Malattie infettive trasmesse da vettori
Impatto sul sistema donazioni e/o trasfusioni

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Università di Brescia
Presidente, Società Italiana di Medicina Tropicale
Epidemics and Pandemics have shaped our history…

Aldighieri, PAHO, 2012
... it is time to close the book on infectious diseases. The war against pestilence is over...

William Stewart, Surgeon General in a message to Congress, 1969
<table>
<thead>
<tr>
<th>Chapters</th>
<th>Pages</th>
<th>Pages for ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part 1. Introduction to clinical medicine</td>
<td>92</td>
<td></td>
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<td>Part 2. Cardinal manifestations and presentations of diseases</td>
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<td>12</td>
</tr>
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<td>20</td>
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<td>Part 6. Nutrition</td>
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<td>Part 7. Oncology and hematology</td>
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<td><strong>Part 8. Infectious diseases</strong></td>
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<td>Part 9. Terrorism and clinical medicine</td>
<td>30</td>
<td>11</td>
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<td>Part 10. Disorders of the cardiovascular system</td>
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<td>Part 11. Disorders of the respiratory system</td>
<td>112</td>
<td>12</td>
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<tr>
<td>Part 12. Critical care medicine</td>
<td>84</td>
<td>9</td>
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<tr>
<td>Part 13. Disorders of the kidney and urinary tract</td>
<td>122</td>
<td>9</td>
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<tr>
<td>Part 14. Disorders of the gastrointestinal system</td>
<td>248</td>
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<td>Part 15. Disorders of the joints and adjacent tissues</td>
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<td>7</td>
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<td>Part 18. Poisoning, drug overdose and evenomations</td>
<td>19</td>
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<tr>
<td></td>
<td>3585</td>
<td><strong>893 (24.9%)</strong></td>
</tr>
</tbody>
</table>
People are not just people. They are an awful lot of microbes, too.

90 percent of the cells in the body are microbial and only the remaining 10 percent are human.
Fattori favorenti l’emergenza di nuove infezioni

• Crescita popolazione, urbanizzazione
• Aumentata produzione animale
• Alterazioni habitat vettori / animali
• Mobilità umana, vettori, germi, reservoir animale
• Modificazioni dell’ecosistema (deforestazione, clima, etc.)
• Comportamento umano
• Pressione farmacologica (uomo e animale)
• Adattamento microbico
• Bioterrorismo?
Incremento demográfico
Urbanizzazione

80% : Latina America, Northern America
73% : Europe
48% : Asia → 64% by 2050
40% : Africa → 56% by 2050

Figure 2.
Urban and rural population of the world, 1950–2050

A majority of the world’s population lives in urban areas.
Some domestic animal populations grew more than people (ratios 2008 to 1961)

**Chickens**

<table>
<thead>
<tr>
<th>Year</th>
<th>1960</th>
<th>2000</th>
</tr>
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<tr>
<td>Value</td>
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<td>8</td>
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</table>

**Sheep**

<table>
<thead>
<tr>
<th>Year</th>
<th>1960</th>
<th>2000</th>
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<tbody>
<tr>
<td>Value</td>
<td>2</td>
<td>8</td>
</tr>
</tbody>
</table>

Bottom of y-axis is =1 in 1961

Source: FAOSTAT, and UN Population Division

J. von Braun Leipzig 2010
International tourist arrivals to reach 1.8 billion by 2030

source: World Tourism Organization (UNWTO) ©
Mobilità di merci, vettori, cibo, etc.
MALARIA IN ZIMBABWE, UNDER CLIMATE CHANGE

Baseline 2000 2025 2050

Source: Kris Ebi
Baseline 2000 2025 2050

Fuzzy Climate Suitability 2025

0
0.01 - 0.05
0.05 - 0.1
0.1 - 0.15
0.15 - 0.2
0.2 - 0.25
0.25 - 0.3
0.3 - 0.35
0.35 - 0.4
0.4 - 0.45
0.45 - 0.5
0.5 - 0.55
0.55 - 0.6
0.6 - 0.65
0.65 - 0.7
0.7 - 0.75
0.75 - 0.8
0.8 - 0.85
0.85 - 0.9
0.9 - 0.95
0.95 - 0.99
0.99 - 1
No Data
Baseline 2000 2025 2050

Source: Kris Ebi
Asymptomatic Leishmania infantum Infection in an Area of Northwestern Italy (Piedmont Region) Where Such Infections Are Traditionally Nonendemic

Alberto Biglino, Cesare Bolla, Erika Coacialdi, Anna Trisciuoglio, Angelo Romano, and Ezio Ferroglino

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

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 (7.4%), while L. infantum kinetoplast DNA was ampliﬁed from buccal cell 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; 55% CI, 1.3 to 10.7), elder age (OR, 2.3; 55% CI, 1.2 to 4.5), and agricultural/other outdoor activities (OR, 3.8; 95% CI, 0.99 to 13.7). 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.
Examples of recent emerging diseases

NATURE; Vol 430; July 2004; www.nature.com/nature
Solo nel nuovo millennio…

2000 : West Nile
2003 : SARS
2004 : H5N1
2009 : H1N1
2011 : MERS-CoV
2013 : H7N9
2014 : allarme poliomielite
2014 : Ebola

… what next?…
Ongoing and untested risks to the blood supply

- Agents for which there are no routine screening tests in place include (partial list):
  
  **Prions:** vCJD
  
  **Viruses:** HAV, HPV, SARS, MCOV, Foamy viruses, HHV-8, Chikungunya, Dengue, Parvovirus, WNV, HEV
  
  **Bacteria:** Rickettsia
  
  **Protozoa:** Malaria, Leishmania, Babesia, T. cruzi
Ongoing and untested risks to the blood supply

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  **Bacteria:** Rickettsia

  **Protozoa:** Malaria, Leishmania, Babesia, T. cruzi
Virus Chikungunya (CHV)

Chikungunya deriva dalla parola “kungunyala” che in lingua Makonde (sud-est Tanzania e Mozambico) significa “ciò che piega, ciò che contorce”
**Aedes albopictus**

- In Italia, è stata avvistata per la prima volta nel 1990 e da allora si è diffusa moltissimo (soprattutto nel Nordest) radicandosi saldamente nel nostro Paese.

