

CLIMATE CHANGE IMPACTS ON HUMAN HEALTH: IMPLICATIONS FOR TOURISM IN SOUTHERN EUROPE

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We know that ...

- Tourism flows to Southern Europe very significant at European & global level.
- Southern European countries are generally considered as warm and sunny destinations
 - The fact that they offer a **low health risk** to the tourist enhances the region's attractiveness as a tourist destination.
- 4 S – Sun, Sea, Sand, Security

Also Know that

- Climate change is now a reality
- Mediterranean Region is one of the most affected region in Europe in the future:
 - Getting warmer
 - Getting drier
 - Extremes more frequent
- Climate change impacts many sectors
 - Human health impacts

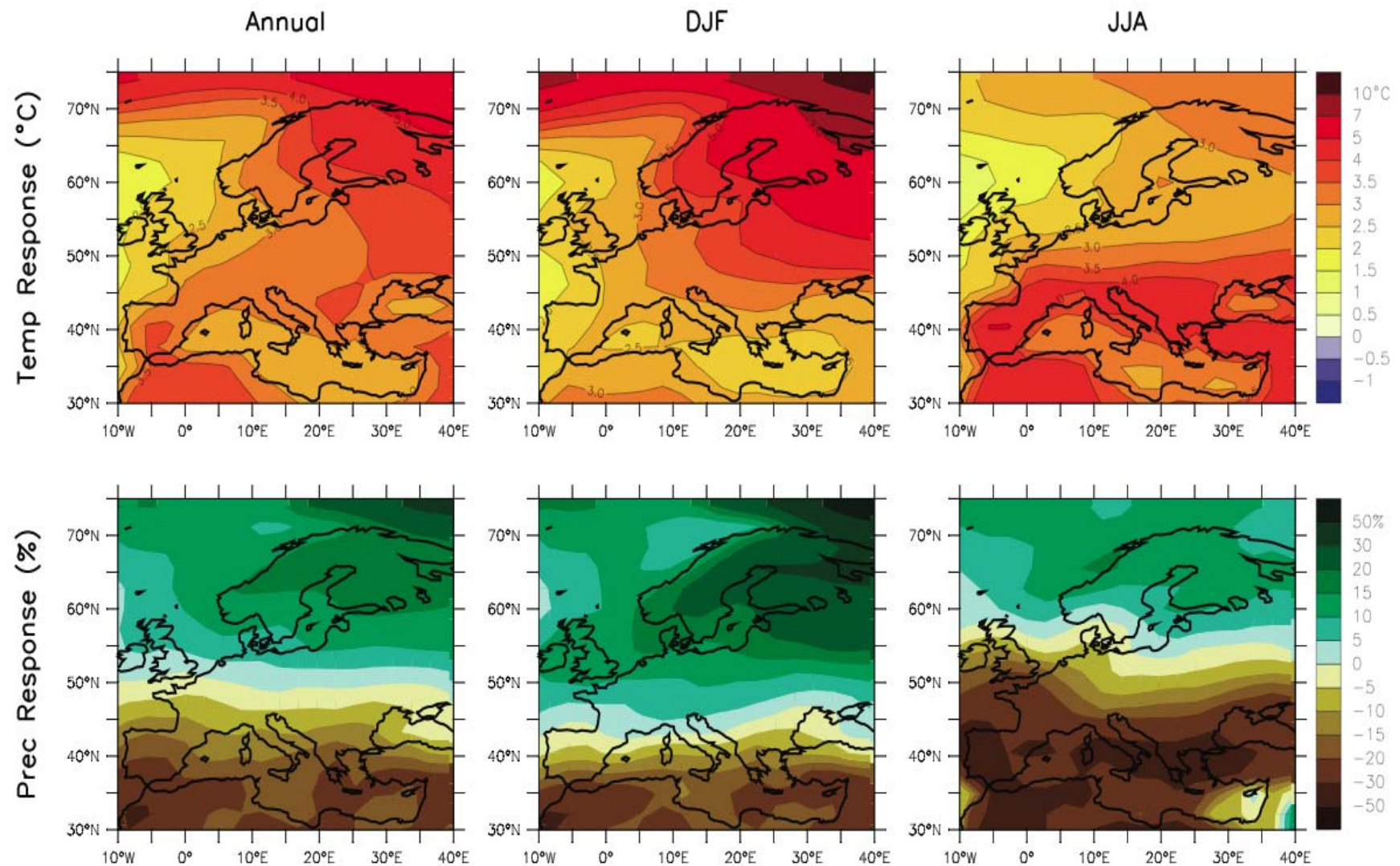


Figure 11.5. *Temperature and precipitation changes over Europe from the MMD-A1B simulations. Top row: Annual mean, DJF and JJA temperature change between 1980 to 1999 and 2080 to 2099, averaged over 21 models. Middle row: same as top, but for fractional change in precipitation.*

