwide, 2012



Data Source: World Health Organization
Map Production: Control of Neglected Tropical Diseases (NTD)
World Health Organization

World Health Organization

300 000 Estimated cases of visceral leishmaniasis (VL) and over 20 000 deaths annually

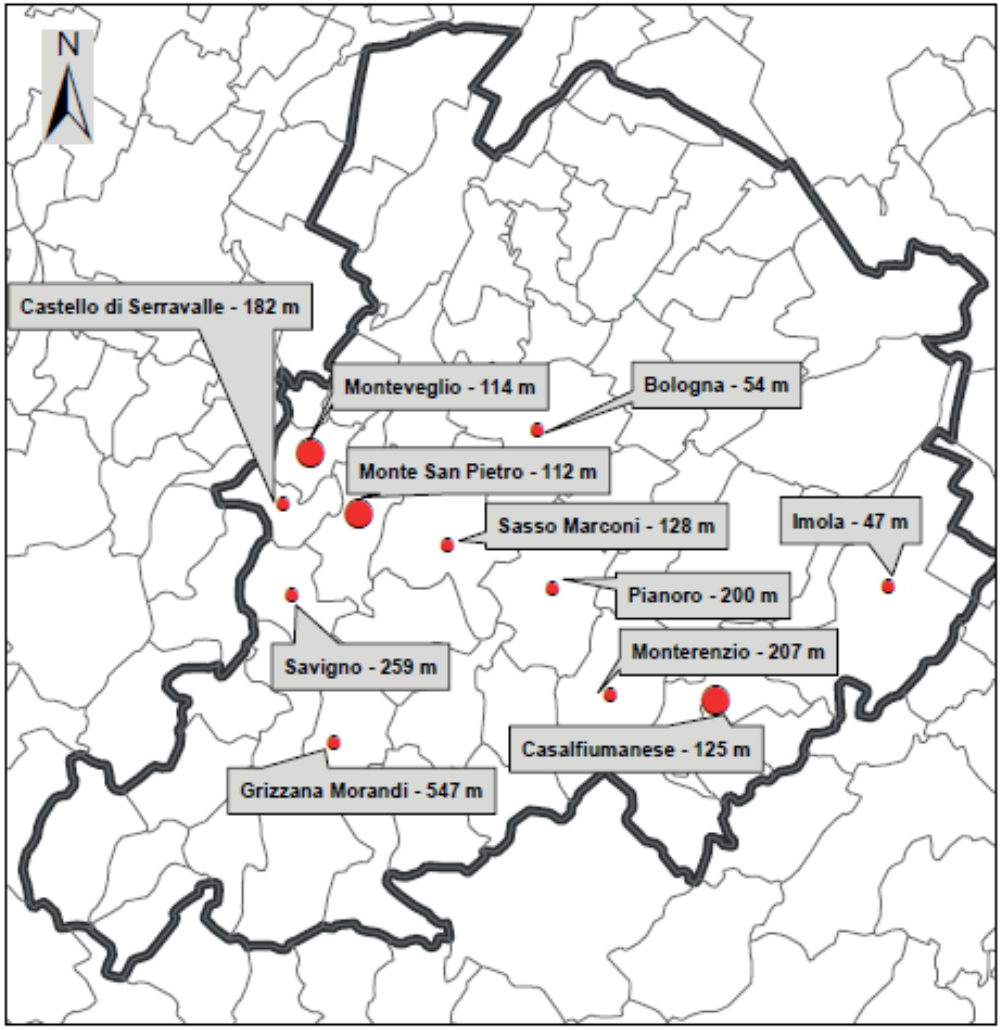
The patient had a recent holiday in northern Italy

In tutta l'area mediterranea la malattia è riemergente con un aumento dei casi nel corso di tutto il decennio '90.

In Italia, secondo dati dell'Istituto superiore di sanità, l'incidenza annuale a inizio degli anni 2000 è di circa 200 casi, anche se molte regioni soffrono di sottonotifica.

Programmi di sorveglianza attiva sono stati messi a punto nelle regioni Campania, Sicilia e Liguria.

Geographical location of human cases of visceral leishmaniasis, Bologna Province, northern Italy, November 2012–May 2013 (n=14)



Euro Surveill. 2013;18(29):pii=20530.