- *Aedes albopictus* è presente nella maggior parte del Paese dalla pianura alla bassa collina (400-500 m)
Habitat domestico di zanzare Aedes
AEDES ALBOPICTUS

Artificial

Natural

Domestic

Breeding sites
Propagation d’Ae. albopictus 2004 - 2009 : zone colonisée

Surveillance d’Aedes albopictus : état des lieux

Extrapolation de la zone colonisée

État des pièges (2009)
- Présence avérée
- Négatif

Présence avérée : au moins une détection d’œuf dans un piège pondoir.
Propagation d’Ae. *albopictus* 2004 - 2009 : zone colonisée

Surveillance d’Aedes *albopictus* : état des lieux

Provence-Alpes-Côte d’Azur - 2009

Extrapolation de la zone colonisée

État des pièges (2009)

- Présence avérée
- Nécessaire : au moins une détection d’œufs dans un piège pondoir

Source : © M. Scan 258 - © EID Méditerranée - déc. 2009
Propaganda d’Ae. albopictus 2004 - 2009 : zone colonisée

Sousveillance d’Aedes albopictus : état des lieux

Provenza-Alpes-Côte d’Azur - 2009

Extrapolation de la zone colonisée
- 2006
- 2005
- 2004

État des pièges (2009)
- Présence avérée
- Négative

Présence avérée : au moins une détection d’œufs dans un piège pondoir.

Source : © IGN Scan 254 - © EID Méditerranée - déc. 2009
Surveillance d'Aedes albopictus : état des lieux

Extrapolation de la zone colonisée

État des pièges (2009)

Présence avérée : au moins une détection d’œufs dans un piège pondoir.

Source : © Idris Scan 2009 - © EID Méditerranée - déc. 2009

2 - DENGUE
Propagation d’Ae. albopictus 2004 - 2009 : zone colonisée

Surveillance d’Aedes albopictus : état des lieux

Provençales-Alpes Côtes-d’Azur - 2009

Extrapolation de la zone colonisée

Présence avérée : au moins une détection d’adultes dans un piège pondoir.
Propagation d’Ae. albopictus 2004 - 2009 : zone colonisée

Surveillance d’Aedes albopictus : état des lieux

Providence-Alpes-Côtes-d’Azur - 2009

Extrapolation de la zone colonisée

- 2009
- 2008
- 2007
- 2006
- 2005
- 2004

État des pièges (2009)
- Présence avérée
- Négative

Présence avérée : au moins une détection d’œuf dans un piège pondoir.

Source : © INRA Scan 258 - © EID Méditerranée - déc. 2009
Current known distribution of *Aedes albopictus*
Figure 1. Weekly density of *Aedes albopictus* in Rome. Percentage of positive traps out of 650 traps (bars, left axis), and mean number of eggs by positive traps (black line, right axis).
Epidemic curve by presumed place of infection

Secondary clusters:

- Cervia (9 Km)    19 cases
- Ravenna (23 Km)  9 cases
- Cesena (19 Km)   15 cases
- Bologna (90 Km)  5 cases
- Rimini (49 Km)   6 cases

On 24 September, the French Ministry of Health reported the first case of chikungunya fever acquired through autochthonous transmission in metropolitan France and on 27 September the French authorities confirmed a second autochthonous case. The cases were detected through enhanced surveillance, which is implemented from May to November in the South-East of France where *Aedes albopictus* mosquito populations have established progressively since 2004 [9].

The cases, two 12-year old girls, resident in Fréjus (district of Var), both developed symptoms on 18 September, including fever, arthralgia, myalgia, rash and headache. The two girls are living in the same neighbourhood and frequenting the same local school. The RT-PCR was positive for chikungunya on 21 September for the first case and on 25 September for the second case. The cases had no recent history of travel in an endemic/epidemic area or blood transfusion [9].

Chikungunya is a notifiable disease in France since July 2006 [8], and enhanced seasonal surveillance of chikungunya and dengue is implemented since 1st January 2006. Since May 2010, two imported cases have been reported in south east France one in Alpes-Maritimes district and one in the district of Var. One confirmed viraemic chikungunya case imported from India was detected in Fréjus (onset of symptoms 29 August 2010 and arrival in France on 30 August). This imported case lives about 2 km away from the first autochthonous case and in the same street (60 meters distance) as the second autochthonous case [9].
Virus dengue
Epidemiologia
Influenza dei cambiamenti climatici

A. Popolazione esposta nel 1990
1,5 miliardi di persone
(30% popolazione mondiale)

B. Stima della popolazione a rischio nel 2085
5-6 miliardi di persone
(50-60% popolazione mondiale)

... sarebbero 3,5 miliardi di persone
(35% popolazione mondiale) in assenza dei cambiamenti climatici

I colori indicano la probabilità di infezione
Potential effect of population and climate changes on global distribution of dengue fever: an empirical model
The Lancet - Published online August 6, 2002
Dengue fever

Table 1 | Estimated burden of dengue in 2010, by continent

<table>
<thead>
<tr>
<th>Continent</th>
<th>Apparent</th>
<th>Inapparent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Millions (credible interval)</td>
<td>Millions (credible interval)</td>
</tr>
<tr>
<td>Africa</td>
<td>15.7 (10.5–22.5)</td>
<td>48.4 (34.3–65.2)</td>
</tr>
<tr>
<td>Asia</td>
<td>66.8 (47.0–94.4)</td>
<td>204.4 (151.8–273.0)</td>
</tr>
<tr>
<td>Americas</td>
<td>13.3 (9.5–18.5)</td>
<td>40.5 (30.5–53.3)</td>
</tr>
<tr>
<td>Oceania</td>
<td>0.18 (0.11–0.28)</td>
<td>0.55 (0.35–0.82)</td>
</tr>
<tr>
<td>Global</td>
<td>96 (67.1–135.6)</td>
<td>293.9 (217.0–392.3)</td>
</tr>
</tbody>
</table>

Bhatt et al. Nature 2013
Dengue fever

- Reported in over 100 countries
- 2.5 billion people live in endemic countries
- SE Asian and Western Pacific regions bear 75% of the global burden
- 2001 to 2007, >30 countries of the Americas notified a total of 4,332,731 cases of dengue
- Globally, disability-adjusted life years (DALYs) per million 528 and 621 per million population
Rising global incidence DF/DHF

Average annual number of DF/DHF cases reported to WHO (per year)
1955-2007

Dengue
Aedes aegypti

- Acquisisce il virus dal malato di dengue
- Periodo di incubazione: 8-11 giorni
- Si riproduce in
  - Cervello
  - Intestino
  - Ghiandole salivari
- Infettiva a vita
- Vita media di circa 25 giorni
- Trasmissione transovarica
Classificazione della OMS