Freshwater Stress

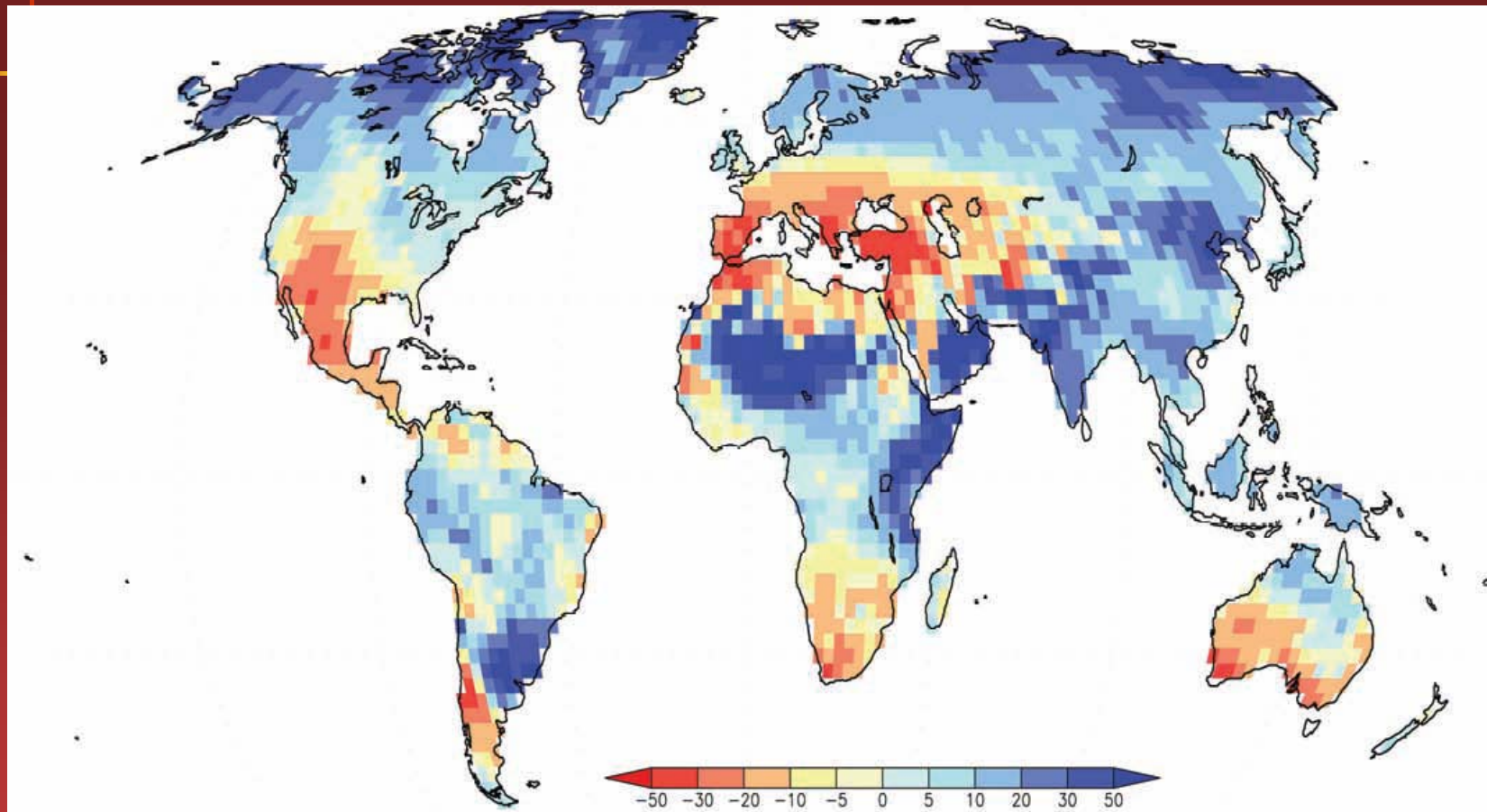
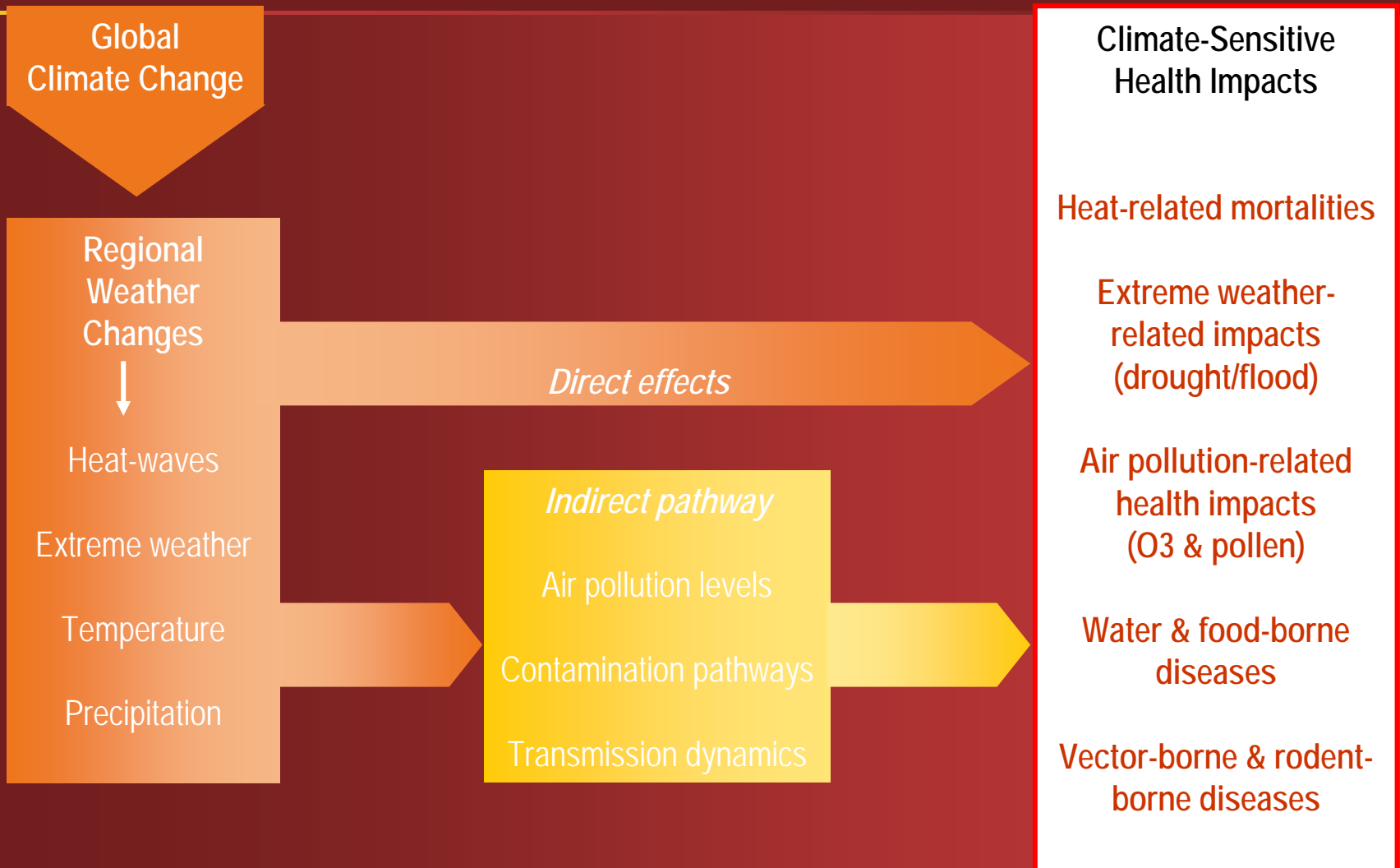