JOURNAL OF CLINICAL MICROBIOLOGY, Jan. 2010, p. 131–136 Vol. 48, No. 1
0095-1137/10/$12.00 doi:10.1128/JCM.00416-09

Asymptomatic *Leishmania infantum* Infection in an Area of Northwestern Italy (Piedmont Region) Where Such Infections Are Traditionally Nonendemic▽

Alberto Biglino,[1]* Cesare Bolla,[1] Erika Concialdi,[1] Anna Trisciuoglio,[2] Angelo Romano,[2] and Ezio Ferroglio[2]

Department of Clinical and Biological Sciences, University of Torino, Infectious Diseases Unit, Corso Dante 202, 10141 Asti, Italy,[1] and Department of Animal Production, Epidemiology and Ecology, University of Torino, Via Leonardo da Vinci 44, 10095 Grugliasco, Italy[2]

Received 25 February 2009/Returned for modification 14 May 2009/Accepted 9 November 2009

The prevalence of *Leishmania infantum*-specific antibodies and asymptomatic infection was assessed in a randomized sample of 526 healthy adults from a continental area of Northwestern Italy where *L. infantum* is not endemic and where autochthonous cases of visceral leishmaniasis (VL) were recently reported. *L. infantum*-specific antibodies were detected by Western blotting (WB) in 39 subjects (7.41%), while *L. infantum* kinetoplast DNA was amplified from buffy coat in 21 out of 39 WB-positive subjects, confirming asymptomatic infection in 53.8% of seropositives. Risk factors significantly associated with WB positivity were uninterrupted residence since childhood in a local rural environment (odds ratio [OR], 3.5; 95% confidence interval [CI], 1.7 to 7.3), daily contact with animals though not exclusively with dogs (OR, 3.7; 95% CI, 1.3 to 10.7), older age (OR, 2.31; 95% CI, 1.2 to 4.5), and agricultural/other outdoor activities (OR, 3.8; 95% CI, 0.99 to 3.7.) Logistic regression analysis showed that uninterrupted residence in a local rural environment and an age of >65 years were the only independent predictors of seropositivity assessed by WB. Follow-up at 24 months did not show evidence of VL in either seropositive or PCR-positive subjects. The detection of a high seroprevalence rate, confirmed as asymptomatic infection by PCR in more than half of the cases, among healthy residents in a continental area of northwestern Italy makes local *L. infantum* transmission very likely. In a region where VL is considered nonendemic, these findings warrant further epidemiological investigations as well as interventions with respect to both the canine reservoir and vectors, given the possible risks for immunosuppressed patients.

Even from Europe…

Travel Med Infect Dis. 2014 Mar-Apr;12(2):167-72. doi: 10.1016/j.tmaid.2013.12.003. Epub 2013 Dec 19.

Leishmaniasis acquired by travellers to endemic regions in Europe: a EuroTravNet multi-centre study.

Ehehalt U[1], Schunk M[2], Jensenius M[3], van Genderen PJ[4], Gkrania-Klotsas E[5], Chappuis F[6], Schlagenhauf P[7], Castelli F[8], Lopez-Velez R[9], Parola P[10], Burchard GD[11], Cramer JP[12].

⊕ Author information

Abstract

BACKGROUND: Leishmaniasis is a disease caused by protozoan parasites of the genus Leishmania. Clinical manifestations of leishmaniasis include cutaneous leishmaniasis (CL) and visceral leishmaniasis (VL). About 90% of cases occur in the tropics or subtropics but the disease is also endemic in the Mediterranean area. No systematic analysis on leishmaniasis in travellers visiting endemic areas in Europe is available.

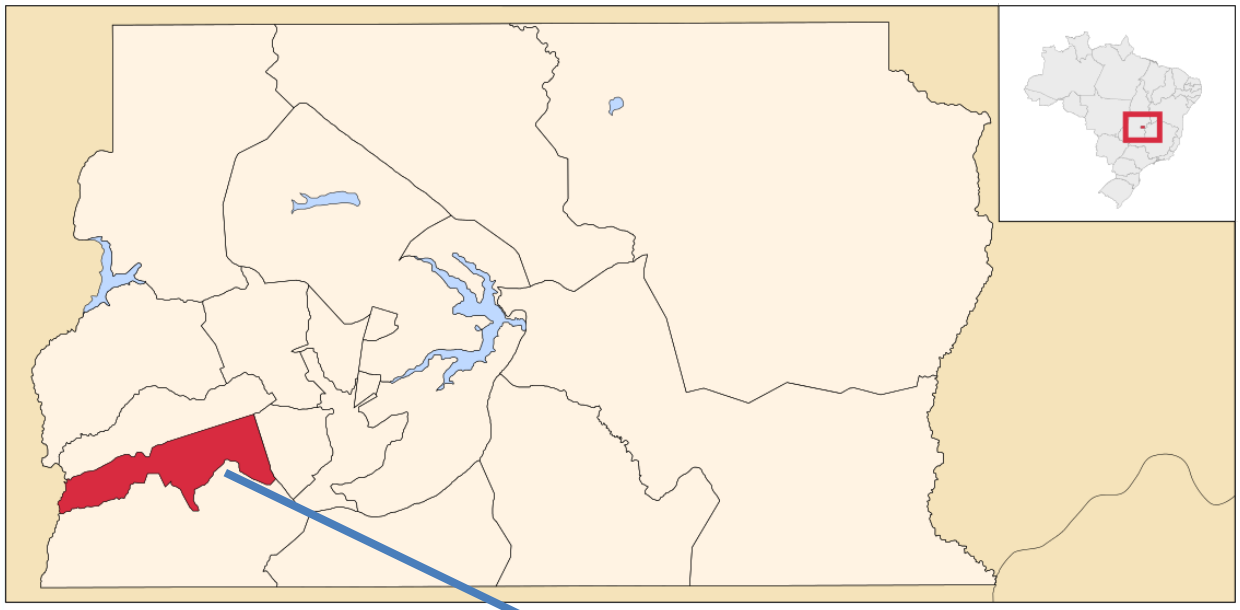
METHODS: Within the European travel medicine network EuroTravNet, we performed a retrospective analysis in travellers who acquired leishmaniasis within Europe diagnosed between 2000 and 2012.