1 - Fase di incubazione

2 - Fase febbrile

3 - Fase critica

4 - Fase de guarigione
Fase febbrile

- Normalmente dura 2-7 giorni (38.5-40°C)
- Necessario monitorare i segni di allarme (progressione verso la fase critica?).
- Defervescenza dopo 3-7 giorni di febbre
  - La temperatura scende a 37.5 - 38°C o meno ed anche sotto i 36°C → ipotermia
  - E’ fase viremica
Lesione endoteliale con perdita di liquidi

Con la defervescenza i pazienti possono migliorare e evolvere verso la dengue grave

- Coloro che migliorano → dengue senza segni di allarme
- Coloro che evolvono → dengue con segni di allarme
Quadro clinico

- Dengue senza segni di allarme
  - Febbre
  - Cefalea
  - Dolore retrobulbare
  - Mialgie ed artralgie
  - Nausea
  - Dolore addominale
  - Malessere generale
  - Epistassi, gengivorragia
  - Faringite, congiuntivite
  - Esantema rubeiforme, talora pruriginoso
  - Diarrea
Quadro clinico

Dengue con segni di allarme

- Dolore addominale intenso
- Vomito incoercibile > 6.
- Segni di disidratazione
- Edema periorbitario
- PIEL MOTEADA Y TURJENTE.
- DERRAME PLEURAL.
- Edema biliare
- Vertigine
- Segni emorragici (petecchie, ecchimosi)
- Emococoncentrazione
- Piastrinopenia e ipoalbuminemia
Quadro clinico

Dengue grave (Collasso circolatorio, shock)

Emodinamica
- Ipotensione
- Diminuzione della PA differenziale

Clinica
- Alterazione dello stato di coscienza
- Dolore addominale persistente
- Tachicardia
- Tachipnea
- Oliguria

Coagulazione
- Sanguinamenti a vari livelli
- Consumo fattori coagulazione
- Consumo del fibrinogeno

Danno d’organo
- Danno epatico, cerebrale, renale, miocardico e polmonare
Fase di convalescenza

Fase di riassorbimento graduale di liquidi dello spazio extravascolare

- La fase di riassorbimento segue nelle successive 48-72 hrs.

- Migliorano gli indicatori emodinamici

- Clinicamente scompaiono i sintomi gastrointestinali, bradicardia e talora prurito
Quadro clinico - Evoluzione temporale

<table>
<thead>
<tr>
<th>Days of illness</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<tr>
<td>Temperature</td>
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<td></td>
<td></td>
<td></td>
<td>40°C</td>
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<tr>
<td>Potential clinical issues</td>
<td></td>
<td></td>
<td>Dehydration</td>
<td>Shock bleeding</td>
<td>Reabsorption fluid overload</td>
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<tr>
<td>Organ impairment</td>
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<tr>
<td>Laboratory changes</td>
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<td>Platelet</td>
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<td>Hematocrit</td>
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<tr>
<td>Serology and virology</td>
<td></td>
<td></td>
<td>Viraemia</td>
<td>IgM/IgG</td>
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<tr>
<td>Course of dengue illness:</td>
<td>Febrile</td>
<td>Critical</td>
<td>Recovery phases</td>
<td></td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

Yip WCL. Dengue haemorrhagic fever: current approaches to management. Medical Progress, October 1980
DENGUE VIRUS

Eurosurveillance, Volume 15, Issue 39, 30 September 2010
Rapid communications
FIRST TWO AUTOCHTHONOUS DENGUE VIRUS INFECTIONS IN METROPOLITAN FRANCE, SEPTEMBER 2010

1. French Institute for Public Health Surveillance (Institut de Veille Sanitaire, InVS), Saint-Maurice, France
2. Regional office of the French Institute for Public Health Surveillance (InVS) in Marseille, France
3. Regional Health Agency of Provence-Alpes-Côte d’Azur, Marseille and Nice, France
4. Entomology, Parasitology, Virology and Emergency Medicine and Internal Medicine Departments, University Hospital of Nice, Nice, France
5. Institut Pasteur, National Reference Centre for arboviruses, Paris, France
6. European Centre for Disease Prevention and Control (ECDC), Stockholm, Sweden
7. Directorate General for Health, Ministry of Health, Paris, France
8. Institut de recherche biomédicale des armées, National Reference Centre for arboviruses associated laboratory, Marseille, France


Date of submission: 24 September 2010

Dengue virus infection in a traveller returning from Croatia to Germany

In September 2010, two cases of autochthonous dengue fever were diagnosed in Nice, south-east France, where Aedes albopictus, the vector of dengue virus circulation in this area. This local transmission of dengue calls for active case finding and vector control measures to reduce the spread of the virus.
REVIEW ARTICLE

Is dengue a threat to the blood supply?

D. Teo,* 1 L. C. Ng† 1 & S. Lam* 1
Blood Services Group, Health Sciences Authority, and †Environmental Health Institute, National Environment Agency, Singapore

Received 2 October 2008; accepted for publication 4 December 2008

SUMMARY. Dengue is the most common arthropod-borne infection worldwide, affecting at least 50 million people every year and endemic in more than 100 countries. The dengue virus is a single-stranded RNA virus with four major serotypes. Infection with one serotype confers homotypic immunity but not heterologous immunity, and secondary infection with another serotype may lead to more severe disease. The major route of transmission occurs through the Aedes aegypti mosquito vector, but dengue has also been transmitted through blood transfusion and organ transplantation. Infection results in a spectrum of clinical illness ranging from asymptomatic infection, undifferentiated fever, dengue fever, dengue haemorrhagic fever (DHF) to dengue shock syndrome (DSS). Dengue is spreading rapidly to new areas and with increasing frequency of major outbreaks. A trend has also been observed towards increasing age among infected patients. This will impact blood supply availability as more blood donors are deferred because of dengue infection or exposure to infection. The risk of transmission through transfusion of blood from asymptomatic viraemic donors will also increase. Although screening tests for dengue and effective pathogen reduction processes are now available for the blood supply, the value of implementing these costly measures needs to be carefully considered. Demand for platelets and fresh frozen plasma will rise with increasing number of DHF/DSS. Evidence-based guidelines for the clinical use of these blood components in the management of patients with DHF/DSS have not been well established, and inappropriate use will contribute to the challenges faced by blood services.