Figure TS.5. Illustrative map of future climate change impacts on freshwater which are a threat to the sustainable development of the affected regions. Background shows ensemble mean change of annual runoff, in percent, between the present (1981-2000) and 2081-2100 for the SRES A1B emissions scenario; blue denotes increased runoff, red denotes decreased runoff. [F3.2]

And That

- Health impacts not limited to the local population
- All individuals (locals and visitors) in a region are vulnerable to the potential climate change impacts of that region.
- Visitors are often more vulnerable
 - unfamiliar culture and environmental conditions
 - hazards linked to specific recreational activities
- Any adverse impact on tourist health makes their and their family members' holiday experience less pleasant
 - subsequently can reduce the location's attractiveness as a future tourist destination.

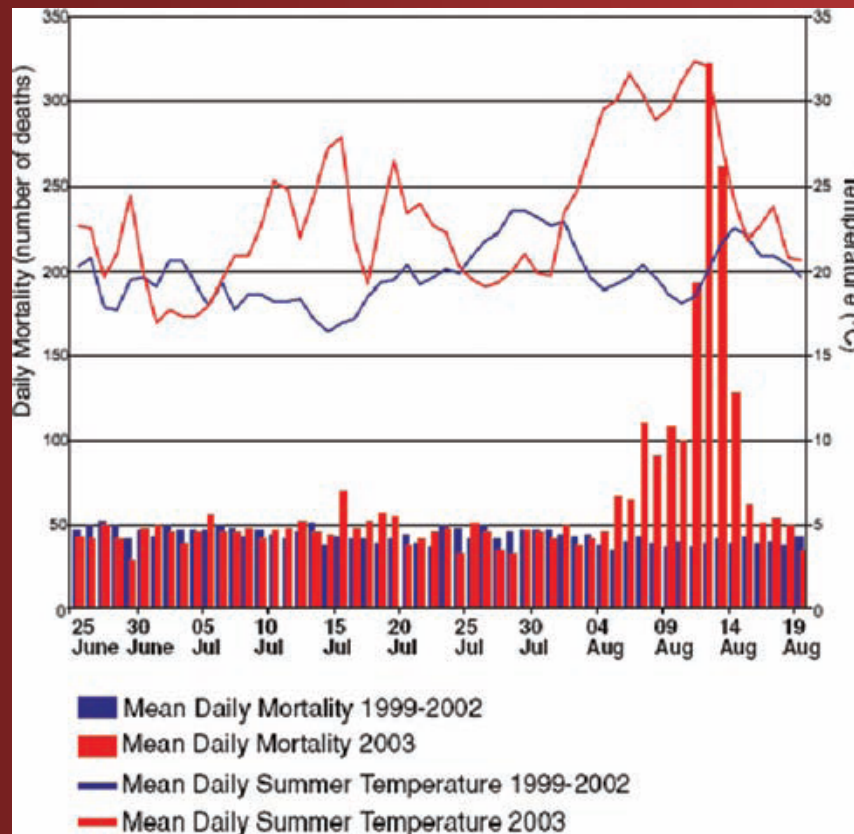
Potential Climate Change Health Impacts in S. Europe



Evidence: 2003 Heatwave

+ 35 000 extra deaths in Europe in 2 weeks !

August = many
tourists in Paris !



Increase in daily mortality in Paris during the heatwave in early August (Vandentorren and Empeur-Bissonnet, 2005).