RESULTS: Forty cases of leishmaniasis (30 CL and 10 VL) were identified; the majority were acquired in Spain (n = 20, 50%), Malta and Italy (each n = 7, 18%). Median age was 48 years (range 1-79). Three of eight (37.5%) of the VL patients were on immunosuppressive therapy. The most frequent reason for travel was tourism (83%). Median duration of travel for patients with CL and VL was 2 weeks with ranges of 1-21 weeks in CL and 1-67 weeks in VL, respectively (P = 0.03).

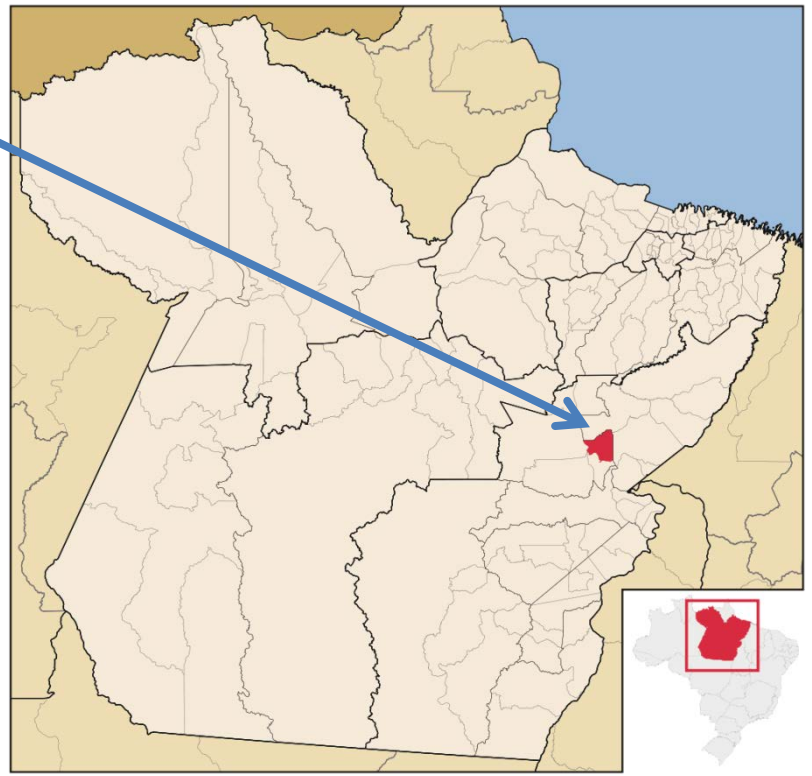
CONCLUSIONS: Health professionals should include leishmaniasis in the differential diagnosis in patients returning from southern Europe - including short-term travellers - with typical skin lesions or systemic alterations like fever, hepatosplenomegaly and pancytopenia.

Case report (II)

- A 7 years old children, born and resident in the Recanto Des Emas DF (Brazil).
- He traveled to Jacundá (State of Parà, northern Brazil) between 05/12/08 and **01/01/09**
- On **20/07/09**, he presented high grade intermittent fever (up to 39° C) accompanied by chills and headache, asthenia and anorexia, myalgia, nausea and vomiting, abdominal pain, diffuse and cramps, diarrhoea, dehydration, oral bleeding, pallor, jaundice, hypotension (90/50 mmHg) and mental confusion.
- He was treated with amoxicillin, without improvement.



Recanto Des Emas



Jacundá

Case report (II)

- On 27/07/2009, he was hospitalized and thick smear hemoscopia was performed: **with positivity for P. vivax (+++)**

Rev Soc Bras Med Trop. 2010 Mar-Apr;43(2):213-4.

[Vivax malaria with long incubation period, detected in the Federal District: three case reports].

