Parasitic infections imported to the Middle East

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Aarhus University, Denmark
&
Senior Consultant
Department of Infectious Diseases
The Royal Hospital
Muscat
Sultanate of Oman

AI Ain, United Arab Emirates
17 – 19 March 2016
Global aviation network. No. of passengers per day between 2 airports.

Hufnagel PNAS 2004, 101:15124-9

March 2016, eskild.petersen@gmail.com

Eskild Petersen, Department of Infectious Diseases
Imported diseases depends on the area of origin

Refugees from Yemen or Syria?

Migrant workers from Pakistan, India and Bangla Desh

Migrant workers from Africa or China?

Think the geography into the diagnostic work up
Travel-associated infection presenting in Europe (2008–12): an analysis of EuroTravNet longitudinal, surveillance data, and evaluation of the effect of the pre-travel consultation

Prevention of insect bites
- Impregnated clothes
- Bed nets

Prevention of diarrhoea
- Hygiene, hygiene and hygiene
Chronic *Strongyloides stercoralis* infection in former British Far East prisoners of war

G.V. GILL, E. WELCH, J.W. BAILEY, D.R. BELL and N.J. BEECHING

*From the Department of Tropical Medicine, Liverpool School of Tropical Medicine, Liverpool L3 5QA, United Kingdom*

<table>
<thead>
<tr>
<th>Category</th>
<th>Cases</th>
<th>Controls</th>
<th>OR</th>
<th>95%CI</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location of captivity (cases 213, controls 224)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burma</td>
<td>78%</td>
<td>46%</td>
<td>4.19</td>
<td>2.70–6.50</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Railway</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thailand (other)</td>
<td>16%</td>
<td>14%</td>
<td>1.18</td>
<td>0.68–2.07</td>
<td>NS</td>
</tr>
<tr>
<td>Sumatra</td>
<td>11%</td>
<td>18%</td>
<td>0.64</td>
<td>0.30–0.97</td>
<td>NS</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>0.5%</td>
<td>0.5%</td>
<td>0.08</td>
<td>0.00–0.02</td>
<td>NS</td>
</tr>
<tr>
<td><strong>Disease in captivity (cases 230, controls 220)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malaria</td>
<td>88%</td>
<td>75%</td>
<td>2.49</td>
<td>1.45–4.18</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Dysentery</td>
<td>79%</td>
<td>75%</td>
<td>1.22</td>
<td>0.77–1.94</td>
<td>NS</td>
</tr>
<tr>
<td>Tropical ulcer</td>
<td>53%</td>
<td>42%</td>
<td>1.59</td>
<td>1.08–2.35</td>
<td>&lt;0.02</td>
</tr>
<tr>
<td>Neurupathy</td>
<td>37%</td>
<td>44%</td>
<td>0.76</td>
<td>0.51–1.14</td>
<td>NS</td>
</tr>
<tr>
<td>Wet beriberi</td>
<td>70%</td>
<td>67%</td>
<td>1.10</td>
<td>0.73–1.68</td>
<td>NS</td>
</tr>
<tr>
<td><strong>Disease post-captivity (cases 230, controls 220)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulmonary TB</td>
<td>5%</td>
<td>2%</td>
<td>2.15</td>
<td>0.66–7.37</td>
<td>NS</td>
</tr>
<tr>
<td>Peptic ulcer</td>
<td>18%</td>
<td>13%</td>
<td>1.45</td>
<td>0.84–2.48</td>
<td>NS</td>
</tr>
<tr>
<td>Psychiatric disease</td>
<td>32%</td>
<td>35%</td>
<td>0.87</td>
<td>0.58–1.31</td>
<td>NS</td>
</tr>
</tbody>
</table>

*Table 1. Clinical and diagnostic features amongst ex-FEPOWs with strongyloidiasis*

<table>
<thead>
<tr>
<th>Feature</th>
<th>Present in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical larva currens rash</td>
<td>70%</td>
</tr>
<tr>
<td>Eosinophilia*</td>
<td>66%</td>
</tr>
<tr>
<td>Positive ELISA/CFT</td>
<td>64%</td>
</tr>
<tr>
<td>Positive stool culture</td>
<td>30%</td>
</tr>
<tr>
<td>Positive stool microscopy</td>
<td>26%</td>
</tr>
<tr>
<td>Gastro-intestinal symptoms**</td>
<td>16%</td>
</tr>
</tbody>
</table>
Sources of information