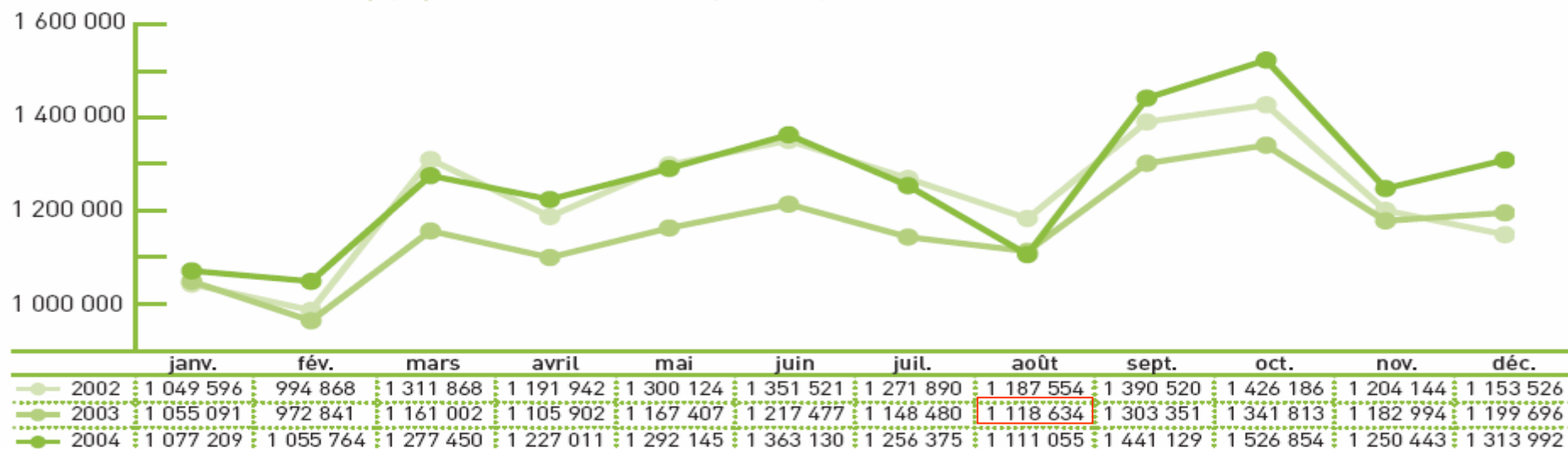


2007

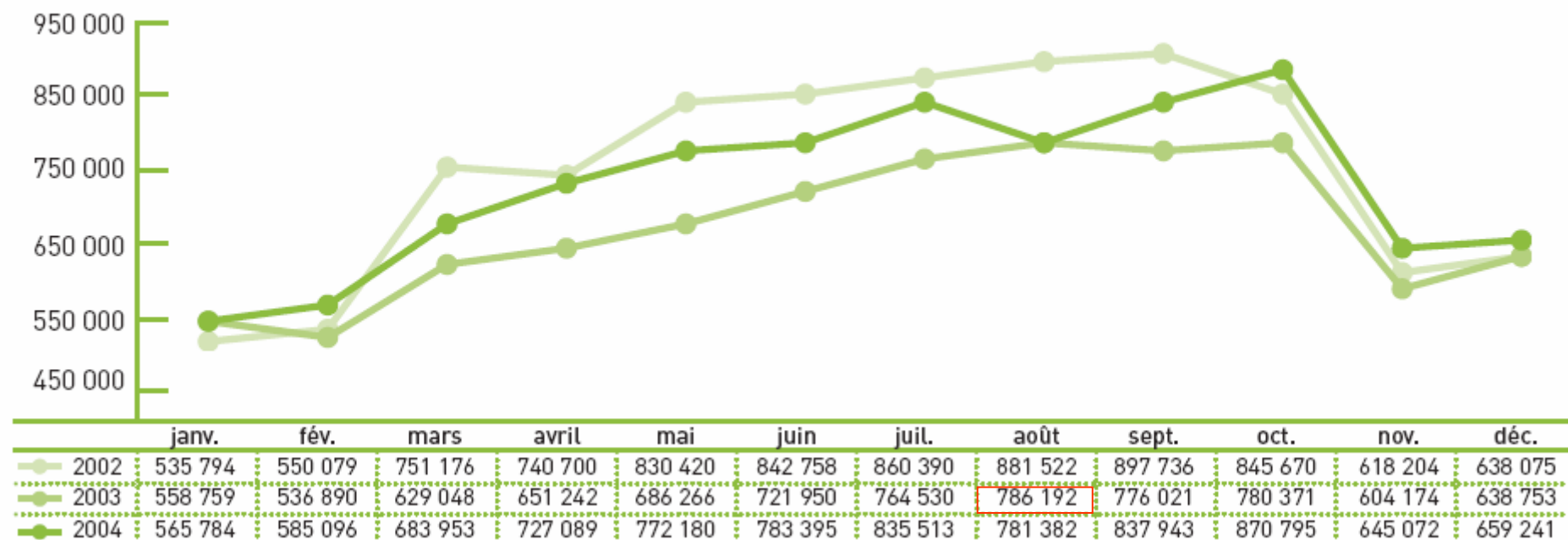
Turkey,
Greece ...

PARIS

Hôtellerie homologuée - Fréquentation mensuelle totale en 2002, 2003 et 2004
(en nombre d'arrivées) *Approved hotels - Total occupancy by month in 2002, 2003 and 2004 (expressed as a number of arrivals)*



Hôtellerie homologuée - Fréquentation étrangère mensuelle en 2002, 2003 et 2004
(en nombre d'arrivées) *Approved hotels - Foreign occupancy by month in 2002, 2003 and 2004 (expressed as a number of arrivals)*



2003 Heatwave Indirect Impacts

- More forest fires
- Reduced air quality
- Power interruptions (fires & transmission)
 - fires – transmission
 - nuclear power plants (cooling & radioactive waste release issues)
- Road accidents
 - no traffic lights
 - excess alcohol
- Food poisonings
-