[Article in Portuguese]

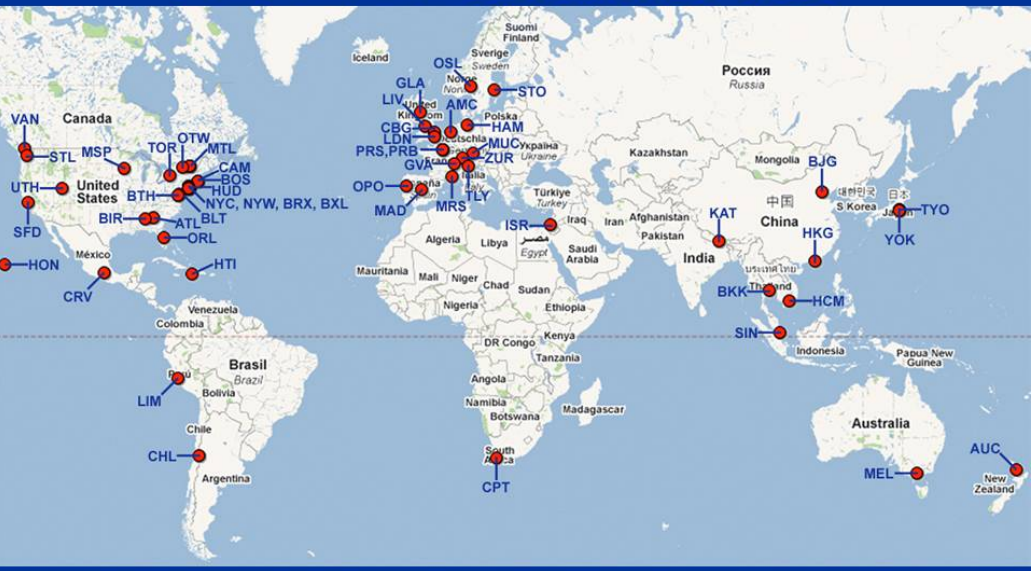
Tauil PL[1], Luz Fd, Oliveira AP, Deckers FA, Santos JB.

⊕ **Author information**

Abstract

Three cases of vivax malaria originating from the Amazon region were detected after living in Brasilia, Federal District (considered to be a non-endemic area), for six months. Long incubation periods have been described only for infections due to strains of Plasmodium vivax in temperate climates. It was not possible to genotype the parasites.

GeoSentinel Surveillance Sites



- Provider-based Surveillance of international travelers and migrants.
  Does not cover endemic diseases in local populations
  - 55 travel/tropical medicine clinics globally (since 1996)

Our experience..

Travel-related infections in children (< 18 yrs) since 2000:

- 31/133 cases of schistosomiasis (**23.3 %**);
- 41/416 cases of pulmonary tuberculosis (**9.8%**);
- 23/218 cases of extrapulmonary tuberculosis (**10.5%**);
- 4/41 cases of disseminated tuberculosis (**9.7%**)
- 2/7 cases of visceral leishmaniasis (**28.5%**)
- 5/63 cases of chronic hepatits B (**7.9%**)
- ……

Demographic Information

Gender: Male
Age: 12
Clinic Visit Date: 22-May-2013

Country of Birth: Senegal
Primary Country of Residence Before Age 10: Senegal
Country of Citizenship: Senegal
Country of Current Residence: Italy

Immigrant: Yes
Date First Arrived: 15-Jun-2011

No Recent Travel
No Previous Travel

Exposure Details

Country of Exposure/Other: Senegal
More specific place of exposure: Senegal

Reason for Travel Related to Current Illness: Immigration
Expatriate: No
Clinical Setting: Immigration Travel Only
Patient Type: Outpatient
Did the patient have a pre-travel encounter with a health care provider? No

Main Presenting Symptoms: Genitourinary
Date of Illness Onset: 22-May-2012

Pre-Existing Conditions - those present prior to onset of the current travel-related illness

- None Known to Exist

Diagnoses

Is the main diagnosis causing today's visit travel related? Travel Related

Final

Primary Diagnosis	Diagnosis	Diagnosis Type	Status	Diagnosis Activity	Screening	Additional Informat
Primary	351 - SCHISTOSOMIASIS, HUMAN SPECIES UNKNOWN	Etiologic	Confirmed	Active	Yes	

Demographic Information

Edit

Gender:	Female
Age:	13
Clinic Visit Date:	14-Oct-2014
Country of Birth:	Senegal
Primary Country of Residence Before Age 10:	Senegal
Country of Citizenship:	Senegal
Country of Current Residence:	Italy
Immigrant:	Yes
Date First Arrived:	15-Jun-2008

No Previous Travel

History of Recent Travel

Edit

Trip Start Date	Trip End Date	Ship	Countries Visited
24-Jun-2014	28-Sep-2014	No	Senegal

Exposure Details

Edit

Country of Exposure/Other:	Senegal
Reason for Travel Related to Current Illness:	Visiting Friends and Relatives
Expatriate:	No
Clinical Setting:	Seen After Travel
Patient Type:	Inpatient
Did the patient have a pre-travel encounter with a health care provider?	No
Main Presenting Symptoms:	Fatigue, Fever, Musculoskeletal
Date of Illness Onset:	5-Oct-2014