Centers for Disease Control, CDC
www.cdc.gov/

European Center for Disease Control, ECDC
www.ecdc.eu.int/

Eurosurveillance
www.eurosurveillance.org/

OECD
www.oecd.org/home/

PubMed

ProMED
www.promedmail.org

W.H.O. (and regional offices)
www.who.int

World Bank
www.worldbank.org/

UNAIDS
www.unaids.org

UNICEF
www.unicef.org/
Malaria, the present challenge

**MALARIA - QATAR: IMPORTED**

16th April 2014
600 imported cases in 2013

**MALARIA - SAUDI ARABIA**

Published Date: 2013-05-26
2788 cases diagnosed since 2011

**MALARIA - DUBAI: REQUEST FOR INFORMATION**

Published Date: 2011-12-16 16:47:23
Several cases in the International City

**MALARIA - UNITED ARAB EMIRATES (02): (ABU DHABI) IMPORTED**

26th June 2012
2731 imported cases in 2011

**MALARIA - OMAN: AUTOCHTHONOUS, REQUEST FOR INFORMATION**

12 April 2014
1440 cases reported in 2013. 11 autochthonous cases
Latest outbreak news from ProMED-mail

Infectious disease risk from the Syrian conflict

Eskild Petersen a,*, Susan Baekeland b, Ziad A. Memish c, Hakan Leblebicioglu d

a ProMED-mail Moderator, Parasitic Diseases, Department of Infectious Diseases, Aarhus University Hospital, Skejby, Aarhus, Denmark
b ProMED-mail Correspondent, Human, Animal and Plant Diseases, Cartet, Normandy, France
c Ministry of Health, Riyadh, College of Medicine, Al Faisal University, Riyadh, Kingdom of Saudi Arabia
d Department of Infectious Diseases and Clinical Microbiology, Ondokuz Mayis University Medical School, Samsun, Turkey

Polio, hepatitis A, Leishmanaisis, Malaria, Schistosomiasis, Dengue . . . . . .
**Rapid communication**

**PROFILE OF ILLNESS IN SYRIAN REFUGEES: A GEOSENTINEL ANALYSIS, 2013 TO 2015**

FP Mockenhaupt, KA Barbre, M Jensenius, CS Larsen, ED Barnett, W Stauffer, C Rothe, H Asgeirsson, DH Hamer, DH Esposito, P Gautret, P Schlagenauf

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>224</td>
<td>66</td>
</tr>
<tr>
<td>At least one intestinal parasite infection°</td>
<td>108</td>
<td>22</td>
</tr>
<tr>
<td>Blastocystis</td>
<td>58</td>
<td>12</td>
</tr>
<tr>
<td>Giardia</td>
<td>34</td>
<td>7</td>
</tr>
<tr>
<td>Other non-pathogenic protozoa</td>
<td>27</td>
<td>6</td>
</tr>
<tr>
<td>Unspecified intestinal parasite</td>
<td></td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Eosinophilia</td>
<td>17</td>
<td>3</td>
</tr>
<tr>
<td>Abnormal urinalysis</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Anaemia</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Schistosomiasis (any species)</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Dental problems</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Fungal infections</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Scabies</td>
<td>3</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Upper respiratory tract infection</td>
<td>2</td>
<td>&lt; 1</td>
</tr>
</tbody>
</table>
Table 3

Demographic and diagnosis information for patients presenting at GeoSentinel sites after migration from Syria, June 2011–November 2015 (n = 44)\textsuperscript{a}

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutaneous leishmaniasis</td>
<td>14</td>
</tr>
<tr>
<td>Active tuberculosis</td>
<td>5</td>
</tr>
<tr>
<td>Pulmonary</td>
<td>3</td>
</tr>
<tr>
<td>Extrapulmonary</td>
<td>2</td>
</tr>
<tr>
<td>Chronic hepatitis</td>
<td>4</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>3</td>
</tr>
<tr>
<td>Hepatitis C</td>
<td>1</td>
</tr>
<tr>
<td>Latent tuberculosis</td>
<td>4</td>
</tr>
<tr>
<td>Vitamin D Insufficiency</td>
<td>4</td>
</tr>
<tr>
<td>Dental problems</td>
<td>3</td>
</tr>
<tr>
<td>Nonseptic arthritis</td>
<td>2</td>
</tr>
<tr>
<td>Antibiotic-resistant pyelonephritis</td>
<td>2</td>
</tr>
</tbody>
</table>

\textsuperscript{a} The data is from a study conducted by GeoSentinel sites after migration from Syria, June 2011–November 2015. 

