

Guidelines for surveillance of drug resistance in tuberculosis

5th Edition



Global burden of drug resistant TB

Philippe Glaziou
September 2018



Global DR surveillance principles

1. **Representativeness** of tested pulmonary cases with bact confirmation
2. Disaggregation by **treatment history**
3. **Quality assurance** of drug susceptibility testing

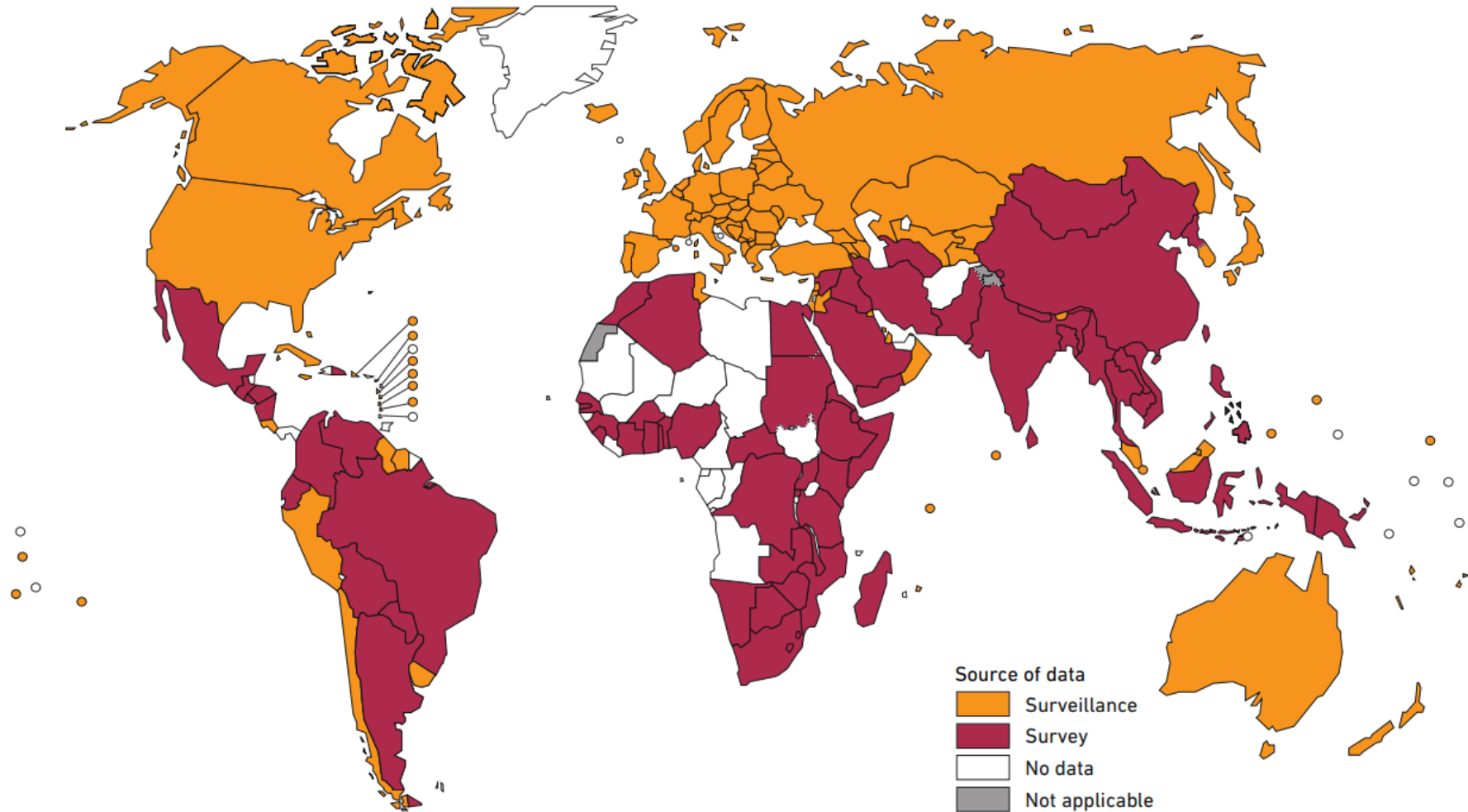
DR data sources

Surveys

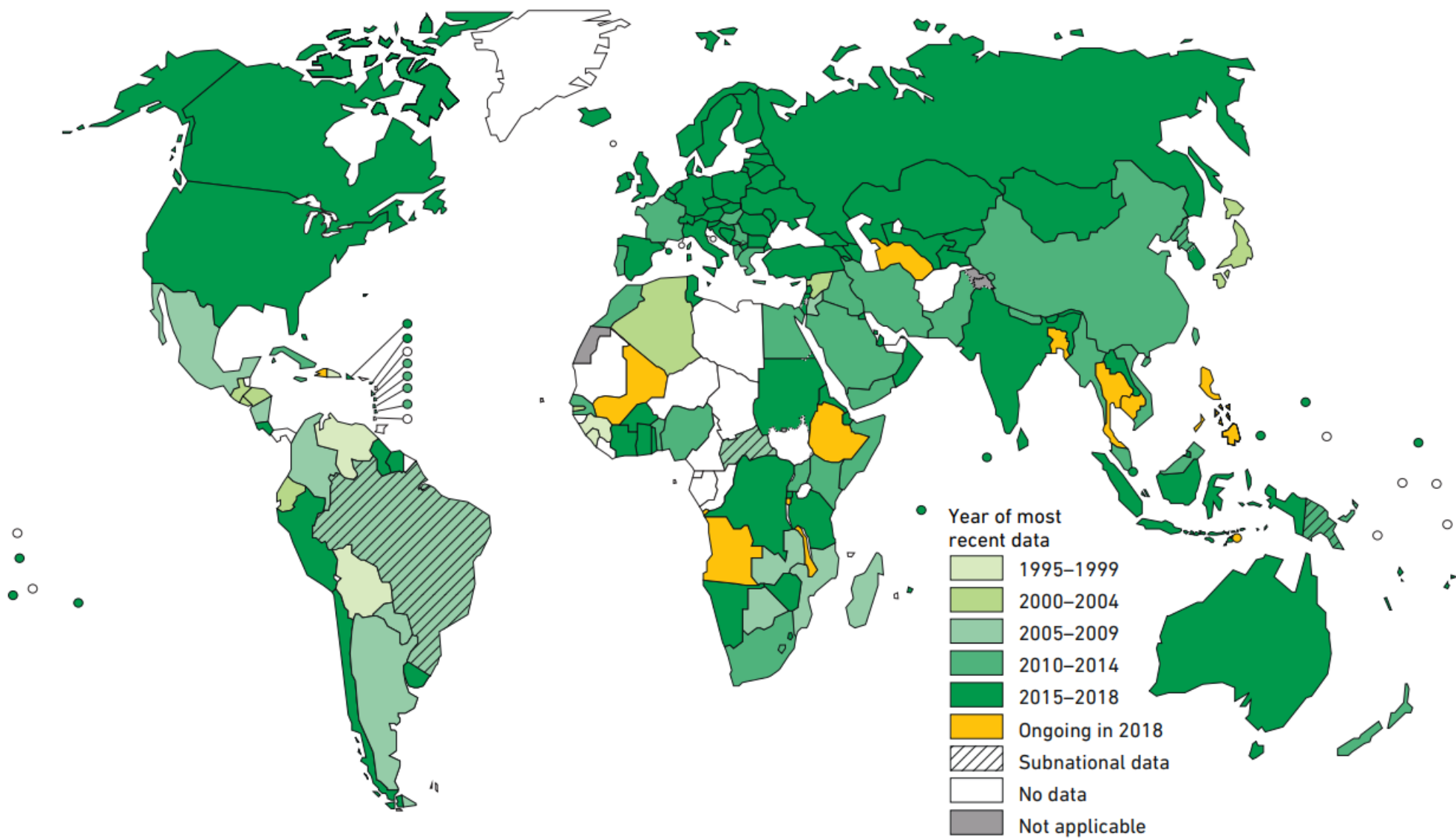
- cluster sampling
- account for design effects on estimates
- MI of missing data