Pre-Existing Conditions - those present prior to onset of the current travel-related illness

Edit

- None Known to Exist

Diagnoses

Edit

Is the main diagnosis causing today's visit travel related? Travel Related

Final

Primary Diagnosis	Diagnosis	Diagnosis Type	Status	Diagnosis Activity	Screening	Additional Information
	328 - HEPATITIS B, CHRONIC	Etiologic	Confirmed	Active	Yes	
Primary	175 - MALARIA, P. FALCIPARUM	Etiologic	Confirmed	Active	No	NO

Immunization Details

Edit

Demographic Information

Gender: Male
Age: 12
Clinic Visit Date: 15-Mar-2001

Country of Birth: India
Primary Country of Residence Before Age 10: India
Country of Citizenship: India
Country of Current Residence: Italy

Immigrant: Yes
Date First Arrived: 15-Jun-1999

No Recent Travel
No Previous Travel

Exposure Details

Country of Exposure/Other:

Reason for Travel Related to Current Illness: Immigration
Expatriate: No
Clinical Setting: Immigration Travel Only
Patient Type: Inpatient
Did the patient have a pre-travel encounter with a health care provider? No

Main Presenting Symptoms: Respiratory
Date of Illness Onset:

Pre-Existing Conditions - those present prior to onset of the current travel-related illness

- None Known to Exist

Diagnoses

Is the main diagnosis causing today's visit travel related? Travel Related

Working - Shown for historical records prior to v2.11; Cannot be edited

Diagnosis	Diagnosis Type	Status	Additional Information
209 - MYCOBACTERIUM TUBERCULOSIS, PULMONARY	Etiologic	Suspect	

Final

Primary Diagnosis	Diagnosis	Diagnosis Type	Status	Diagnosis Activity	Screening	Additional Information
	209 - MYCOBACTERIUM TUBERCULOSIS, PULMONARY	Etiologic	Confirmed		No	

Demographic Information

Gender:	Female
Age:	8
Clinic Visit Date:	8-Apr-2010
Country of Birth:	Pakistan
Primary Country of Residence Before Age 10:	Pakistan
Country of Citizenship:	Pakistan
Country of Current Residence:	Italy
Immigrant:	Yes
Date First Arrived:	15-Jun-2003

No Recent Travel

History of Previous Travel

Country	Years Visited
Pakistan	2009 [>30]

Exposure Details

Country of Exposure/Other:	Pakistan
Reason for Travel Related to Current Illness:	Immigration
Expatriate:	No
Clinical Setting:	Immigration Travel Only
Patient Type:	Inpatient
Main Presenting Symptoms:	Abnormal Lab Test, Fever, Lymphatic, Respiratory
Date of Illness Onset:	

Did the patient have a pre-travel encounter with a health care provider? No

Pre-Existing Conditions - those present prior to onset of the current travel-related illness

- None Known to Exist

Diagnoses

Is the main diagnosis causing today's visit travel related? Travel Related

Working - Shown for historical records prior to v2.11; Cannot be edited

Diagnosis	Diagnosis Type	Status	Additional Information
211 - MYCOBACTERIUM TUBERCULOSIS, EXTRAPULMONARY	Etiologic	Suspect	lymphnodal
209 - MYCOBACTERIUM TUBERCULOSIS, PULMONARY	Etiologic	Exclusion of	

Final

Primary Diagnosis	Diagnosis	Diagnosis Type	Status	Diagnosis Activity	Screening	Additional Information
	211 - MYCOBACTERIUM TUBERCULOSIS, EXTRAPULMONARY	Etiologic	Confirmed		No	lymphnodal

Demographic Information

Gender:	Male
Age:	15
Clinic Visit Date:	19-Apr-2011
Country of Birth:	Italy
Primary Country of Residence Before Age 10:	Italy
Country of Citizenship:	Sri Lanka
Country of Current Residence:	Italy
Immigrant:	No
Date First Arrived:	

History of Recent Travel

Trip Start Date	Trip End Date	Ship	Countries Visited
1-Nov-2010	15-Dec-2010	No	Sri Lanka

History of Previous Travel

Country	Years Visited
Sri Lanka	2009 [>30], 2007 [>30]

Exposure Details

Country of Exposure/Other:	Sri Lanka More specific place of exposure: Sri Lanka, Sri Lanka
Reason for Travel Related to Current Illness:	Visiting Friends and Relatives
Expatriate:	No
Clinical Setting:	Seen After Travel
Patient Type:	Inpatient
Did the patient have a pre-travel encounter with a health care provider?	Yes
Main Presenting Symptoms:	Abnormal Lab Test, Skin
Date of Illness Onset:	