Key words: blood supply, dengue fever, dengue virus.
Dengue Outbreak a Madeira, 2012-2013
(Aedes aegypti)

> 2000 casi confermati dal 3 ottobre 2012 al 5 febbraio 2013

Request for opinion

In December 2013 ECDC received requests for opinion (CA for Blood Sweden - 17/12/2013 and CA for cells and tissues Italy - 19/12/2013) concerning the status of dengue outbreak in Madeira and geographic deferral of donors returning from Madeira.

Event background information

Between 26 September 2012 and 3 March 2013, Madeira reported a dengue outbreak with 2 168 cases including 1080 confirmed cases. The last dengue autochthonous case was reported on week 4 of 2013 and the outbreak was declared over in 03 March 2013 (3). In 2013, between weeks 4 and 19, three imported cases from Angola (two) and Brazil (one) were identified in Madeira [4]. ECDC conducted two missions during and post outbreak to support the regional authorities in Madeira with the assessment and control of dengue outbreak [5]. ECDC published a detailed recommendation for the safety of blood, cells, tissues and organ donations, issued by Portuguese authorities [6].

ECDC threat assessment for the EU

Since the outbreak in 2012, Madeira has implemented enhanced surveillance of dengue [5]; In March 2013, the end of the 2012 outbreak has been published by Portuguese Directorate-General of Health (DGS) [3];
In 2013, the surveillance system permitted the detection of three imported cases while no autochthonous cases were detected [4].

According to this information, the risk of importation of dengue virus from Madeira to other EU areas is considered low as far as this situation will remain the same.

Conclusion

Member States can consider withholding the geographic temporary deferral of travellers returning from Madeira.
Virus del West Nile (WNV)
Prior to 1999, the West Nile virus had only been found in Africa, Eastern Europe, West Asia, and the Middle East.
# Table 2 Characteristic of DENV, CHIKV, WNF cases, diagnosed in Veneto Region between 15<sup>th</sup> of June and 30<sup>th</sup> of November, years 2010-2012

<table>
<thead>
<tr>
<th></th>
<th>N° of cases</th>
<th>Sex M/F</th>
<th>Mean age (range), years</th>
<th>Area of exposure</th>
<th>Time from symptom onset to diagnosis, (range) days</th>
<th>Positivity of PCR and/or viral isolation</th>
<th>Sero type</th>
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<td>24</td>
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<td>America (7)</td>
<td>14 (2-37)</td>
<td>15/24 (62%)</td>
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<td>Asia (15)</td>
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</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>Africa (1)</td>
<td></td>
<td></td>
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<td>Europe (1)</td>
<td></td>
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</tr>
<tr>
<td>CHIKV</td>
<td>3</td>
<td>1/2</td>
<td>29 (13-58)</td>
<td>Asia (3)</td>
<td>17 (16-19)</td>
<td>0/3 (0%)</td>
<td>-</td>
<td>n.a.</td>
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<tr>
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<td>24</td>
<td>18/6</td>
<td>59 (29-80)</td>
<td>Italy (24)</td>
<td>23 (6-66)</td>
<td>4/24 (17%)</td>
<td>-</td>
<td>22/25 (88%)</td>
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</table>
Human and entomological surveillance of West Nile fever, dengue and chikungunya in Veneto Region, Italy, 2010-2012

Federico Gobbi1, Giola Capelli2, Andrea Angheben3, Mario Groppa4, Mario Contoto5, Marzia Francia6, Anna Maria Cattelan6, Enzo Risse7, Pierangelo Rovere8, Paolo Mutti9, Fabrizio Montani9, Andrea Drogo10, Luisa Baccelli11, Giuseppe Napolitano12, Francesco Zaniboni13, Francesco Pozzi13, Francesco Russo13, Paolo Bini9, Giorgio Paolucci9,11, Zeno Bracchi9 and Summer Fever Study Group

A 2010

B 2011

C 2012

- Positive capture sites
- Mosquito capture sites
- Provinces
- Regions
- Municipalities with human WNV cases

Culex pipiens - relative density
- Not available
- Low
- Medium-Low
- Medium
- Medium-High
- High

100 km
Sorveglianza veterinaria


In sintesi l’attività di sorveglianza veterinaria si svolge su diversi livelli (figura 1):

- sorveglianza entomologica
- sorveglianza su avifauna selvatica
- sorveglianza su equidi.

Prevalence of IgM and IgG antibodies to West Nile virus among blood donors in an affected area of north-easterly Italy, summer 2009


Following reports of West Nile neuroinvasive disease in the north-easterly area of Italy in 2009, all blood donations dating from the period between 1 August and 31 October 2009 in the Rovigo province of the Veneto region were routinely checked to exclude those with a positive nucleic acid test for West Nile virus (WNV). Only one of 5,726 blood donations was positive (17.5 per 100,000 donations; 95% confidence interval (CI): 0.4–97.3). In addition, a selection of 2,507 blood donations collected during the period from 20 July to 15 November 2009 were screened by ELISA for IgG and IgM antibodies against WNV. A positive result was received for 94 of them. The positive sera were further evaluated using immunofluorescence and plaque reduction neutralisation test (PRNT), in which only 17 sera were confirmed positive. This corresponds to a prevalence of 6.8 per 1,000 sera (95% CI: 4.0–10.9). In a case-control study that matched each of the 17 PRNT-positive sera with four negative sera with the same date of donation and same donation centre, we did not find a significant association with age and sex of the donor; donors who worked mainly outdoors were significantly more at risk to have a positive PRNT for WNV.
Malaria
Etiologic agents of human malaria

• *Plasmodium falciparum*
• *Plasmodium vivax*
• *Plasmodium ovale*
• *Plasmodium malariae*
• *Plasmodium knowlesi*

*Human infections with *P. knowlesi* are not new in Southeast Asia. *P. knowlesi* infections are primarily a zoonosis with wild macaques as the reservoir hosts. Ongoing ecological changes resulting from deforestation, with an associated increase in the human population is enabling this species to switch to humans as the preferred host.*
17 Novembre 1970

L’Organizzazione Mondiale della Sanità dichiara l’Italia libera dalla malaria.
Roll-Back Malaria (RBM) & World Health Assembly targets (Global strategic plan 2005-15)

• **Vector control:**
  - Insecticide treated nets (ITN)
  - Insecticide residual sprays (IRS)
  - Larval control

• **Chemoprevention:**
  - Intermittent preventive treatment (pregnant women and newborns)
  - Seasonal malaria chemoprophylaxis (SMC)
  - Vaccine ... in the future

• **Diagnostic confirmation of suspect cases**
  - Haemoscopy
  - Diagnostic rapid tests