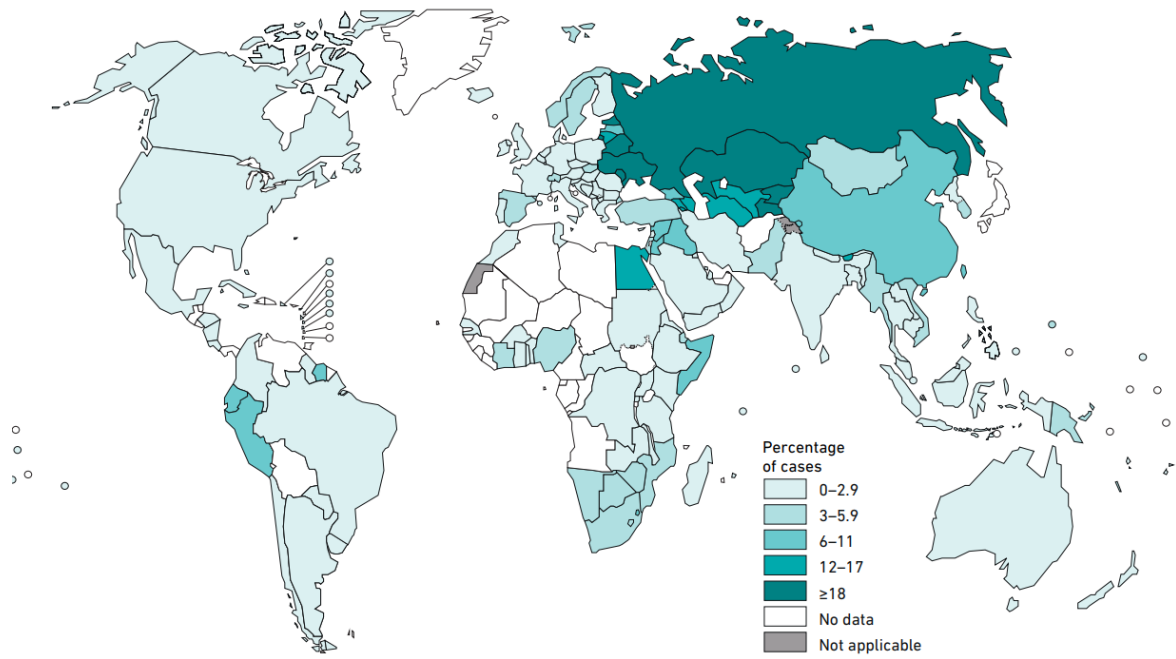
Surveillance

testing coverage $\geq 80\%$
of notified B+ cases



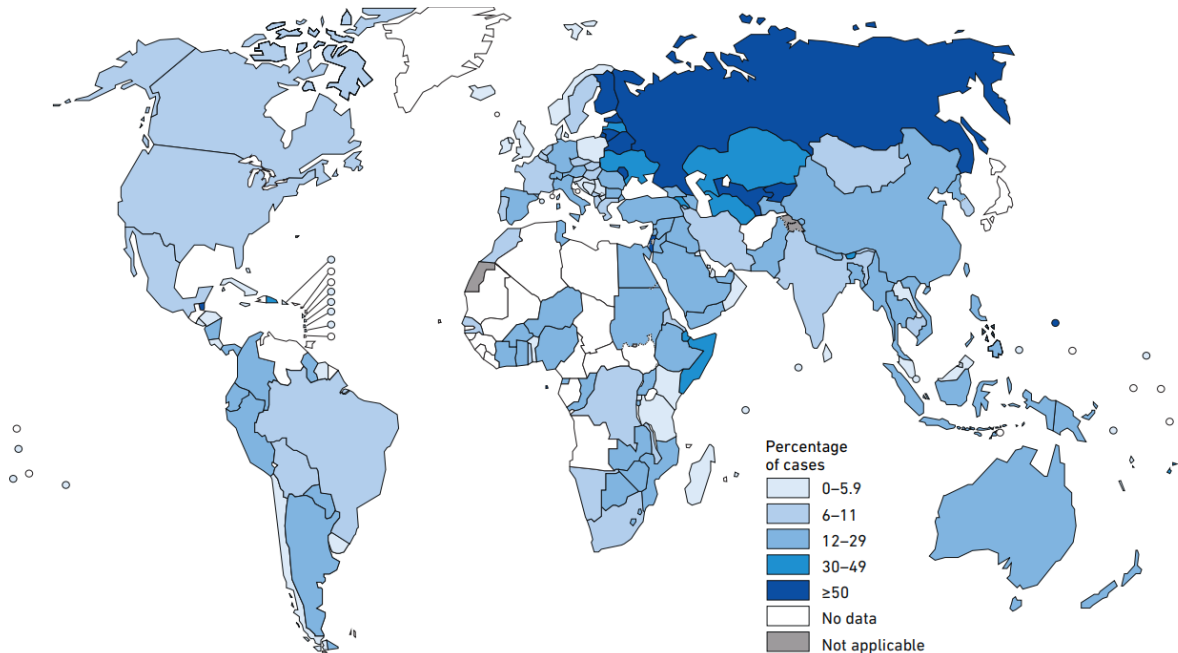
Coverage





**RR-TB in new cases
(2017)**

3.5 (2.5 - 4.7)%



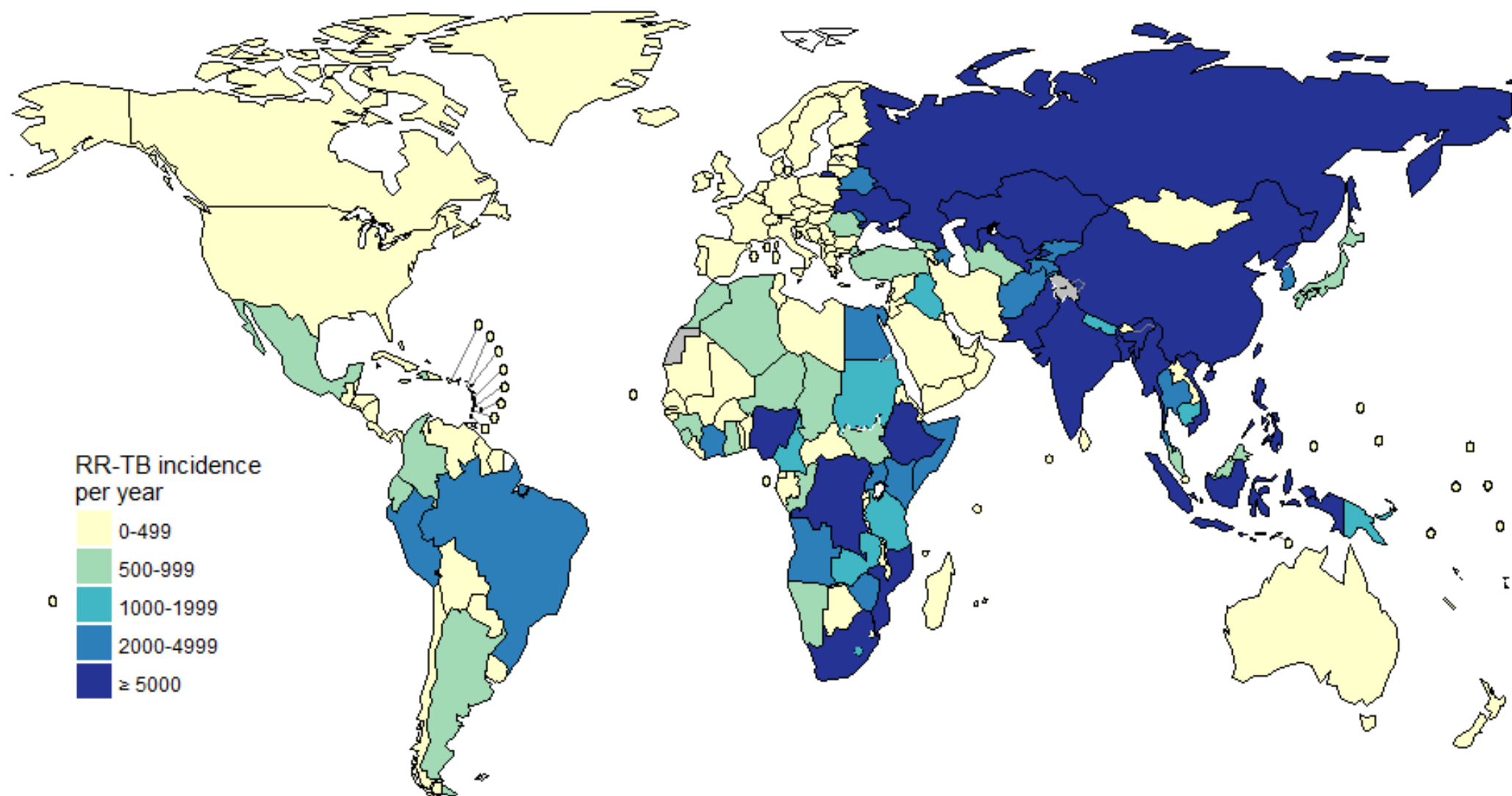
**RR-TB in retreatment
cases (2017)**

18 (6.3 - 34)%

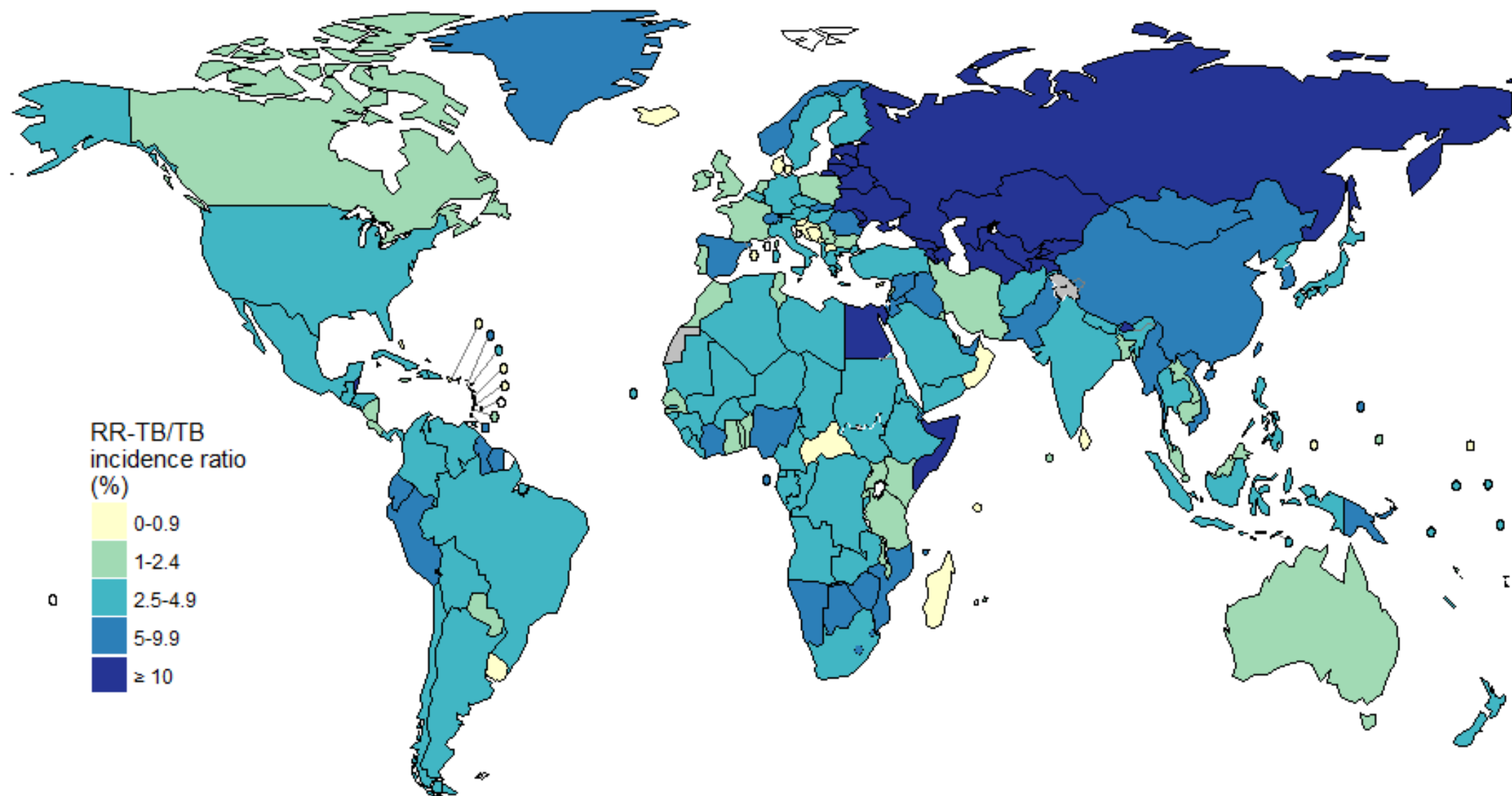
MDR/RR-TB incidence

$$I_{rr} = I \left[\overset{\text{Overall incidence}}{(1 - f)} \overset{\text{do not fail nor