

Travel Acquired Infections



Why should we care . . .

And what we should do.

A word on travel



CURIOSITY

SOME PLACES REMAIN UNKNOWN BECAUSE NO ONE HAS VENTURED FORTH.
OTHERS REMAIN SO BECAUSE NO ONE HAS EVER COME BACK.



Background

- 1 Billion international arrivals per annum
 - 503 M to Europe
 - 216 M to Asia/pacific
 - 100 M to North America
 - 56 M to rest of Americas
 - 105 M to Africa/middle east
- 4% growth per annum

Tourism direct contribution in selected economies*

| Countries | GDP(%) | Employment(%) |
|--------------------------|--------|---------------|
| Australia | 2.6 | 4.5 |
| Brazil | 3.6 | 6.2 |
| Canada | 1.9 | 3.6 |
| China | 4.2 | 2.3 |
| Germany | 3.2 | 4.7 |
| India | 2.8 | 4.6 |
| Indonesia | 2.5 | 3.5 |
| Japan | 1.9 | 2.9 |
| Republic of Korea | 1.5 | 2.0 |
| Saudi Arabia | 2.9 | 6.6 |
| South Africa | 3.0 | 4.3 |
| Spain | 6.4 | 5.1 |
| United Kingdom | 3.8 | 14.2 |
| United States of America | 2.7 | 3.7 |

*Source: UNWTO



Types of Tourism



And then . . .



But don't forget to ask about...



Even the honest ones:



OVER 150
PRETTY LADIES...
AND 2 UGLY ONES!

A hand-drawn sign with three horizontal panels. The top panel contains the text "OVER 150", the middle panel contains "PRETTY LADIES...", and the bottom panel contains "AND 2 UGLY ONES!". The sign is mounted on a metal pole. In the background, there is a green wall and a person wearing a white t-shirt with a colorful graphic.



Infectious Health Risks

- Diarrhoeal disease
- Respiratory tract disease
- Childhood infections
- Vaccine preventable
- Malaria
- Typhoid
- Hepatitis
- STIs/HIV
- Leishmania
- Arboviruses
- TB
- Rickettsia
- Anthrax
- Leptospirosis
- Plague
- MDROs



Other infectious travel health risks

- Tick borne encephalitis
- Yellow fever
- Japanese encephalitis
- Dengue and friends
- Meningitis
- Avian influenza
- Rabies
- Brucella
- Hemorrhagic fevers
- More . . .



Illness abroad

- Around 35-45% of travellers will experience illness
 - 25-35% confined to bed
 - 14-20% consult MD
 - 1% require hospitalization
- Diarrhea, RTI and Fever most common
- Death rare:
 - MVA
 - Drowning
 - Suicide
 - Underlying medical condition (MI, CVA . . .)
- Affected by age, type of travel, duration

Regarding our more adventurous travelers



BRAVERY

EVERY MAN DIES. BUT NOT EVERY MAN TRULY LIVES
ONLY TO DIE OF SHEER STUPIDITY.



Risk of Death

- People <55 yrs – double risk of dying
 - Motor vehicle accidents
 - Drowning
 - Homocide/Suicide . . .
- People aged >55
 - Cardiovascular accidents
- Mostly in people **RESIDENT** abroad

Table 1.1 Reported Deaths of U.S. Citizens Abroad by Cause of Death

| | |
|---------------------------|-----|
| Vehicle-related accidents | 569 |
| Homicide | 287 |
| Drowning | 213 |
| Other accidents | 207 |
| Suicide | 204 |
| Air accident | 74 |
| Drug-related | 60 |
| Natural disaster | 42 |
| Terrorist action | 51 |
| Train accident | 11 |
| Maritime accident | 10 |
| Under investigation | 1 |
| Unknown | 1 |

*From October 1, 2002 to December 31, 2004



Why we care

- Diarrhea
 - ETEC/EHEC
 - Salmonella
 - Viruses (norovirus, rotavirus)
 - Parasites (giardia . . .)
- RTI
 - Influenza
 - S. Pneumo
 - TB
- STD
 - Gonorrhoea/chlamydia
 - Syphilis
 - HIV



Why we care

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 - TB
- STD
 - Gonorrhoea/chlamydia
 - Syphilis
 - HIV
- Other
 - MDR Organisms

Red indicates illnesses with IC implications



Also

- MDR organisms:
 - Carbapenemases
 - Acinetobacter
 - S. pneumoniae
 - S. typhi
 - Tuberculosis
 - Gonorrhoea
 - Malaria
 - Hemorrhagic fever