Forest Fires

Portugal, 2003

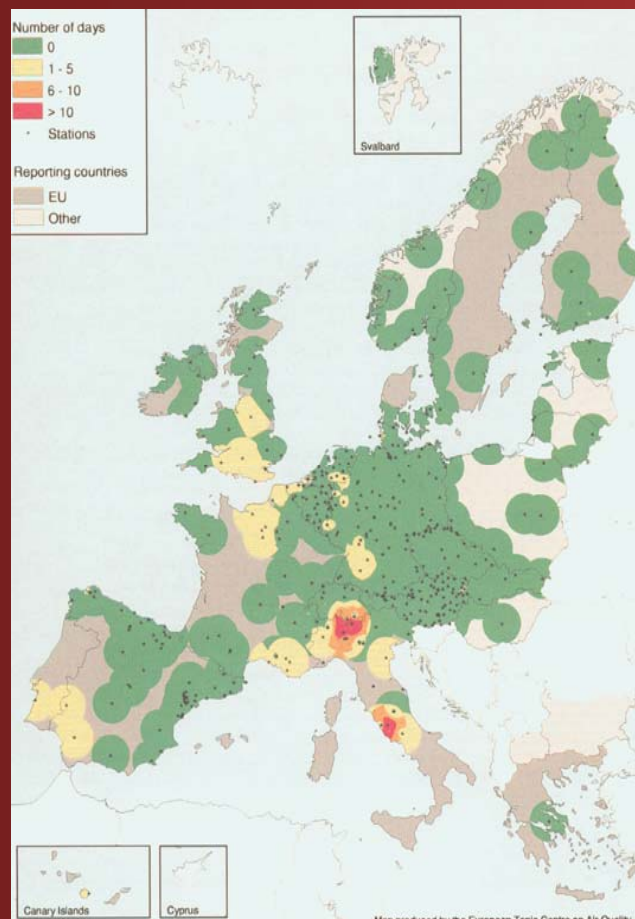


Greece, 2007

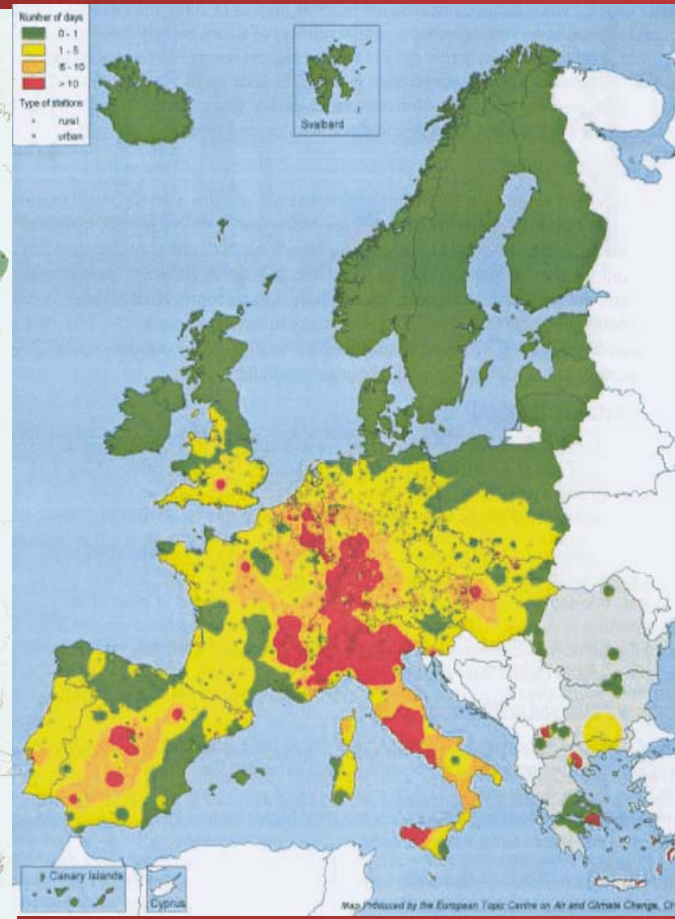


Air Pollution and Health

Number of days with surface ozone $>180 \mu\text{g}/\text{m}^3$



1999



Summer 2003

Poor Air Quality = Negative Tourism Impact

Disaster Zone Declared As Thai Haze Reaches Dangerous Levels

by Staff Writers
Bangkok (AFP) March 14, 2007

Thailand's northern Chiang Rai province has

Olympics spectators warned over air in Beijing

By Graeme Baker

Last Updated: 3:15am BST 24/08/2007

High levels of air pollution in Beijing could damage the health of many spectators at next years Olympic Games, a leading World Health Organisation expert has warned.



Malaysia fears providing pollution figures amid haze will hurt economy

Source: Copyright 2004, [Agence France-Presse](#)

Date: June 24, 2004

KUALA LUMPUR (AFP) - Malaysia said air pollution figures would remain a state secret due to fears the economy would be hurt by revealing how much smog from neighbouring Indonesia had blanketed parts of the country.

Commuters filled buses and underground trains



Thai think tank Kasikorn Research said the haze in the north could cause a two billion baht (60.7 million dollar) loss in tourism revenue for the region.



Good Air Quality = Positive for Tourism

Ozone and PM_{2.5} Exposure and Acute Pulmonary Health Effects: A Study of Hikers in the Great Smoky Mountains National Park

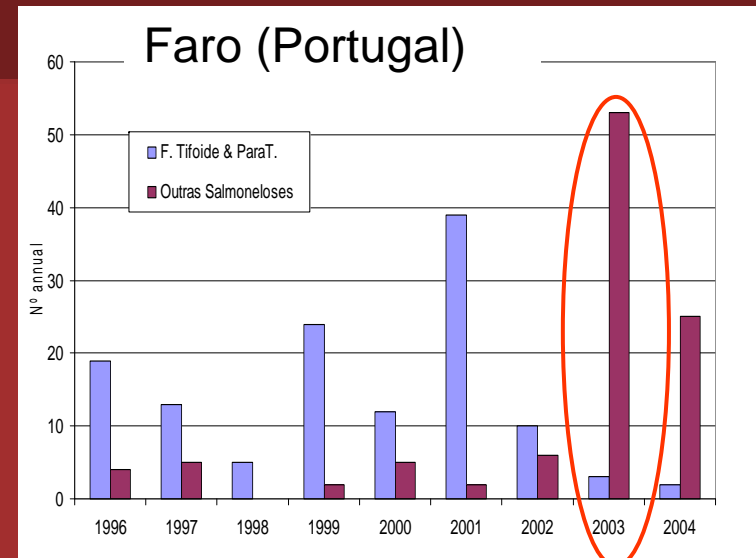
Steven P. Girardot,^{1,2} P. Barry Ryan,^{1,2} Susan M. Smith,³ Wayne T. Davis,⁴ Charles B. Hamilton,³ Richard A. Obenour,⁵ James R. Renfro,⁶ Kimberly A. Tromatore,³ and Gregory D. Reed⁴

reaching the summit, and mean daily temperature. O₃ and PM_{2.5} concentrations measured during the study were below the current federal standards, and we found no significant associations of acute changes in pulmonary function with either pollutant.