• **Early and appropriate treatment**
  - ACTs
Obstacles to malaria elimination

- Parasite drug resistance
- Mosquito insecticide resistance
- Human and vector mobility
- Limited diagnostic capability
- Available resource to fight malaria in low-income countries
- Low international priority

... therefore vaccines could be an ideal solution ...
<table>
<thead>
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<th></th>
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<th>2011</th>
<th>2012</th>
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<th>Upper</th>
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</table>

*World Malaria Report, WHO, 2013*
Imported Malaria by year in Brescia, Italy

Castelli, unpublished data
Global Distribution (Robinson Projection) of Dominant or Potentially Important Malaria Vectors

http://www.cdc.gov/malaria/about/biology/mosquitoes/map.html
Travel-related imported infections in Europe, EuroTravNet 2010

Gautret P. et al, EID, 2013
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<td>1,691</td>
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<tr>
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<td>91</td>
<td>1,098</td>
<td>386</td>
<td>350</td>
<td>1,925</td>
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</table>
In non-endemic countries, malaria cases are mostly imported (from travelers or immigrants), but blood transfusion malaria, or malaria in transplant recipients, or even cases of "airport malaria" can occasionally be seen [1]. Greece has been malaria free since 1974. However, rare cases of autochthonous malaria are occasionally reported. Recently, in August 2011, an announcement was posted by European Centres for Disease Prevention and Control (ECDC) and American Centers for Disease Control and Prevention (CDC) that six autochthonous malaria cases were reported in southern Greece [2,3]. An autochthonous case in a schoolgirl in the Attica region in 2009 is hereby described.
Malaria risk in Corsica, former hot spot of malaria in France

Céline Toty¹, Hélène Barre², Gilbert Le Goff¹, Isabelle Lartet-Thiéry⁴, Nil Rahola¹, Daniel Couret¹, Didier Fontenille¹*

Abstract

Background: The prevalence of Plasmodium falciparum and Plasmodium vivax malaria was very high in Corsica just before the Second World War. The last outbreak was in 1972 and the most recent indigenous case was in 2006.

Results: Analysis of historical data shows that anopheline vectors were abundant. Recent surveys demonstrated that potential vectors are still present in Corsica, despite the likely disappearance of Anopheles sacharovi. Moreover, P. falciparum can develop experimentally into these mosquitoes, notably Anopheles labranchiae, which is locally abundant, and parasites are regularly introduced into the island.

Discussion, Conclusions: The presence of vectors, the introduction of parasites and the conducive climate raise questions about the possibility of malaria re-emerging and becoming re-established in Corsica. Analysis of historic and current parasitological and entomological data shows that the current theoretical risk of indigenous cases or malaria foci is negligible, particularly since there is very little contact between humans and Anopheles mosquitoes, Plasmodium carriers are reliably treated and there is a widespread vector control on the island.

In October 2010, one case of autochthonous malaria due to *Plasmodium vivax* was diagnosed in Spain. The case occurred in Aragon, north-eastern Spain, where the vector *Anopheles atroparvus* is present. Although the source of infection could not be identified, this event highlights that sporadic autochthonous transmission of vector-borne diseases in continental Europe is possible and calls for enhanced surveillance and vector control measures.

**Background**

Malaria is a mosquito-borne parasitaemic disease caused by parasites of the *Plasmodium* genus and endemic in
A systematic review of the donor's charts revealed that he was a 30-yr-old black male who had returned to Italy from Ghana 1 month before his sudden death in a road traffic accident.

Blood films: *P. falciparum* trophozoites

NOTE: two kidney recipients from the same donor also developed malaria (1 in Brescia)
Case report (V)

- 60 years-old Italian engineer who spent 33 years in Tanzania
- **January 2006**: returned to Italy
- December 2006: diagnosis of lung cancer (CT) and findings of splenomegaly
- 25 December 2006: fever, headache, vomiting, profuse sweating
- **2 January 2007**: hospitalized at the Department of Internal Medicine of the Spedali Civili General Hospital (Brescia)

- No fever (on entry)
- Mild anaemia (Hb = 10,5 gr/dl)
- Elevated γ-globulins (24,6%)
Delphi study 2006 – TropNet

Response to scenarios
(prophylaxis YES, NO, UNCERTAIN)
Variability in Malaria Prophylaxis Prescribing Across Europe: A Delphi Method Analysis

Guido Calleri, MD;* Ron H. Behrens, MD;* Zeno Bisoffi, MD;* Anders Bjorkman, MD;* Francesco Castelli, MD;* Joaquim Gascon, MD,† Federico Golbi, MD,‡ Martin P. Grobusch, MD,§ Tomas Jelínek, MD,* Matthias L. Schmid, MD,* Mauro Niero, PhD,* and Pietro Caramello, MD*

*Department of Infectious Diseases, Travel Medicine Unit, Amedeo di Savoia Hospital, Torino, Italy; †Department of Infectious and Tropical Diseases, London School of Hygiene and Tropical Medicine, London, UK; ‡Centre for Tropical Medicine, Oswaldo Cruz Institute, Rio de Janeiro, Brazil; §Institute of Medical Microbiology, Division of Infectious Diseases, University of Lübeck, Germany

2006:
A 3 speed Europe?

Mean of “Yes”

- Red: 6-8
- White: 8-10
- Blue: 10-12
New Italian guidelines for malaria prophylaxis in travellers to endemic areas

G. Calleri · F. Castelli · I. El Hamad · F. Gobbi · A. Matteelli · G. Napoletano · R. Romi · A. Rossanese

Received: 5 September 2013/Accepted: 14 November 2013/Published online: 18 December 2013
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The new guidelines for malaria chemoprophylaxis in Italy by the Italian Society of Tropical Medicine (SIMET) Endorsed by SIMIT, SIMM, SIMVIM, SoIPA, SIMG, SItI
The new “indications” for malaria chemoprophylaxis in Italy
By the Italian Society of Tropical Medicine (SIMET)
Endorsed by SIMIT, SIMM, SIMVIM, SoIPA, SIMG, SItI

Recommendations for antimalarial chemoprophylaxis have been based on:

1) Local incidence data
   - n. cases of yearly imported malaria / 100,000 travellers
   - API (Annual Parasite Incidence: yearly n. cases / 1,000 inhabitants
   - seasonality

2) Presence of *P. falciparum*
   - when only *P. vivax* is present, no chemoprophylaxis is recommended;