Pre-Existing Conditions - those present prior to onset of the current travel-related illness

- None Known to Exist

Diagnoses

Is the main diagnosis causing today's visit travel related? Travel Related

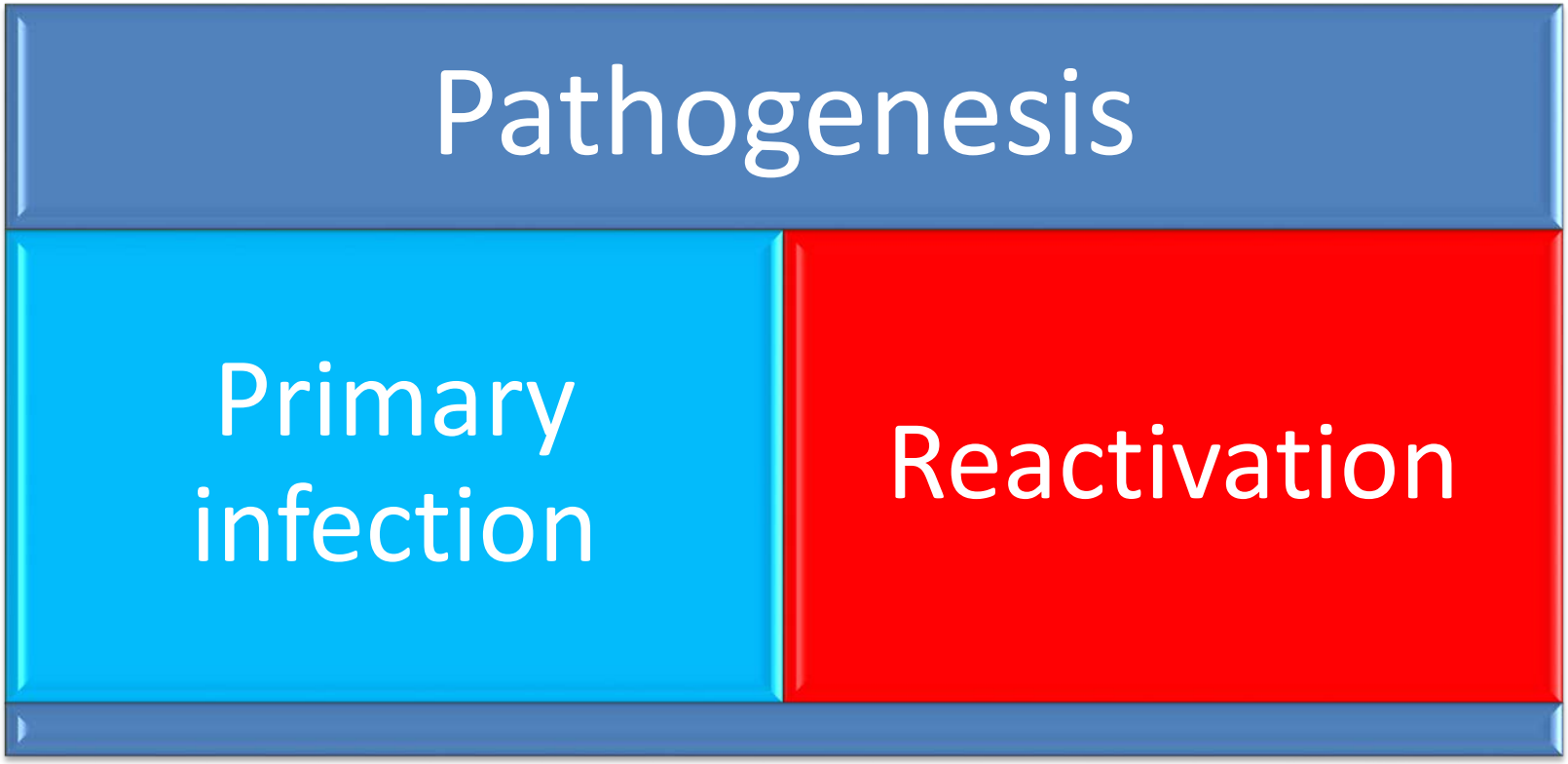
Working - Shown for historical records prior to v2.11; Cannot be edited

Diagnosis	Diagnosis Type	Status	Additional Information
171 - LEISHMANIA, CUTANEOUS	Etiologic	Suspect	

Final

Primary Diagnosis	Diagnosis	Diagnosis Type	Status	Diagnosis Activity	Screening	Additional Information
	171 - LEISHMANIA, CUTANEOUS	Etiologic	Confirmed		No	

A few examples …



Think of immunosuppressed travelers!