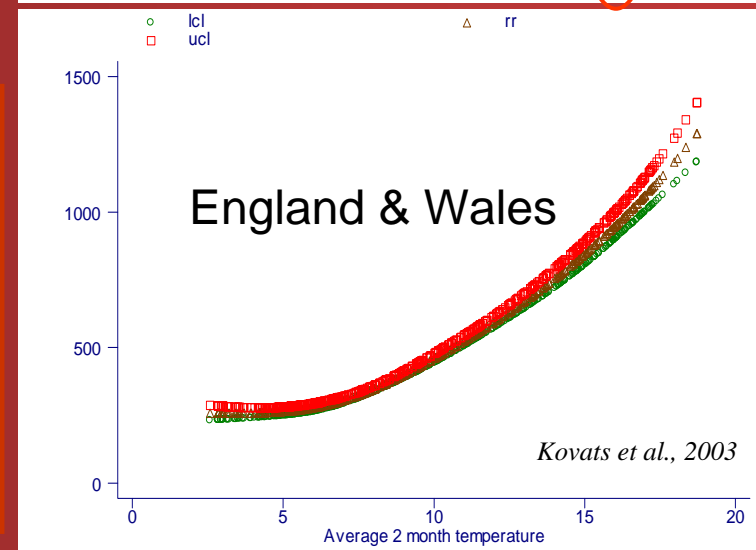
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Good air quality in natural parks in US marketed as a positive aspect of why people should visit the park

Water & Foodborne

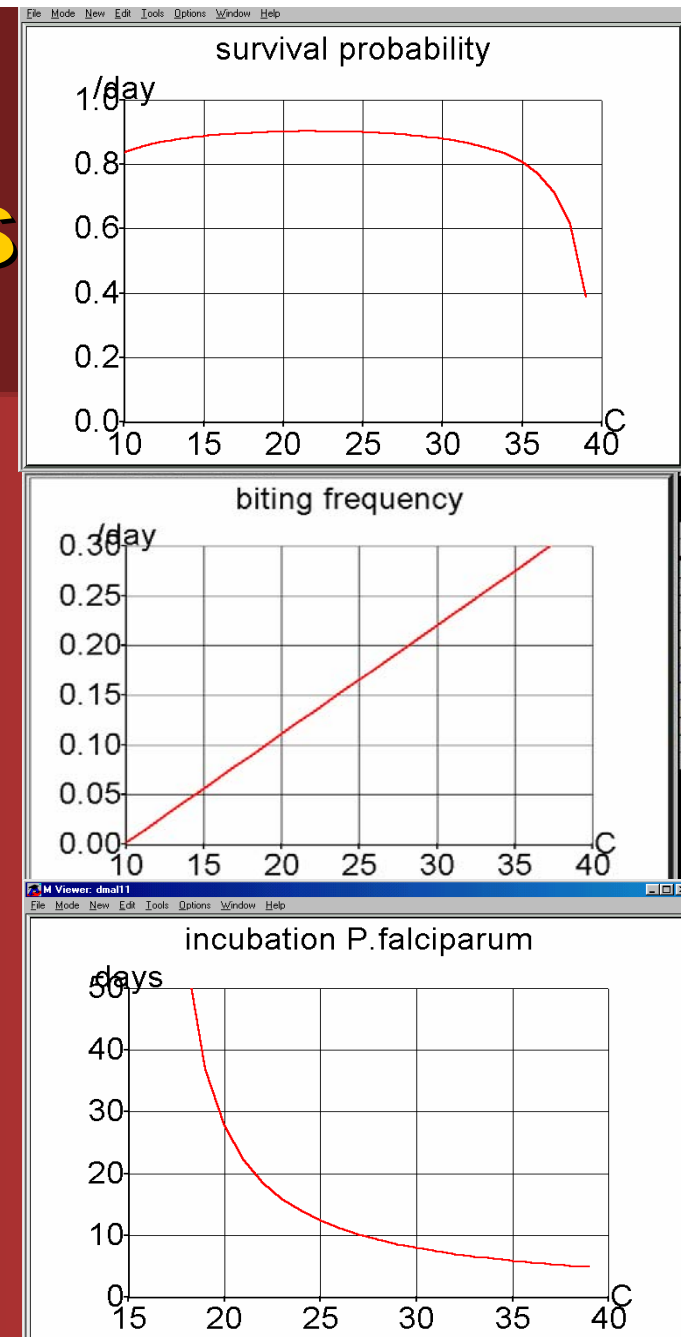


Water recreational activities ...



Vector Borne Diseases

- Transmission influenced by:
 - Temperature
 - Rainfall
 - Humidity
- And other factors



+

VectorBorne Diseases: Climate Change

- Current seasonal patterns can change
- Changes in current distribution
 - Climate change driven
 - Facilitated by global travel