3) Stand-by treatment is considered under specific circumstances

Calleri et al., *Infection*, 2013
Threshold between low risk (no chemoprophylaxis,) and high risk (prophylaxis recommended) (cases of malaria /100,000 travellers)

<table>
<thead>
<tr>
<th>Country</th>
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<th>malaria</th>
</tr>
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<td>169.00</td>
</tr>
<tr>
<td>Burma (Myanmar)</td>
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<td>15.11</td>
</tr>
<tr>
<td>Kenya</td>
<td>7.34</td>
<td>6.11</td>
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<tr>
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</tbody>
</table>

(cases of malaria /100,000 travellers)

Delphi Study, 2011

Servizio di Medicina dei Viaggi – Osp. Amedeo di Savoia - Torino
Figure 1. Mortality in severe falciparum malaria. The mortality (indicated as a percentage) of the common syndromes of severe malaria are clinically defined by: (i) impaired consciousness (cerebral malaria); (ii) deep breathing (respiratory distress) and severe anaemia (haemoglobin <5 g dl^{-1}). Adapted from Ref. [13].
Management of imported malaria in Europe

Helena H Asling¹, Fabrice Bruneel², Gerd Burchard³, Francesco Castelli⁴, Peter L Chiodini⁵, Martin P Grobusch⁶, Rogelio Lopez-Vélez⁷, Margaret Paul⁸, Eskild Petersen⁹, Corneliu Popescu¹⁰, Michael Ramharter¹¹ and Patricia Schlegenthal¹² on behalf of the European Society for Clinical Microbiology and Infectious Diseases Study Group on Clinical Parasitology

Abstract

In this position paper, the European Society for Clinical Microbiology and Infectious Diseases, Study Group on Clinical Parasitology, summarizes main issues regarding the management of imported malaria cases. Malaria is a rare diagnosis in Europe, but it is a medical emergency. A travel history is the key to suspecting malaria and is mandatory in patients with fever. There are no specific clinical signs or symptoms of malaria although fever is seen in almost all non-immune patients. Migrants from malaria endemic areas may have few symptoms. Malaria diagnostics should be performed immediately on suspicion of malaria and the gold-standard is microscopy of Giemsa-stained thick and thin blood films. A Rapid Diagnostic Test (RDT) may be used as an initial screening tool, but does not replace urgent microscopy which should be done in parallel. Treatment should not lead to delayed initiation of appropriate treatment. Patients diagnosed hospitalized. If outpatient management is preferred, as is the practice in some Europe countries, malaria cases are usually followed closely (at least daily) until clinical and parasitological cure. Treatment for Plasmodium falciparum malaria is either with oral artemisinin combination therapy or atovaquone/proguanil. Two forms of ACT are available in Europe: artesunate/lumefantrine or artemether/lumefantrine. ACT is also effective against Plasmodium vivax, Plasmodium ovale, Plasmodium malariae and Plasmodium knowlesi, but these species can be treated with chloroquine. Treatment of P. vivax and P. ovale with primaquine is indicated after excluding glucose 6 phosphate dehydrogenase deficiency. The role of anti-malarias is important considerations in the choice of treatment. Complicated malaria is treated with intravenous artesunate resulting in a much higher adherence and if needed, transfer to intensive care units, would normally be instantly available. Repeated monitoring of blood pressure, urinary output and oxygen saturation may be indicated. However, management as outpatients may be considered in uncomplicated cases in some healthcare systems where daily follow up until clearance of parasitaemia and fever and monitoring of treatment adherence can be undertaken. Persons migrating from malaria endemic regions may fall into this category.
Efficacy and Safety of the RTS,S/AS01 Malaria Vaccine during 18 Months after Vaccination: A Phase 3 Randomized, Controlled Trial in Children and Young Infants at 11 African Sites

Background: A malaria vaccine could be an important addition to current control strategies. We report the safety and vaccine efficacy (VE) of the RTS,S/AS01 vaccine during 18 mo following vaccination at 11 African sites with varying malaria transmission.

Methods and Findings: 6,537 infants aged 6–12 wk and 8,923 children aged 5–17 mo were randomized to receive three doses of RTS,S/AS01 or comparator vaccine. VE against clinical malaria in children during the 18 mo after vaccine dose 3 (per protocol) was 46% (95% CI 42% to 50%), (range 40% to 77%; VE, p<0.01 across all sites). VE during the 20 mo after vaccine dose 1 (intention to treat (ITT)) was 45% (95% CI 41% to 49%). VE against severe malaria, malaria hospitalization, and all-cause hospitalization was 34% (95% CI 15% to 48%), 41% (95% CI 30% to 50%), and 12% (95% CI 11% to 27%), respectively (ITT). VE against clinical malaria in infants was 27% (95% CI 20% to 32%, per protocol), 27% [95% CI 21% to 33%] (ITT), with no significant protection against severe malaria, malaria hospitalization, or all-cause hospitalization. Post-vaccination anti-circumsorozoite antibody geometric mean titer varied from 348 to 787 EU/ml across sites in children and from 117 to 335 EU/ml in infants (per protocol). VE waned over time in both age categories (Schoenfeld residuals p<0.001). The number of clinical and severe malaria cases averted per 1,000 children vaccinated ranged across sites from 37 to 2,365 and from −1 to 49, respectively; corresponding ranges among infants were −10 to 1,402 and −13 to 37, respectively (ITT). Meningitis was reported as a serious adverse event in 16/5,949 and 1/2,974 children and in 9/4,358 and 3/2,179 infants in the RTS,S/AS01 and control groups, respectively.

Conclusions: RTS,S/AS01 prevented many cases of clinical and severe malaria over the 18 mo after vaccine dose 3, with the highest impact in areas with the greatest malaria incidence. VE was higher in children than in infants, but even at modest levels of VE, the number of malaria cases averted was substantial. RTS,S/AS01 could be an important addition to current malaria control in Africa.

Trial registration: http://www.ClinicalTrials.gov NCT00866619
P. falciparum distribution (www.map.ox.ac.uk).