- Hyperinfestation with dissemination of Strongyloides
- Disseminated leishmaniasis
- Neurocysticercosis
- Neurotoxoplasmosis
- Tuberculosis
- …

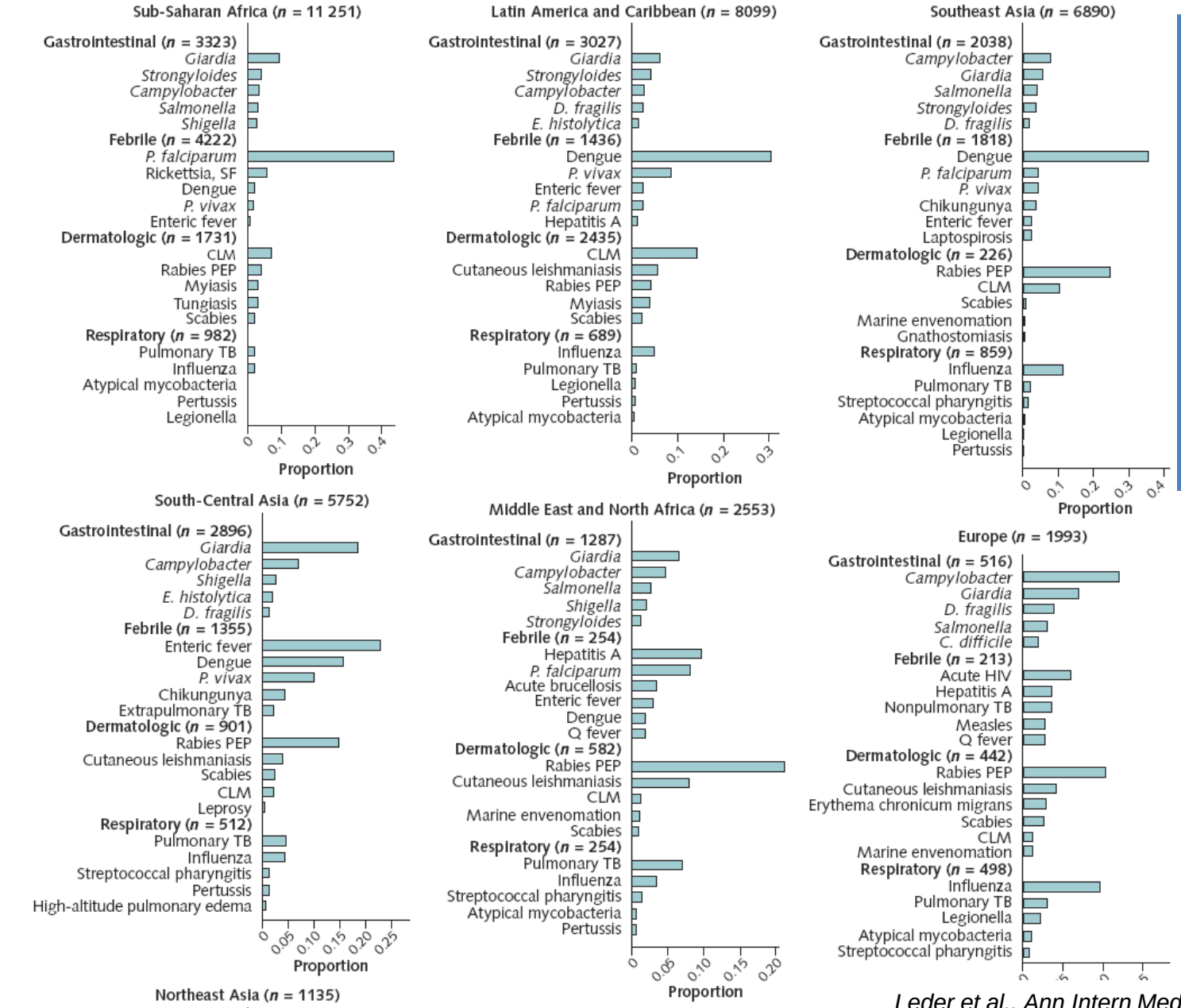
LATE MANIFESTATIONS OF AN OLD INFECTION!

Do you think travel-related infections with long incubation period are frequent?

- How frequently travel-related infections may manifest long (> 6 months) after return? Proportion of symptomatic cases/all symptomatic cases)

  - 5%
  - 10%
  - 20%
  - 50%
  - > 50%

Figure 2. **Top identified specific causes for gastrointestinal, febrile, dermatologic, and respiratory illnesses by region among ill returned travelers.**



There is no mention of diseases with long incubation..

Are there only a small minority?
Are there understimated?