Organisms in red will be discussed extensively



PLANNING

ALWAYS BE A STEP HIGHER THAN OTHERS





But first: MDR threats without IC implications

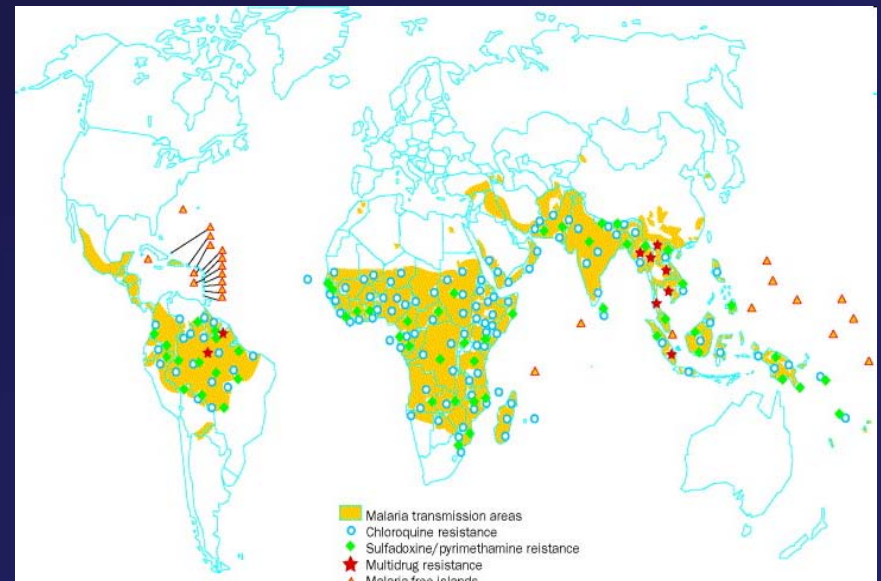
- Malaria
- Typhoid
- *Gonococcus*

MDR Malaria

- No IC implications
- 500 000 deaths /yr
- Mostly children
- Hard to test
- Combination therapy
- R to ACT present
- Poor quality
- Partial therapy

Table 1. Dates of introduction and first reports of antimalarial drug resistance

| Antimalarial drug | Introduced | First reported resistance | Difference (years) | Refs |
|---------------------------|------------|---------------------------|--------------------|------|
| Quinine | 1632 | 1910 | 278 | 2 |
| Chloroquine | 1945 | 1957 | 12 | 3 |
| Proguanil | 1948 | 1949 | 1 | 2,4 |
| Sulfadoxine-pyrimethamine | 1967 | 1967 | 0 | 2,4 |
| Mefloquine | 1977 | 1982 | 5 | 5 |
| Atovaquone | 1996 | 1996 | 0 | 6 |



MDR typhoid / paratyphoid

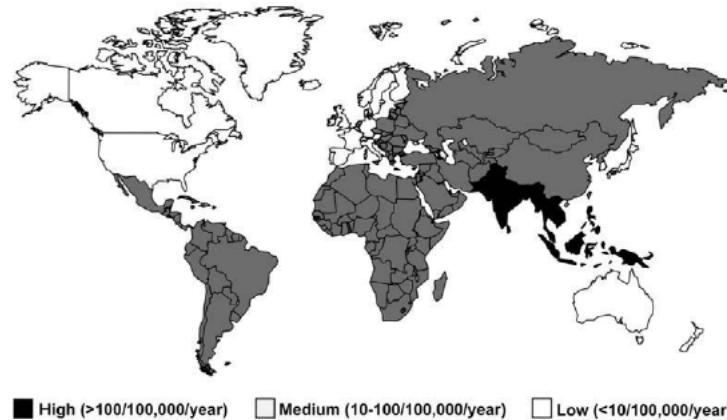
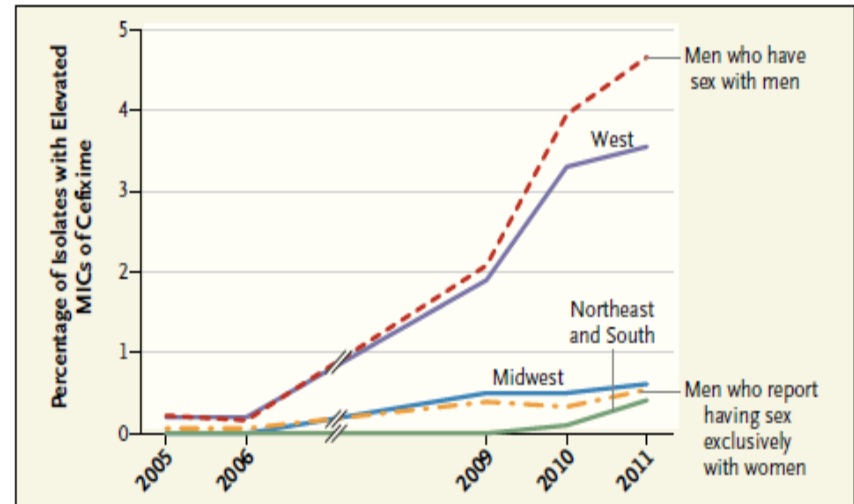


Figure 1. Geographic distribution of enteric fever. Values are no. of cases per 100,000 population per year. From [2]. (Permission was granted by the World Health Organization for reproduction in this journal.)