P. vivax distribution (www.map.ox.ac.uk).
Trypanosoma cruzi

Where do *Triatominae* live?
Natural history of Chagas disease

Human exposure to *T. cruzi* (vectorial, via transfusion, congenital, oral, via organ transplant, accidental)

- No infection

Acute Chagas infection (asymptomatic or symptomatic)

- Cure (50-80% of cases)
- Antiparasitic drug

Chronic phase in indeterminate form

- Cure (20-60% of cases)
- Antiparasitic drug

10-30 years later

Chronic phase in determinate form

- Antiparasitic drug

- Reactivation

- Immunosuppression

Permanent indeterminate form

Cardiac

Cardiodigestive

Digestive

Death from myocarditis or meningoencephalitis

<5-10% of symptomatic cases

Rassi et al., Lancet, 2010, 375: 1388-1402
Chronic Chagas disease

- Megaoesophagus
- Cardiomyopathy
- Megacolon
## Risk of transmission by route

<table>
<thead>
<tr>
<th>ROUTE OF TRANSMISSION</th>
<th>RISK (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single blood transfusion (500 ml)</td>
<td>15-20</td>
</tr>
<tr>
<td>Kidney transplantation from a <em>T.cruzi</em>-infected donor in the indeterminate stage</td>
<td>35</td>
</tr>
<tr>
<td>Reactivation following immunosuppression</td>
<td>30</td>
</tr>
<tr>
<td>Mother-to-child</td>
<td>0.1-12</td>
</tr>
</tbody>
</table>
Expert Commentary

Chagas Disease Has Now Gone Global

Herbert B. Tanowitz\textsuperscript{1,2,3,4*}, Louis M. Weiss\textsuperscript{1,2,3}, Susan P. Montgomery\textsuperscript{5}

1 Department of Pathology (Division of Parasitology), Albert Einstein College of Medicine, Bronx, New York, United States of America, 2 Department of Medicine (Division of Infectious Disease), Albert Einstein College of Medicine, Bronx, New York, United States of America, 3 Global Health Center, Albert Einstein College of Medicine, Bronx, New York, United States of America, 4 Jacobi Medical Center (Diagnostic Parasitology Laboratory), Bronx, New York, United States of America, 5 Division of Parasitic Diseases and Malaria, Centers for Disease Control and Prevention, Atlanta, Georgia, United States of America
Map A3. Distribution of cases of *Trypanosoma cruzi* infection in Europe by country, and reported transmission (autochthonous, transfusional or congenital transmission of infection acquired among European travellers to disease-endemic areas) among the European population (data reported to WHO as of December 2009).

Country ranking of estimated infected people:
- More than 50 000
- 6 001 to 16 000
- 1 601 to 6 000
- 501 to 1 600
- 140 to 269
- Less than 100

Control and prevention of Chagas disease in Europe

Report of a WHO Informal Consultation (jointly organized by WHO headquarters and the WHO Regional Office for Europe)

Geneva, Switzerland
17–18 December 2009

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## Estimated number of *T. cruzi*-infected LA immigrants in Italy, 2008-2009

<table>
<thead>
<tr>
<th>COUNTRIES</th>
<th>LEGAL+ILLEGAL</th>
<th>PREVALENCE OF T.CRUIZI INFECTION</th>
<th>ESTIMATED NUMBER OF INFECTED IMMIGRANTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>16294</td>
<td>4,9%</td>
<td>798</td>
</tr>
<tr>
<td>Bolivia</td>
<td>18-26000</td>
<td>14,8%</td>
<td>2664-3848</td>
</tr>
<tr>
<td>Brasile</td>
<td>150000</td>
<td>0,8%</td>
<td>1200</td>
</tr>
<tr>
<td>Cile</td>
<td>4372</td>
<td>1,2%</td>
<td>52</td>
</tr>
<tr>
<td>Colombia</td>
<td>19832</td>
<td>1,2%</td>
<td>238</td>
</tr>
<tr>
<td>Costarica</td>
<td>446</td>
<td>n.d.</td>
<td>n.d.</td>
</tr>
<tr>
<td>Cuba</td>
<td>17638</td>
<td>n.d.</td>
<td>n.d.</td>
</tr>
<tr>
<td>Ecuador</td>
<td>73235-80000</td>
<td>0,2%</td>
<td>146-160</td>
</tr>
<tr>
<td>El Salvador</td>
<td>6096</td>
<td>1,5%</td>
<td>91</td>
</tr>
<tr>
<td>Guatemala</td>
<td>532</td>
<td>n.d.</td>
<td>n.d.</td>
</tr>
<tr>
<td>Honduras</td>
<td>632</td>
<td>n.d.</td>
<td>n.d.</td>
</tr>
<tr>
<td>Messico</td>
<td>5724</td>
<td>0,5-6,8%</td>
<td>29-389</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>373</td>
<td>n.d.</td>
<td>n.d.</td>
</tr>
<tr>
<td>Panama</td>
<td>384</td>
<td>n.d.</td>
<td>n.d.</td>
</tr>
<tr>
<td>Paraguay</td>
<td>1246</td>
<td>4,5%</td>
<td>56</td>
</tr>
<tr>
<td>Peru'</td>
<td>76406-78000</td>
<td>0,2%</td>
<td>153-156</td>
</tr>
<tr>
<td>Uruguay</td>
<td>1956</td>
<td>0,6%</td>
<td>12</td>
</tr>
<tr>
<td>Venezuela</td>
<td>6235</td>
<td>1,3%</td>
<td>81</td>
</tr>
<tr>
<td>Others</td>
<td>144</td>
<td>n.d.</td>
<td>n.d.</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>417493-438656</td>
<td>-</td>
<td>5520-7081</td>
</tr>
</tbody>
</table>
Leishmania
Figure 3: Map providing the regional outline of northern Italy with geographic distribution of autochthonous kshmaniasis foci detected after 1990. (a) Five foci recognized through the 1990–2002 retrospective study; (b) as in a, plus five new foci detected during the 2003–2005 prospective survey, as shown in Tables 2 and 3. Sites where autochthonous canine kshmaniasis (CanL) cases and/or phlebotomine vectors were detected, but that did not fulfill criteria for the classification of an undisputable kshmaniasis focus. Focus labels include province acronyms, RSSM, Republic of San Marino.
Infezione da Leishmania nei cani nelle regioni italiane settentrionali

