Traveling resistant bacteria…

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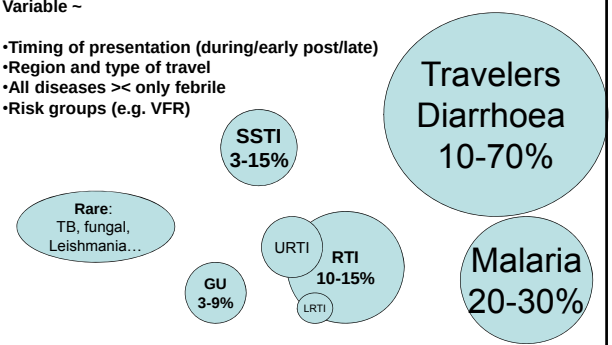
Traveling (resistant) bacteria…

- **Colonisation - carriership**
  - rectal flora, skin
- **Infection: mild-moderate**
  - Travelers' diarrhoea, SSTI, UTI
- **Infection: severe - life threatening**
  - Typhoid fever, pneumonia, VAP, bacteriemie,…

Infections after tropical travel

Variable ~

•Timing of presentation (during/early post/late)
•Region and type of travel
•All diseases >< only febrile
•Risk groups (e.g. VFR)



Wilson Curr Op Infect Dis 2007; Bottieau Ann Int Med 2006; Freedman NEJM 2006; Ansart J Trav Med 2005

AB use in travelers

- During travel
  - Standby treatment for TD
  - (standby treatment for SSTI, LRTI)
  - (chemoprophylaxis for TD)
- After travel
  - Empiric treatment for common (bacterial) infections
    - TD, LRTI, SSTI, typhoid fever

What is causing TD?

esp. in Central/South America

esp. South (East) Asia

TABLE 1. Common enteric pathogens isolated in cases of traveler's diarrhea

Enteric pathogen	% Isolation
Bacteria	50–80
Escherichia coli	
ETEC	20–50
EAEC	?
EIEC	5–15
Campylobacter jejuni	5–30
Salmonella spp.	5–25
Shigella spp.	5–15
Aeromonas spp.	0–10
Plesiomonas shigelloides	0–5
Vibrio spp.	5
Viruses	5–25
Norovirus	0–10
Rotavirus	0–10
Protozoa	<10
Giardia intestinalis	0–10
Entamoeba histolytica	0–10
Cryptosporidium parvum	1–5
Cyclospora cayetanensis	0–5
No pathogen isolated	10–50

Diemert, Clin Microbiol Rev 2006

Resistance in ETEC from TD

10 year trend (1998-2008):

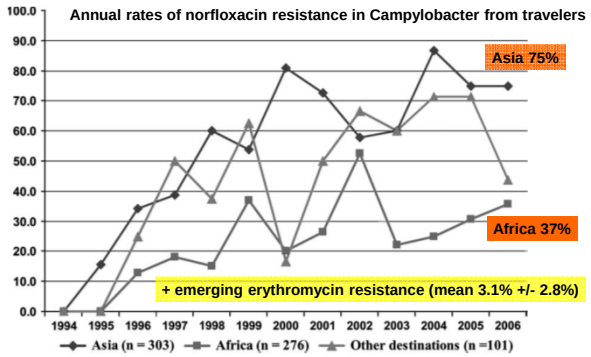
4-10 x increase of MIC90 for:
ceftriaxone, ciprofloxacin, levofloxacin, azithromycin

NOT (yet?) for rifaximin…

NAL	≥32	>1,024	71.1	>1,024	38.5
TET	≥16	256	52.5	256	59.2
DOX	≥16	128	48.5	64	51.9
T/S	≥8/152	64	58.9	128	46
CFO	≥32	0.5	6.2	0.25	4.8
RIF	≥32	32	19.6	32	15.5
CIP	≥4	256	27.8	64	17.5
LEV	≥8	8	40.8	8	20.1
AZM	≥8[a]	32	24.5	32	16.1

Ouyang-Latimer, AAC 2011

Resistance in *Campylobacter* spp. (travelers at ITM, Antwerp)



Asia 75%

Africa 37%

+ emerging erythromycin resistance (mean 3.1% +/- 2.8%)

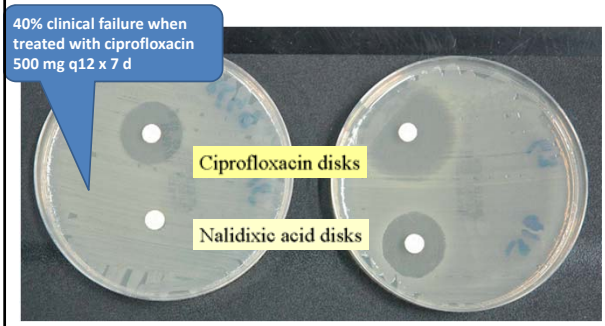
Vlieghe & Jacobs, J Trav Med 2008

Salmonella spp.