Global traffic and disease vector dispersal

Andrew J. Tatem^{*,†}, Simon I. Hay^{*,†}, and David J. Rogers^{*}

6242–6247 PNAS April 18, 2006 vol. 103 no. 16

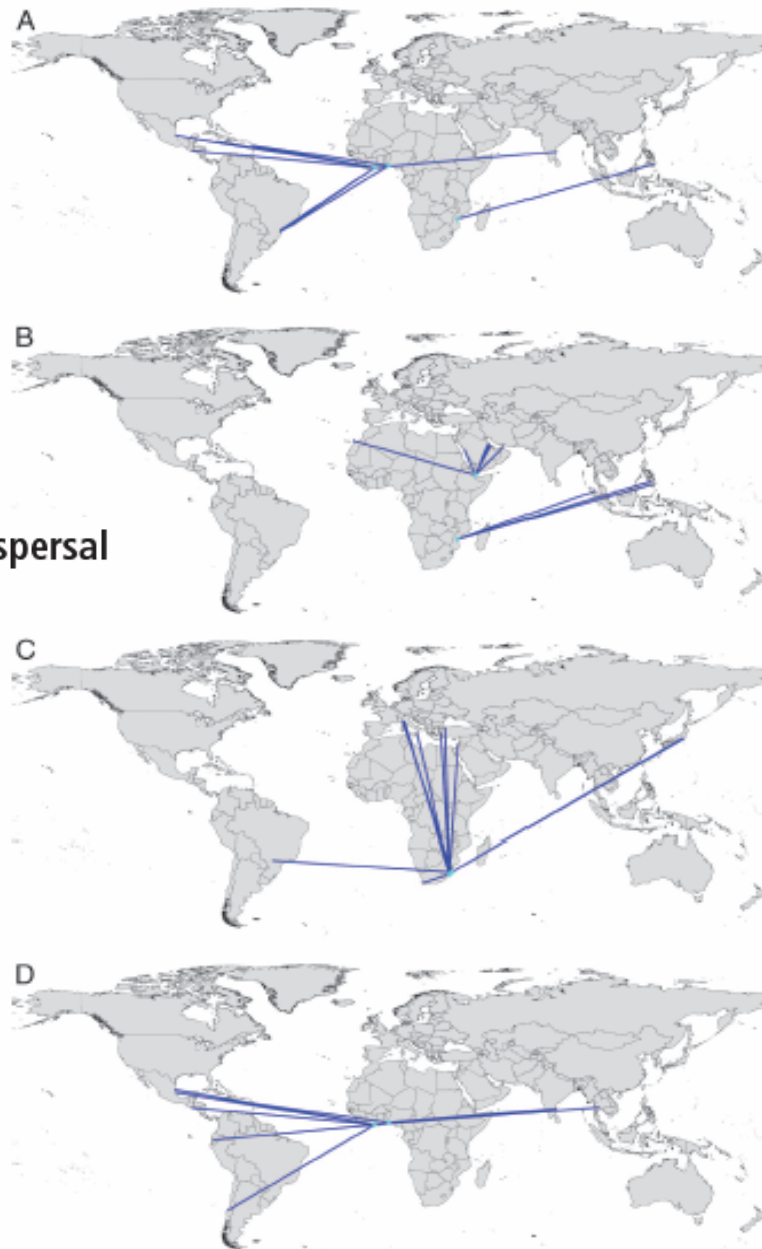


Fig. 3. The 10 sea traffic routes identified with the strongest risk factors for importation and establishment of each of four principal members of the *An. gambiae* complex. (A) *An. gambiae sensu stricto* (s.s.). (B) *An. arabiensis*. (C) *An. quadriannulatus*. (D) *An. melas*.

VBD of Concern in S. Europe

- Mosquito

- Dengue
- Yellow fever
- Malaria
- West Nile Fever



+ surprises



- Sandfly

- Leishmaniasis

- Ticks

- Med. Spotted fever
- Lyme disease



Two linked cases of West Nile virus (WNV) acquired by Irish tourists in the Algarve, Portugal

Jeff Connell¹, Paul McKeown²(Paul.McKeown@ndsc.ie), Patricia Garvey², Suzanne Cotter², Aileen Conway¹, Darina O'Flanagan², Brian P. O'Herlihy³, Dilys Morgan⁴, Angus Nicoll⁴ and Graham Lloyd⁵

¹National Virus Reference Laboratory, Dublin, Ireland

²National Disease Surveillance Centre, Dublin, Ireland

³Department of Public Health, Eastern Regional Health Authority Dublin (ERHA), Ireland

⁴Health Protection Agency Communicable Disease Surveillance Centre, London, England

⁵Health Protection Agency, Porton Down, Wiltshire, England

On 21 July 2004, Ireland's National Virus Reference Laboratory (NVRL) reported two suspected cases of West Nile virus (WNV) infection to the National Disease Surveillance Centre (NDSC). It is thought that both patients were exposed in the Algarve region of Portugal during a holiday stay between 26 June and 10 July. The patients developed influenza-like symptoms at the end of their holiday. One of them subsequently developed symptoms and signs of mild encephalitis. Both are recovering well.

Initial diagnosis was based on detection, at the NVRL, of IgM specific to WNV in the sera of both cases. Analysis of the second samples, collected seven days after the first sample, confirmed high levels of IgM in one patient and a significant rise in IgM in the second patient. Testing at the Health Protection Agency, Porton Down, confirmed WNV infection.

These cases are the first reported cases of imported WNV infection in Ireland or in northwest Europe. Countries around the Mediterranean have seen sporadic WNV activity over the last 40 years [1,2] involving human, mammalian, avian and vector infection [3]. Autochthonous European cases appear occasionally, most recently in France [4]. Results of studies during the 1960s and 1970s suggest there may have been low level transmission of the virus in Portugal in the past [5], although these are the first reported clinical cases of WNV disease acquired in Portugal.

Portuguese authorities were notified of the initial diagnosis and have started a national action plan, which involves strengthening the mechanisms of vigilance related to human and animal health and mosquitoes.

In Ireland and the United Kingdom, information has been produced for travellers to any area (including Southern Europe) where there is a risk of encountering mosquitoes. This emphasises the possible but low risk of WNV and other vectorborne diseases in the region and advises on reducing the risk of exposure (see http://www.nathnac.org/travellers/news_west_nile_virus.html and <http://www.ndsc.ie/d1027.HTML.html>).

CURRENT OUTBREAK

Surprises

Travellers to Italy warned of deadly mosquito virus

By James Sturcke
Thursday September 6, 2007
[Guardian Unlimited](#)

European health authorities have warned tourists in parts of Italy to protect themselves against mosquitoes after the detection of a deadly tropical virus.

At least 151 cases of chikungunya fever were reported in the province of Ravenna, in the north-eastern region of Emilia-Romagna, between July 4 and September 3.