Eurosurveillance 2016;21(10)
Search Results (12)

10 Dec 2015 Leishmaniasis - Syria (03)
23 Nov 2015 Leishmaniasis - Syria (02): (TD): government troops
03 Apr 2015 Leishmaniasis - Syria: (RA) ISIS-held area
31 Aug 2013 Leishmaniasis - Syria (07): Turkey ex Syria, refugee camps
17 Jul 2013 Leishmaniasis - Syria (06): Iraq ex Syria, refugee camp
07 Jun 2013 Leishmaniasis - Syria (05): (HL)
20 Apr 2013 Leishmaniasis - Syria (04): comment on canine reservoir
09 Apr 2013 Leishmaniasis - Syria (03): Turkey ex Syria
28 Mar 2013 Leishmaniasis - Syria (02)
27 Feb 2013 Leishmaniasis - Syria: RFI
27 Dec 2012 Leishmaniasis, tuberculosis - Syria (02): comment
26 Dec 2012 Leishmaniasis, tuberculosis - Syria

SCHISTOSOMIASIS - YEMEN
******************************
A ProMED-mail post
<http://www.promedmail.org>
ProMED-mail is a program of the International Society for Infectious Diseases
<http://www.isid.org>

Date: Tue 26 Feb 2008
Source: Yemen Observer [edited]
<http://www.yobserver.com/front-page/10013772.html>
LEISHMANIASIS - SYRIA (RAQQA): ISIS-HELD AREA

A ProMED-mail post
http://www.promedmail.org
ProMED-mail is a program of the International Society for Infectious Diseases
http://www.isid.org

Date: Fri 20 Nov 2015
Source: ARA News [edited]

Batting militants of the Islamic State (DAESH) near the ancient city of Palmyra (Tadmur), dozens of soldiers of the Syrian army were reportedly infected with skin diseases, a source close to the Syrian army reported.

"Dozens of Syrian troops have been infected with leishmaniasis, amid lack of treatment," the source told ARA News on the condition of anonymity.

LEISHMANIASIS - SYRIA (RAQQA): GOVERNMENT TROOPS

A disease caused by a parasite and transmitted by the bite of the sand fly [leishmaniasis] is spreading rapidly in the city of Raqqa, Syria. Raqqa is the putative capital of the caliphate proclaimed by ISIS in the territory it controls in Syria and Iraq.

The Express, a British media outlet, reports today that leishmaniasis is becoming widespread amid the loss of medical personnel and the lack of medicine.

Syria
Leishmaniasis Worldwide and Global Estimates of Its Incidence

Jorge Alvar¹*, Iván D. Vélez¹,², Caryn Bern³, Mercé Herrero⁴, Philippe Desjeux⁵, Jorge Cano⁶, Jean Jannin¹, Margriet den Boer¹,⁹, the WHO Leishmaniasis Control Team¹

¹ Department for the Control of Neglected Tropical Diseases (HTM/NTD/IDM), Leishmaniasis Control Program, World Health Organization, Geneva, Switzerland, ² PECET, Universidad de Antioquia, Medellín, Colombia, ³ Division of Parasitic Diseases and Malaria, National Center for Global Health, Centers for Disease Control and Prevention, Atlanta, Georgia, United States of America, ⁴ Disease Prevention and Control Programmes, World Health Organization, Addis Ababa, Ethiopia, ⁵ Institute of OneWorldHealth, San Francisco, California, United States of America, ⁶ National Centre for Tropical Medicine and International Health, Instituto de Salud Carlos III, Madrid, Spain

Visceral leishmaniasis

Iraq
Oman

No Leishmaniasis in the UAE
Saudi Arabia

Visceral leishmaniasis

Cutaneous leishmaniasis

Visceral leishmaniasis trend

Cutaneous leishmaniasis trend

© by author
Yemen

The whole country of Yemen is endemic for CL, except for the highlands above 2300 m.
Both CL caused by *L. major* and CL caused by *L. tropica* are prevalent.
In 2004, 2 outbreaks were reported, one of 500 cases in the Taiz region, and another one of 900 cases.