**Table 3** Leishmania foci identified through the 2003–2005 prospective study on canine leishmaniasis (CanL)

<table>
<thead>
<tr>
<th>Focus label*</th>
<th>Autochthonous cases</th>
<th>Asymptomatic dogs examined</th>
<th>Total seropositives (%)</th>
<th>Autochthonous seropositives (%)</th>
<th>Leishmania infantum strains identified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Alpine territories</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AO-1†</td>
<td>4</td>
<td>611</td>
<td>8 (1.3)</td>
<td>4 (0.7)</td>
<td>0</td>
</tr>
<tr>
<td>CN-1</td>
<td>2</td>
<td>347</td>
<td>4 (1.1)</td>
<td>4 (1.1)</td>
<td>1</td>
</tr>
<tr>
<td>TO-2†</td>
<td>5</td>
<td>741</td>
<td>28 (3.8)</td>
<td>17 (2.3)</td>
<td>1</td>
</tr>
<tr>
<td>TO-3</td>
<td>3</td>
<td>60</td>
<td>3 (5.0)</td>
<td>3 (5.0)</td>
<td>0</td>
</tr>
<tr>
<td>BS-1</td>
<td>5</td>
<td>192</td>
<td>17 (8.8)</td>
<td>10 (5.2)</td>
<td>1</td>
</tr>
<tr>
<td>BS-2</td>
<td>1</td>
<td>290</td>
<td>6 (2.1)</td>
<td>3 (1.0)</td>
<td>0</td>
</tr>
<tr>
<td>TN-1</td>
<td>3</td>
<td>257</td>
<td>9 (3.5)</td>
<td>6 (2.3)</td>
<td>1</td>
</tr>
<tr>
<td>TV-1</td>
<td>2</td>
<td>384</td>
<td>4 (1.0)</td>
<td>4 (1.0)</td>
<td>1</td>
</tr>
<tr>
<td>VR-1†</td>
<td>2</td>
<td>703</td>
<td>13 (1.8)</td>
<td>12 (1.7)</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>3585</td>
<td>92 (2.6)</td>
<td>63 (1.8)</td>
<td>6</td>
</tr>
<tr>
<td>Pre-Apennine/Po valley territories</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AL-2</td>
<td>2</td>
<td>182</td>
<td>4 (2.2)</td>
<td>4 (2.2)</td>
<td>0</td>
</tr>
<tr>
<td>AT-1</td>
<td>6</td>
<td>373</td>
<td>28 (7.5)</td>
<td>18 (5.0)</td>
<td>1</td>
</tr>
<tr>
<td>PV-1</td>
<td>2</td>
<td>76</td>
<td>10 (13.2)</td>
<td>3 (3.9)</td>
<td>0</td>
</tr>
<tr>
<td>PC-1</td>
<td>1</td>
<td>40</td>
<td>7 (17.5)</td>
<td>2 (5.0)</td>
<td>0</td>
</tr>
<tr>
<td>BO-2</td>
<td>2</td>
<td>497</td>
<td>15 (3.0)</td>
<td>5 (1.0)</td>
<td>0</td>
</tr>
<tr>
<td>MO-1/RE-1</td>
<td>5</td>
<td>573</td>
<td>19 (3.3)</td>
<td>12 (2.1)</td>
<td>0</td>
</tr>
<tr>
<td>RSM</td>
<td>2</td>
<td>116</td>
<td>12 (10.3)</td>
<td>4 (3.4)</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>1857</td>
<td>95 (5.1)</td>
<td>48 (2.6)</td>
<td>2</td>
</tr>
<tr>
<td>Over total</td>
<td>47</td>
<td>5442</td>
<td>187 (3.4)</td>
<td>106 (2.1)</td>
<td>8</td>
</tr>
</tbody>
</table>

RSM, Republic of San Marino.
*Labels include province acronyms.
†Focus previously recorded by the retrospective study.

Maroli et al., TMIH, 2008
Infezione da Leishmania nei flebotomi nelle regioni italiane settentrionali

### Table 4 Location and number of sites surveyed during two consecutive sandy seasons (2003–2004) and Leishmania vector species identified in each focus

<table>
<thead>
<tr>
<th>Focus label*</th>
<th>No. of sites surveyed</th>
<th>Positive sites</th>
<th>Specimens of Phlebotomus (Larroussius) species collected</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>P. perniciosus</td>
<td>P. perffrei</td>
</tr>
<tr>
<td>Pre-Alpine territories</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AO-1</td>
<td>15</td>
<td>4</td>
<td>23</td>
<td>0</td>
</tr>
<tr>
<td>CN-1</td>
<td>19</td>
<td>4</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>TO-2</td>
<td>24</td>
<td>5</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>TO-3</td>
<td>21</td>
<td>7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>BS-1</td>
<td>15</td>
<td>8</td>
<td>33</td>
<td>0</td>
</tr>
<tr>
<td>BS-2</td>
<td>18</td>
<td>3</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>TN-1</td>
<td>4</td>
<td>2</td>
<td>33</td>
<td>0</td>
</tr>
<tr>
<td>TV-1</td>
<td>4</td>
<td>3</td>
<td>365</td>
<td>0</td>
</tr>
<tr>
<td>VR-1</td>
<td>10</td>
<td>6</td>
<td>279</td>
<td>0</td>
</tr>
<tr>
<td>Total (%)</td>
<td>130</td>
<td>42</td>
<td>769</td>
<td>0</td>
</tr>
<tr>
<td>Pre-Apennine/Po valley territories</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AL-2</td>
<td>16</td>
<td>6</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>AT-1</td>
<td>19</td>
<td>8</td>
<td>29</td>
<td>0</td>
</tr>
<tr>
<td>PV-1</td>
<td>10</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>FC-1</td>
<td>8</td>
<td>2</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>BO-2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>46</td>
</tr>
<tr>
<td>MO-1/RE-1</td>
<td>4</td>
<td>4</td>
<td>27</td>
<td>512</td>
</tr>
<tr>
<td>RSM</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>37</td>
</tr>
<tr>
<td>Total (%)</td>
<td>62</td>
<td>26</td>
<td>91</td>
<td>595</td>
</tr>
<tr>
<td>Overall total (%)</td>
<td>192</td>
<td>68</td>
<td>860</td>
<td>595</td>
</tr>
</tbody>
</table>

RSM, Republic of San Marino.
*Labels include province acronyms.
Asymptomatic *Leishmania infantum* Infection in an Area of Northwestern Italy (Piedmont Region) Where Such Infections Are Traditionally Nonendemic

Alberto Biglino, Cesare Bolla, Erika Concialdi, Anna Trisciuoglio, Angelo Romano, and Ezio Ferroglio

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

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.
World's Deadliest Animals

Number of people

- 10 Shark
- 10 Wolf
- 100 Lion
- 100 Elephant
- 1,000 Crocodile
- 2,000 Tapeworm
- 2,500 Ascaris
- 725,000 Mosquito

Sources: WHO, crocodile-attack.info, Katulnikova et al., (2011); Lell et al., (2012); Lu et al., (2013); Packer et al., (2014); Alessandro De Maddalena. All calculations have wide error margins.