- Most common:
 - Travellers to Indian Subcontinent 45-50%
 - Travellers Visiting Friends and Relatives (VFRs) 40%
- Vaccine available
- MDR *S. typhi* 0→35% (1965-1997)
- MDR *S. paratyphi* 9 → 25% (1999-2000)
- New quinolone resistance
- No IC implications,
- public health for food handlers

MDR Gonorrhoea

- 1940s R to sulfonamide
- 1980s R to tetracycline
- 1997 R to quinolones
- 2012 increasing R to 3rd Gen cephalosporins
- 1 class for Rx



Percentage of Isolates in Which Minimal Inhibitory Concentrations (MICs) of Cefixime Were 0.25 µg per Milliliter or Higher, 2005–2011.

Susceptibility to cefixime was not tested in 2007 or 2008. From the Gonococcal Isolate Surveillance Project.

n engl j med 366;6



Infection control concerns

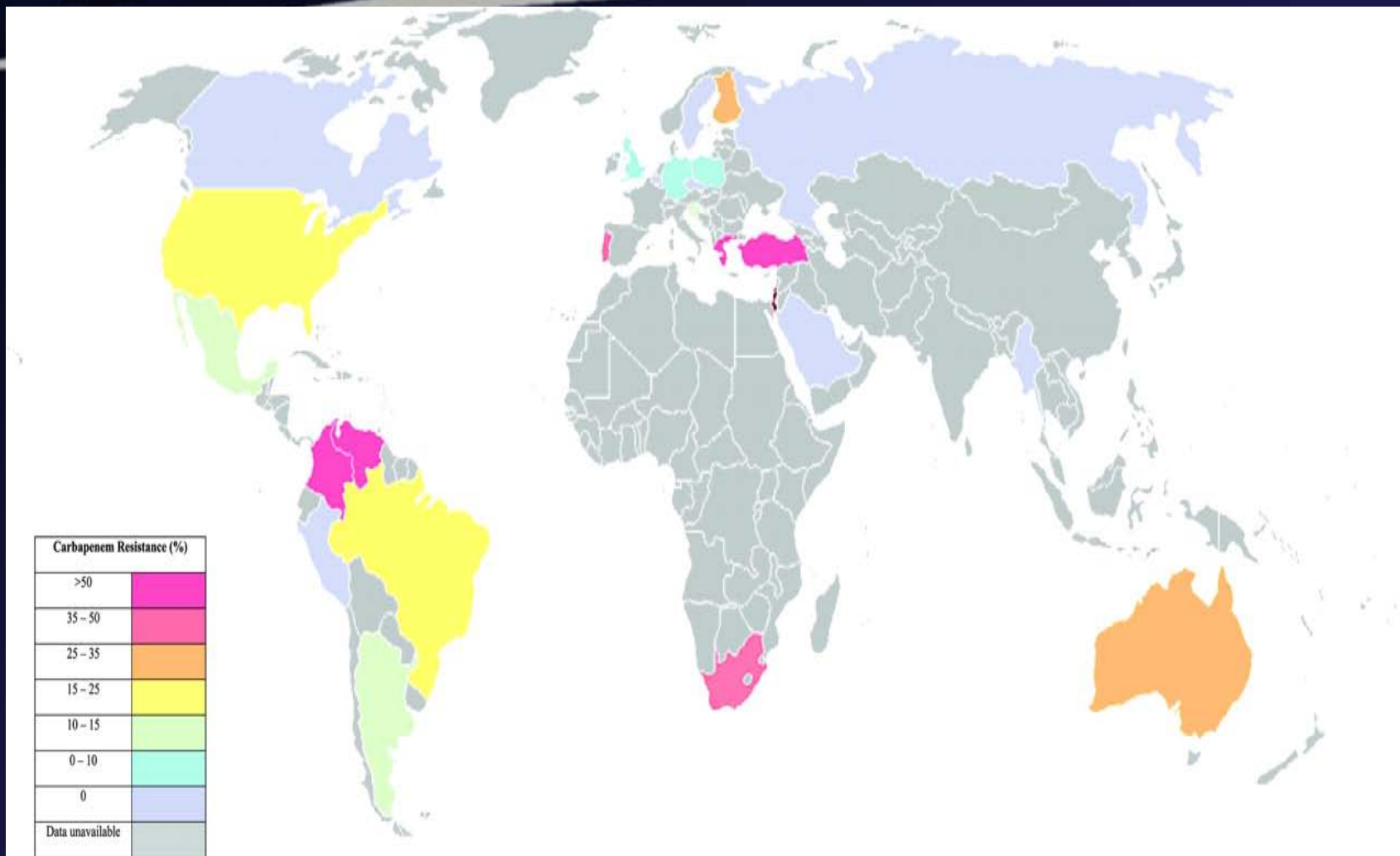
- Acinetobacter
- Carbapenemases
- Tuberculosis
- Hemorrhagic fever