Leishmaniasis is a highly neglected disease in Yemen.
The data strongly supports the existence of *L. infantum* as a causative agent of VL among Yemeni children. Moreover, reporting canine Leishmaniasis, and that dogs possibly act as reservoir hosts support the role of *L. infantum*
Epidemiology of waterborne Toxoplasma Campos - Brazil

Lilian M G Bahia Oliveira Emer Inf Dis 2003
Figure 1. Survival analyses showing proportion of children without retinochoroiditis according to age in years when first eye lesion was detected in Brazil (solid line), and European neonatal (long dash) and prenatal centers (short dash).
Clinical evolution of Chagas disease

Subacute form

5 to 10%

Acute phase

2 to 3%

Death

Chronic phase

Initial indeterminate form

90%

30%

Chronic cardiac form

15%

Mild cardiopathy

15%

Severe cardiopathy

60%

Permanent indeterminate form

10%

Digestive form
Schistosomiasis in Yemen
Epidemiological, clinical and haematological profile of schistosomiasis in Yemen

M.A.M. Nagi¹, A. Kumar², J.S. Mubarak² and S.A. Bamashmoos²

Table 1 Prevalence of intestinal and urinary schistosomiasis among schoolchildren in Yemen

<table>
<thead>
<tr>
<th>Governorate</th>
<th>No. examined</th>
<th>S. mansoni-infected</th>
<th>S. haematobium-infected</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Sana'a</td>
<td>1451</td>
<td>273</td>
<td>18.8</td>
</tr>
<tr>
<td>Hadja</td>
<td>1401</td>
<td>106</td>
<td>7.6</td>
</tr>
<tr>
<td>Sada'a</td>
<td>1000</td>
<td>305</td>
<td>76.3</td>
</tr>
</tbody>
</table>

http://applications.emro.who.int/emhj/0501/EMHJ_1999_5_1_177_181.pdf?ua=1
Schistosomiasis is seen in travellers and migrants from tropical Africa.

Gut Associated Antigen
Antibodies against GAA is associated with acute infection.

Membrane Bound Antigen
Antibodies against MBA is associated with chronic infection.

Tarp et al. Trop Med Intl Hlth 2000,5:185-91
The schistosoma-specific antibody response after treatment in non-immune travellers

LIV MARIE DUUS\textsuperscript{1}, ANDERS VITTRUP CHRISTENSEN\textsuperscript{1}, DORTE NAVNTOFT\textsuperscript{1}, BRITTA TARP\textsuperscript{2}, HENRIK V. NIELSEN\textsuperscript{3} & ESKILD PETERSEN\textsuperscript{1}

From the \textsuperscript{1}Department of Infectious Diseases, Aarhus University Hospital, Skejby, Aarhus, \textsuperscript{2}Department of Infectious Diseases, Regionshospitalet Silkeborg, Silkeborg, and \textsuperscript{3}Laboratory of Parasitology, Statens Seruminstitut, Copenhagen, Denmark

Figure 2. The dots represent all the measured GAA values from the patients. For each patient the slope and interception are calculated.
Salalah
Dhofar Province
Oman

Photo
Agnes Sonnenvend & Tibor Pal
Distribution of lymphatic filariasis (LF), onchocerciasis (Oncho), schistosomiasis (SCH) and soil-transmitted helminthiases (STH), 2009


http://www.metapathogen.com/lymphatic-filariasis/
Distribution of *E. granulosus*
Infectious Diseases: A Geographic Guide
Edited by Eskild Petersen, Lin Hwei Chen and Patricia Schlagenhauf-Lawlor

• “Where have you been” is a critical question leading the infectious disease specialist to a correct diagnosis when seeing the ill returned traveler.
• “Where are you going?” in the pre-travel setting, this book is an indispensible reference for travel medicine practitioners
• Infectious Diseases: a Geographic Guide by Eskild Petersen, Lin H. Chen, and Patricia Schlagenhauf will be the first resource most of us reach for when those questions are fielded.”
• - Alan J. Magill MD, FACP, FIDSA, President of the ISTM

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• £54.99 / €71.90 / $84.95

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Thank you very much