- 'Multi drug resistance' (R to ampicillin+ SMX-TMP + chloramphenicol)
  - Asia 25-90%
  - Africa 30-40%
- Fluoroquinolones
  - Asia: 50-90%
  - Africa: 5-15%
- ESBL and other cephalosporin resistance
- Emerging
  - Non-typhoid salmonella >> S. Typhi
  - – Azithromycin
  - – Carbapenemases

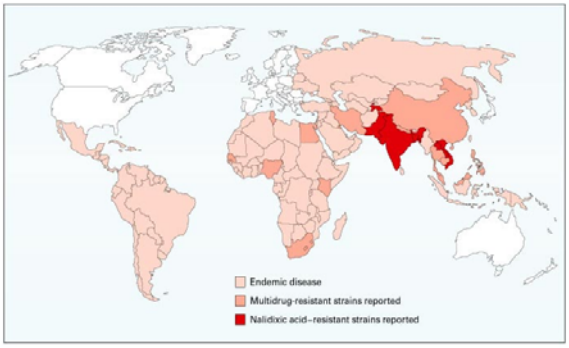
Nalidixic acid resistance predicts decreased ciprofloxacin susceptibility

40% clinical failure when treated with ciprofloxacin 500 mg q12 x 7 d



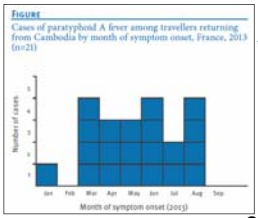
S. Typhi, nalidixin R *S. Typhi*, nalidixin S

Typhoid fever



Paratyphoid fever

France 2013, travelers returning from Cambodia

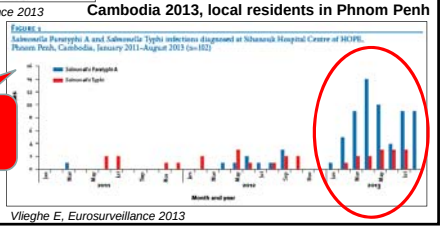


2003-2012: 7 cases in 10 year
2013: 35 cases in 6 months!!

Tourdjman M, Eurosurveillance 2013

Cambodia 2013, local residents in Phnom Penh

2007-2010: 2 cases
2011-2013: 71 cases



Vlieghe E, Eurosurveillance 2013

Shigella spp.

CTX-M-15-Producing *Shigella sonnei* Strain from a Czech Patient Who Traveled in Asia

Jaroslav Hrabák, Joanna Empel, Marek Gniadkowski, Zbynek Halbhuber, Karel Rébl and Pavla Urbásková
J. Clin. Microbiol. 2008, 46(6):2147. DOI:

Travel as risk factor for ESBL+ *E. coli* colonisation

2008: travel is an independent risk factor for infections with ESBL+ *E. coli* (Laupland, J Infect 2008)

Author	Country	Year	n travelers	% ESBL+ PRE T	% ESBL+ POST T
Tangdén	Sweden	2010	100	0%	24%
Tham	Sweden	2010	242 (TD)	?	24%
Peirano	Canada	2011	113	?	24%
Dhanji	UK	2011	1031	?	18%
Lausch	Denmark	2013	88	?	12.5%
Paltansing	Holland	2013	370	8.6%	30.5%
Ostholm-Balkhed	Sweden	2013	262	2.6%	30%

ESBL E. coli colonisation

- Mostly CTX-M group 1
  - High rates of co-resistance to FQ, AG,…
  - wide genetic variety
- RR↑ if…
  - travel > 2 w
  - diarrhoea
  - travel to India>> Asia > Africa

Duration of colonization

- **Health status**
  - Healthy travelers (Tangén AAC 2010, Paltansing EID 2013)
    - 7-24% > 6 m
  - Travelers diarrhoea (Tham, Scan J Infect Dis 2012)
    - 24% 3-8 m
    - 10% 3 y
- **Use of antibiotics during travel**

- **Resistance pattern**: ESBL < FQ, AG
- **Phylogenetic group** of E. coli

From colonisation to infection…

Asia travel is a risk factor for CA-ESBL+ UTI: OR 21 (4.5-97)

Soraas, Plos One 2013

Travel is a risk factor for severe sepsis after prostatic Bx: RR 2.7 (1.0-7.1)

Patel, BJU, 2011

From bad (ESBL) to worse (CPE)…

New Delhi Metallo-β-Lactamase from Traveler Returning to Canada[1]

Gisele Peirano, Jasmine Ahmed-Bentley, Neil Woodford, and Johann D. Pitout

NDM-1 travel track record…

If all goes wrong…

- Colonisation/infection with MDR pathogens in 'repatriates'…
  - KPC from Greece
  - NDM-1 from Egypt & India
  - PDR *Acinetobacter* from Iraq
  - VRE from US
  - …

- Mondial assistance France: **7%** of 'repatriates'

Lepelletier, J Trav Med 2011; Josseaume, J Trav Med 2012

MRSA

Switserland 2004: 58 patients with community-acquired MRSA
- **65% travelled abroad**

- **Sweden 2009: 444 imported MRSA cases**
- **Overall risk:**
  - **6 cases/10^6 travelers**
- **N Africa & Middle east:**
  - **60 cases/ 10^6 travelers**
- **Other high risk areas:**
  - **Oceania, East Asia, South America, s SAfrica, (UK, US)**

- **No info on underlying disease, hospitalisations, duration of stay,…**

Stenhem EID 2009; Tiemersma EID 2004

Conclusion (1)

- Traveling (especially to South(east) Asia) is an independent risk factor for colonisation/infection with MDR pathogens
- Use of antibiotics (FQ, macrolides) can have additional negative impact

Conclusions (2)

- Empiric choices for TD?
- Treatment treshold for TD?
- Quid immune compromised travelers?
- Screening/isolation for seriously ill travelers to risk areas?