MDR Acinetobacter

- Global attention during Gulf War II
- Multiple infections from injured soldiers
- Traced to field hospitals in Iraq
- Found in intermediate hospital Germany
- Resistant to most antibiotics
- Resulting infections:
 - Ventilator associated pneumonia
 - Complicated skin and soft tissue infections (wounds)
 - Urinary tract infections
 - Bacteremia

Acinetobacter isolates resistant to carbapenems

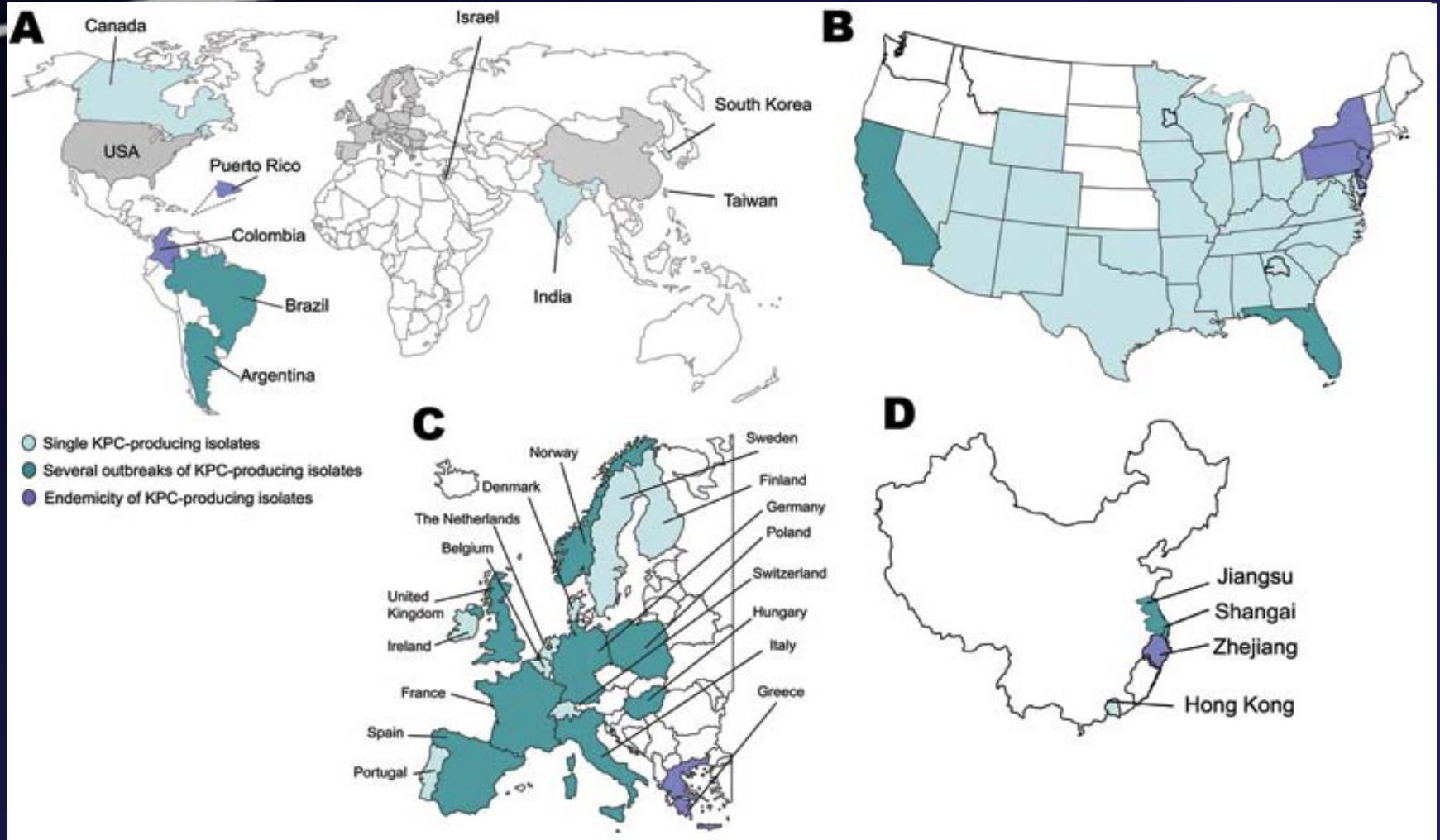


Carbapenemases (credit to M. Mulvey)