default}}{p_n} \left(\overset{\text{Risk of RR}}{(1 - r)} + \overset{\text{higher risk of RR in relapses}}{r\rho} \right) + \overset{\text{failures \& default}}{f} \overset{\text{Risk of RR}}{p_r} \right]$$

RR-TB incidence (2017)



RR-TB / TB incidence ratio



Other key findings

- No strong evidence of increasing global MDR among TB in the past 10 years
- 82% of RR with MDR
- XDR: 113 countries with nationally representative data
- **8.5%** (6.2 – 11%) XDR among MDR
- No strong evidence of increasing global XDR among MDR

RR-TB care cascade

Incident RR-TB

```
graph TD; A[Incident RR-TB] --> B[29% detected and reported]; B --> C[87% treated]; C --> D[55% cured];
```

The diagram illustrates the RR-TB care cascade as a vertical flowchart. It begins with a wide blue bar at the top labeled 'Incident RR-TB'. A downward arrow leads to a box labeled '29% detected and reported'. Another downward arrow leads to a box labeled '87% treated'. A final downward arrow leads to a box labeled '55% cured'. A horizontal red dotted line is positioned below the final box.

29% detected and reported

87% treated

55% cured

Selected modelling questions, in random order

- Why are RR-TB strains not taking over despite decades of pop exposure to rif?
- Where is the global RR-TB epidemic headed?
- Impact of containment and treatment?
- Dynamics of primary vs acquired RR-TB?
- Heterogeneity in effective contact rate: super spreaders? Risk factors?