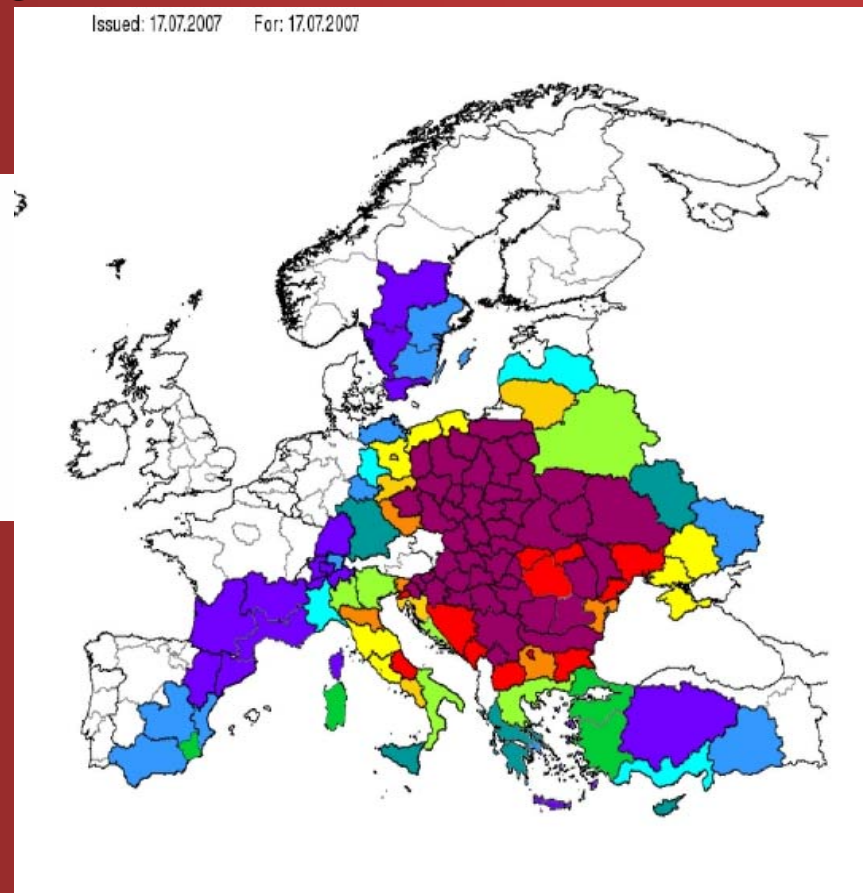
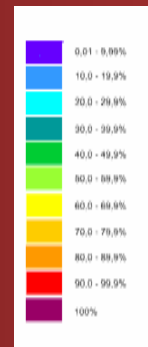
Sufferers experienced high fever and joint pain, headaches, muscle pain, rash and, less frequently, gastrointestinal symptoms, according to the European Centre for Disease Prevention and Control (ECDC).

Activities Most at Risk

Disease	Tourist activity with highest exposure concern
Dengue & Yellow fever	Urban activities
Malaria & West Nile Fever	Camping, Birdwatching, Horse riding, Fishing
Lyme Disease & Med. Spotted Fever	Camping, Hiking, Hunting

Adaptation Measures : Heatwaves

- Early warning system
 - Euroheat Project



Adaptation Measures : Heatwaves

- Early warning system
 - Euroheat Project
 - National Level
 - Tourism focused

Direcção-Geral da Saúde

www.dgs.pt



Ministério da Saúde

Direcção-Geral da Saúde

Circular Informativa

Assunto: Contingency Plan for Heat Waves

Nº: 25/DA

DATA: 13/08/07

Para: Recommendations for Tourists



Contacto na DGS: Environmental Health Department

Adaptation Measures : Heatwaves

- Early warning system
- Drink lots of water
 - No alcohol
 - No caffeine!
- Suitable cooling

ORIGINAL ARTICLES

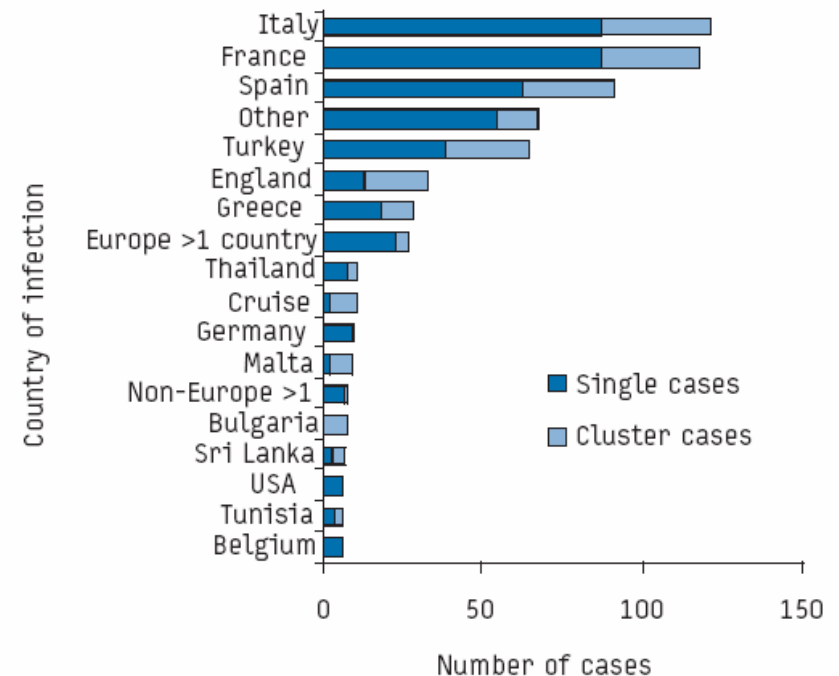
Euro roundup

TRAVEL ASSOCIATED LEGIONNAIRES' DISEASE IN EUROPE: 2003

K Ricketts, C Joseph on behalf of the European Working Group for Legionella Infections*

EURO SURVEILLANCE 2004 VOL. 9 Issue 10 - 12

Countries visited by more than 5 travel cases in 2003
by type of case



Adaptation Measures: Infectious Diseases

- Collaboration between health (human & veterinary) and tourism sectors
 - Monitoring and surveillance programs
 - Routine disinsection & quality control
 - Outreach programs to inform tourists of risks and how they can protect themselves
 - Air conditioned room = less mosquitoes
 - White trousers best for hiking = easier to see ticks
 - Cooked vs. raw/smoked foods
 - Vaccinations
 - Family pets can be infection sources

Take Home Message

Urgent need for integrated/collaborative work between the health and tourism sectors to ensure that proactive adaptation measures are put in place to reduce tourist vulnerability to climate change health impacts



Thank you

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