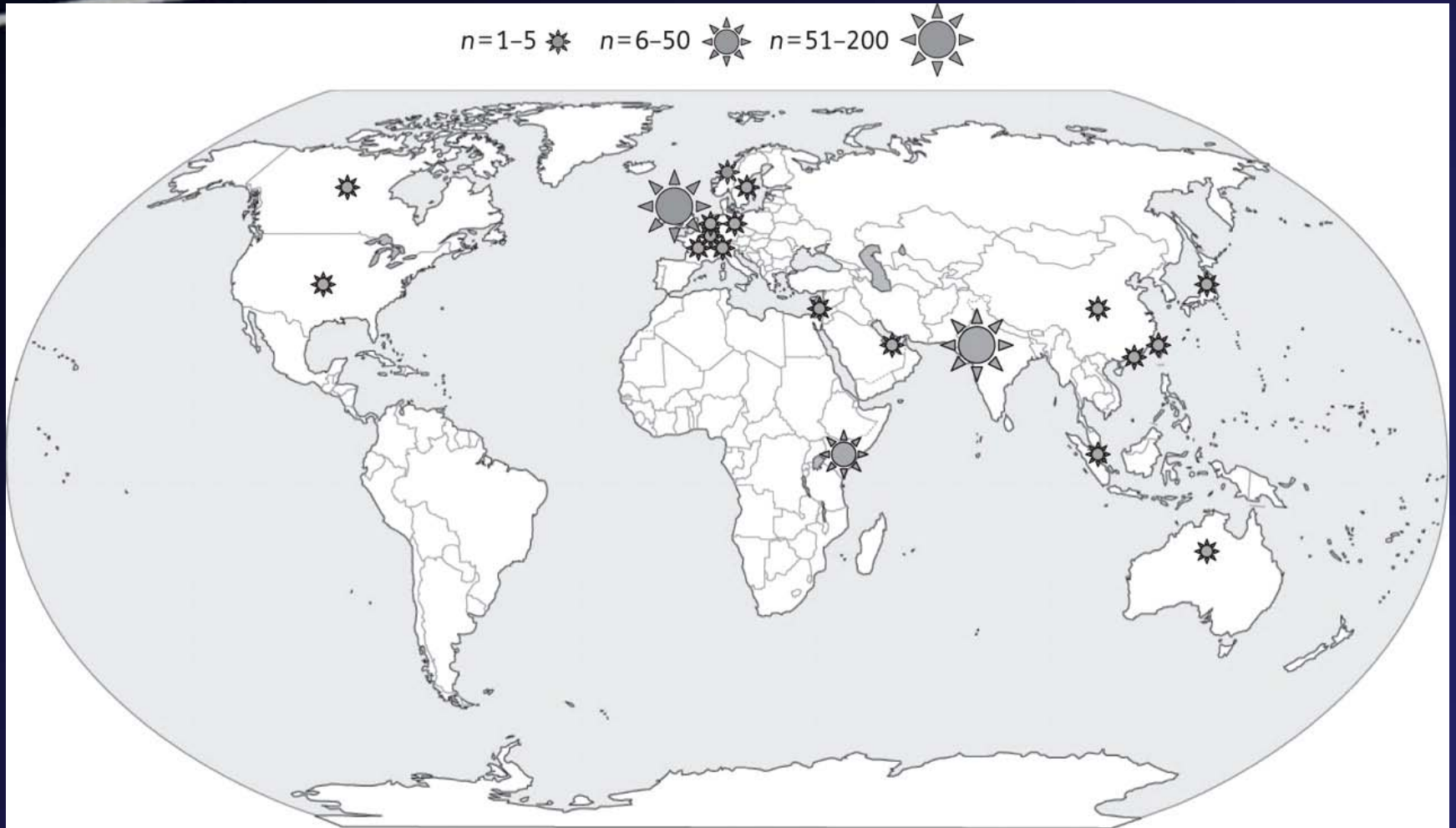
- Multiple different "flavours"
 - NDM-1 → Indian subcontinent
 - KPC → eastern USA, Israel, Greece
 - OXA-48 → Mediterranean, Europe
- Laboratory detection difficult
- Treatment not clear, can be pan-resistant
- Outbreaks can occur "under the radar"



Global Spread of KPCs



Global spread of NDM-1



NDM-1 as a part of the environment



Lancet 11(May 2011)

Screening for MDR GNRs -recommendations



INDECISION

THE MARK OF THE LEADER IS THE ABILITY TO MAKE DECISIONS.
THE MARK OF THE SURVIVOR IS KNOWING WHEN NOT TO.