Leder et al., Ann Intern Med, 2013; 158: 456-68

Travel-associated Illness Trends and Clusters, 2000–2010

Karin Leder, Joseph Torresi, John S. Brownstein, Mary E. Wilson, Jay S. Keystone, Elizabeth Barnett, Eli Schwartz, Patricia Schlagenhauf, Annelies Wilder-Smith, Francesco Castelli, Frank von Sonnenburg, David O. Freedman, and Allen C. Cheng, for the GeoSentinel Surveillance Network[1]

Table 1. Major diagnoses for returning travelers visiting 18 GeoSentinel sites, 2000–2010*

Diagnosis	No. cases
Malaria	1,762
Giardiasis	1,296
Dengue fever	888
Campylobacteriosis	596
Cutaneous larva migrans	577
Rabies postexposure prophylaxis	349
Enteric fever†	262
Spotted fever rickettsiosis	220
Chikungunya	120
Acute hepatitis A	94
Confirmed influenza A/B	84

*Other diagnoses included nonspecific gastrointestinal or diarrheal syndromes (≈25% of all patients); nonspecific febrile illness or viral syndrome (≈10%); rash, itch, or skin infection (≈10%); respiratory syndrome (≈5%); and other infectious and noninfectious problems. †*Salmonella enterica* serovar Typhi, *S. enterica* ser. Paratyphi, or unspecified.

Emerg Infect Dis. 2013 Jul;19(7):1049-73

Health conditions of international migrants seen at Geosentinel clinics

a) Age < 19 years old (n. 854)

Diagnosis	#	%
Malaria	170	20.0
LTBI	92	10.8
No health condition	87	10.2
Schistosmiasis	71	8.3
Giardiasis	65	7.6
Active TB	47	5.5
Hepatitis B, acute and chronic	41	4.8
Strongyloidiasis	40	4.7
Eosinophilia	25	2.9
Intestinal Ascaris	19	2.2

b) Age 19 years and older (n. 6751)

Diagnosis	#	%
LTBI	1619	24.0
Hepatitis B, acute and chronic	864	12.8
No health condition	723	10.7
Malaria	510	7.6
Active TB	370	5.5
Schistosmiasis	346	5.1
Strongyloidiasis	344	5.1
No health condition	326	4.8
Malaria	321	4.8
Eosinophilia	182	2.7

Timing of presentation to Geosentinel Clinics (after resettlement)	
< 1 year	42%
1-5 years	31%
> 5 years	27%

McCarthy et al., for the Geosentinel Surveillance Network, Clin Infect Dis. 2013 Apr;56(7):925-33.

What do you suggest to do?

- Do you think post-travel screening in <u>asymptomatic</u> travelers is useful?

  - never
  - only if exposure to specific risk is reported
  - only if the lenght of stay is longer than 6 weeks
  - only if pre-existing medical conditions exist
  - always

Do we need to screen asymptomatic returned travelers?

Table 5-06. Considerations for screening asymptomatic travelers

RISK OR EXPOSURE	SCREENING TEST
Stays <3–6 months	None
Stays >3–6 months, poor sanitation or hygiene	Eosinophil count, consider stool ova and parasites
Walking barefoot on soil potentially contaminated with human feces or sewage	*Strongyloides* serologic tests
Exposure to freshwater rivers, lakes, or irrigation canals	*Schistosoma* serologic tests
Sexual contact	Screen for sexually transmitted infections
Work in health care setting, close contact (>6 months) with population in a highly TB-endemic area	TB screening (TST or IGRA)

Abbreviations: TB, tuberculosis; TST, tuberculin skin testing; IGRA, interferon-γ release assay.

Lenght of stay

Risk exposure

CDC, The Yellow Book, 2014

Who and when to screen?

Lenght of stay	Risk exposure	Baseline conditions	Symptoms within 3 mos after return
• Have spent > 3 months in a developing country	• Consider that they have been exposed to a potentially severe infectious disease while traveling	• Undelined chronic diseases • Immunosuppressed	• persisting diarrhea, fever, nausea, vomiting, weight loss, jaundice, urinary disorders, skin disease or genital infections

Clerinx et al., Travel Medicine, 3° Edition, 2013, 467-74

3,5 months stay in rural areas, Ecuador in 1975

Specific Screening Tests

- **Screening for latent TB**: only for those who have been in close contact with a known infectious case;
- **STIs** (HIV, syphilis, gonorrhea, chlamydia, genital herpes, condylomata, viral hepatitis): in travelers with a history of sexual contact with a new partner within a time lapse of 3 weeks to 3 months after exposure;
- **Schistosomiasis**: history of contact with potentially infected fresh water in endemic regions;
- **Strongyloidiasis:** history of intermittent itching, serpiginous urticaria, hypereosinofilia.
- **Invasive Amebiasis**: amebic colitis and/or liver abscess
- **Neurocysticercosis:**?? It is not clear whether a positive serological test is associated with active disease!
- Don't forget: **Malaria, leishmaniasis, Filariasis**…

Clerinx et al., Travel Medicine, 3° Edition, 2013, 467-74

In conclusion..

Medical history should always include the specific question:

Unde venis?

(latin for "where do you come from")