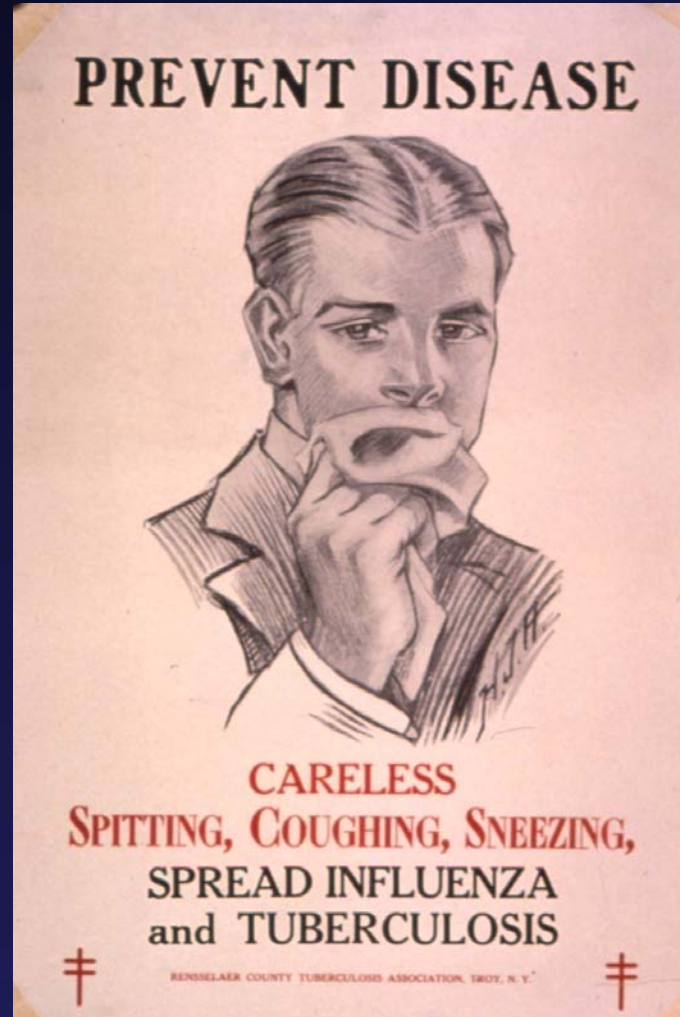
Screening for MDR-GNRs - VCH policy

- Anybody admitted to a foreign hospital (6 months)
- Anybody at the discretion of IC
- Screen peri-rectal, wounds, (urine, sputum)*
- [Would also be screened for MRSA, VRE]
- Ventilated patients on droplet[‡] & contact until neg
- Non-ventilated on contact until neg
- Isolation cleans
- Limit movement as much as possible

- ?Can we ever remove flag

*= if instrumented, ‡= at VGH airborne for administrative reasons

Plus ça change . . .

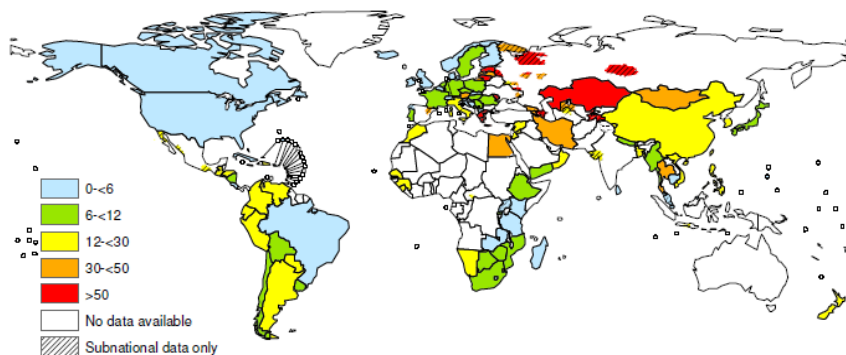


Public Health Poster from the 1920s

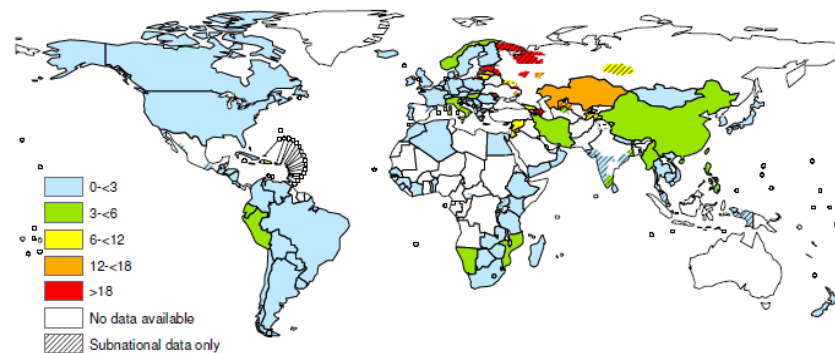
MDR TB

- 440 000 new cases of multidrug-resistant tuberculosis (MDR-TB) emerge annually, causing at least 150 000 deaths (WHO data)

Proportions of MDR among previously treated TB cases, 1994-2010

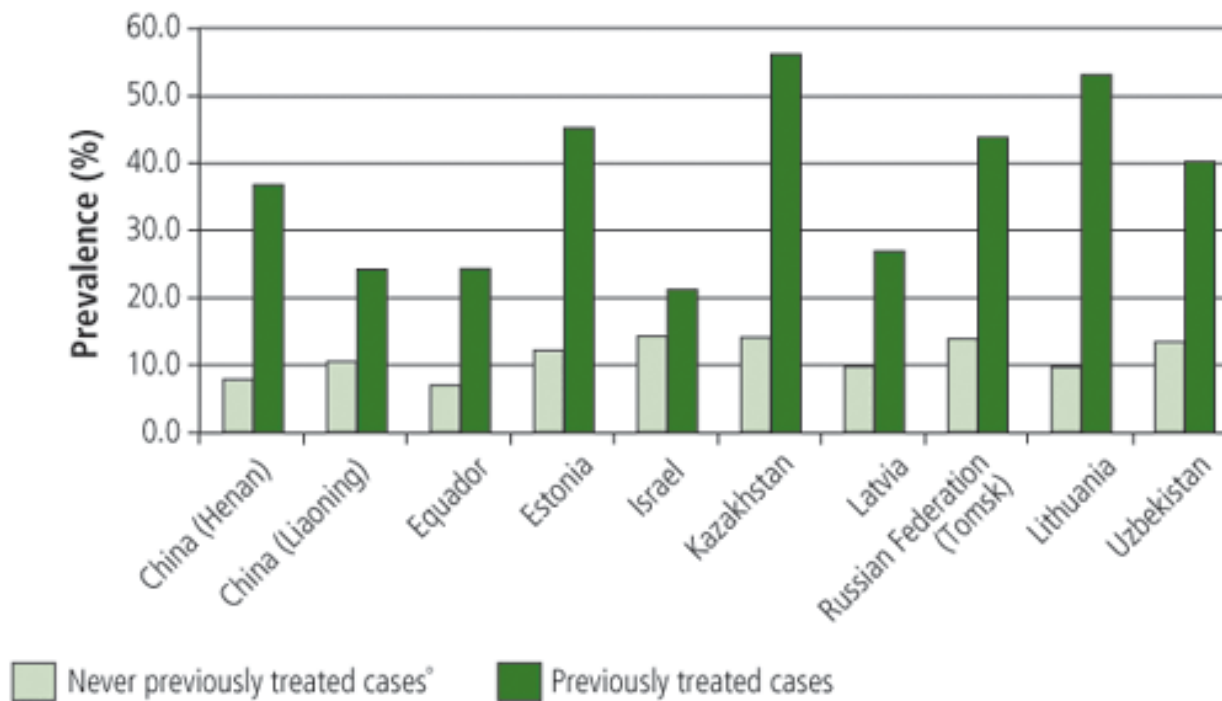


Proportions of MDR among new TB cases, 1994-2010



The New Challenge

Fig. 1. Prevalence of multidrug-resistant tuberculosis (MDR-TB) in the ten countries or areas where it is most prevalent



Source: <http://www.who.int/bulletin/volumes/85/5/06-035345/en/index.html>

XDR TB

Countries that had reported at least one XDR-TB case by end 2010



Mortality of ~40%

| | | | | | | |
|--------------|----------------|------------------------|------------|-------------------|---------------------|--------------------------|
| Argentina | Bhutan | France | Kazakhstan | Nepal | Republic of Moldova | Togo |
| Armenia | Cambodia | Georgia | Kenya | Netherlands | Romania | Tunisia |
| Australia | Canada | Germany | Kyrgyzstan | Norway | Russian Federation | Ukraine |
| Austria | Chile | Greece | Latvia | Pakistan | Slovenia | United Arab Emirates |
| Azerbaijan | China | India | Lesotho | Peru | South Africa | United Kingdom |
| Bangladesh | Colombia | Iran (Islamic Rep. of) | Lithuania | Philippines | Spain | United States of America |
| Belgium | Czech Republic | Ireland | Mexico | Poland | Swaziland | Uzbekistan |
| Botswana | Ecuador | Israel | Mozambique | Portugal | Sweden | Viet Nam |
| Brazil | Egypt | Italy | Myanmar | Qatar | Tajikistan | |
| Burkina Faso | Estonia | Japan | Namibia | Republic of Korea | Thailand | |

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement. © WHO 2011. All rights reserved



PROBLEMS

NO MATTER HOW GREAT AND DESTRUCTIVE YOUR PROBLEMS MAY SEEM NOW,
REMEMBER, YOU'VE PROBABLY ONLY SEEN THE TIP OF THEM.

www.despair.com



Recognizing resistant TB

- Bottom line: Lab testing -- >6 wks*
- Risk factors:
 - Travel to area with high risk
 - Contact with somebody with known MDR-TB
 - Previous treatment (especially non-standard)
- Increases need to isolate immediately!
- Remain aware of world epidemiology

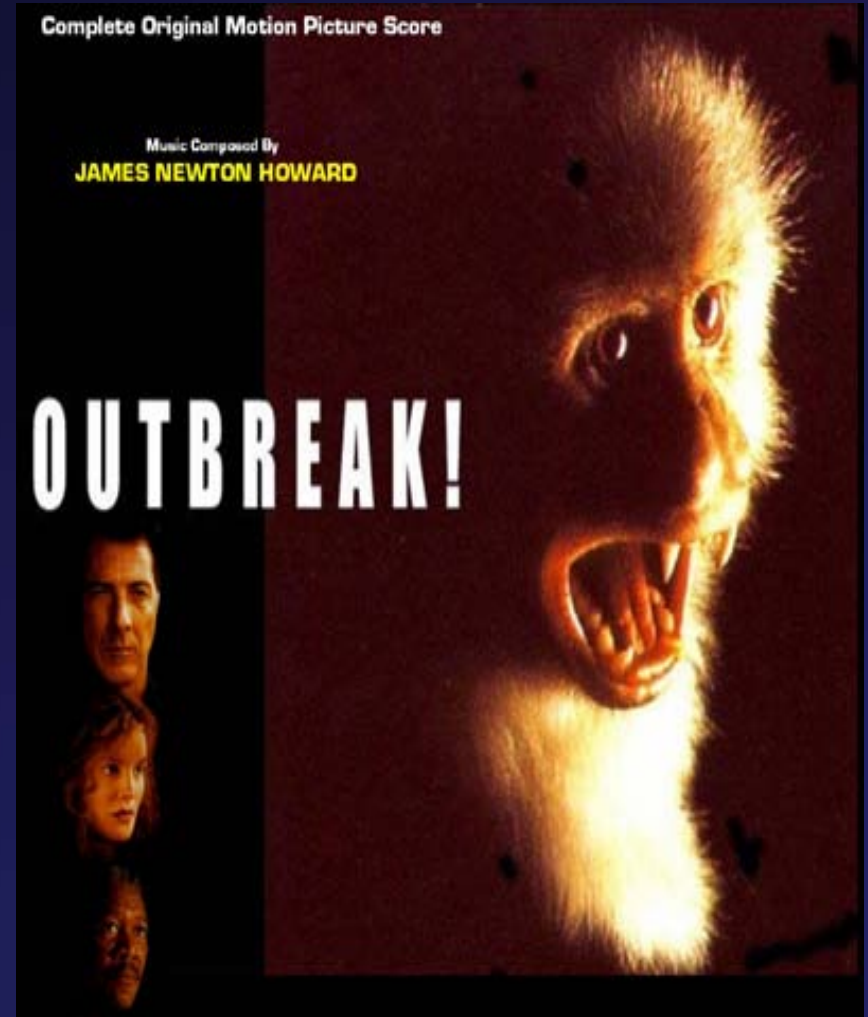
* = newer technologies may improve this

Africa's most wanted



Hemorrhagic fevers (viral)

- Multiple flavours
- Arboviruses:
 - Dengue
 - Yellow Fever
 - CCHF
 - RVF
- Vectors (not arthropods)
 - Hantavirus (and similar)
- Non-vector borne
 - Ebola
 - Marburg
 - Lassa



The most feared ...



ANATIDAEPHOBIA

The fear that somewhere, somehow, a duck is watching you.

IC approach

Immediately:

- Airborne, contact, droplet
- Secured room
- Record HCP who enter
- Notify PH

Later:

- Identify risk factors
- Identify likely diagnosis
- Confirm diagnosis
- Assess IC measures based on diagnosis



Differences in IC Here vs. There

Here

- Full level 3 garb
- N95 mask
- Visor
- Or PAPR



There

- Head covering
- goggles
- Re-usable mask
- Gloves
- Rubber boots
- Rubber Apron
- Surgical gown



Actual isolation based on diagnosis

| Dengue, Yellow Fever | Lassa, CCHF, RVF, Hantavirus | Ebola, Marburg |
|--|---|---|
| None required, care with needles and specimens for lab | Contact, droplet, avoid needle sticks, clinical specimens to be handled in hood | Contact, droplet, double gloves, leg/shoe coverings, impermeable gowns, avoid needle sticks, clinical specimens to be handled in hood |

Do you think she'll get bird flu?

- Not going to talk about Influenza . . .
- Worth a couple of hours on its own
- Isolate anybody with respiratory symptoms . . .
- Assume the worst



What are your priorities?



PRIORITIES

HUNDREDS OF YEARS FROM NOW, IT WILL NOT MATTER WHAT MY BANK ACCOUNT WAS, THE SORT OF HOUSE I LIVED IN, OR THE KIND OF CAR I DROVE... BUT THE WORLD MAY BE DIFFERENT BECAUSE I DID SOMETHING SO BAFFLINGLY CRAZY THAT MY RUINS BECOME A TOURIST ATTRACTION.



Priorities

- Identify what is LIKELY
- Identify what would have a high IMPACT
- Involve your FRONT LINE
- Pay attention to THE WORLD:
 - ProMED mail
 - Gideon
 - Other services.

Questions

I will not ask dumb questions
I will not ask dumb questions
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