

The role of TB prevention in countries and regions targeting pre-elimination

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Low-incidence

< 100 TB cases (all forms) per 1 million population and year

“Pre-elimination”

< 10 notified TB cases (all forms) per million population and year

TB prevention activities

Vaccination

- BCG
- New vaccine?

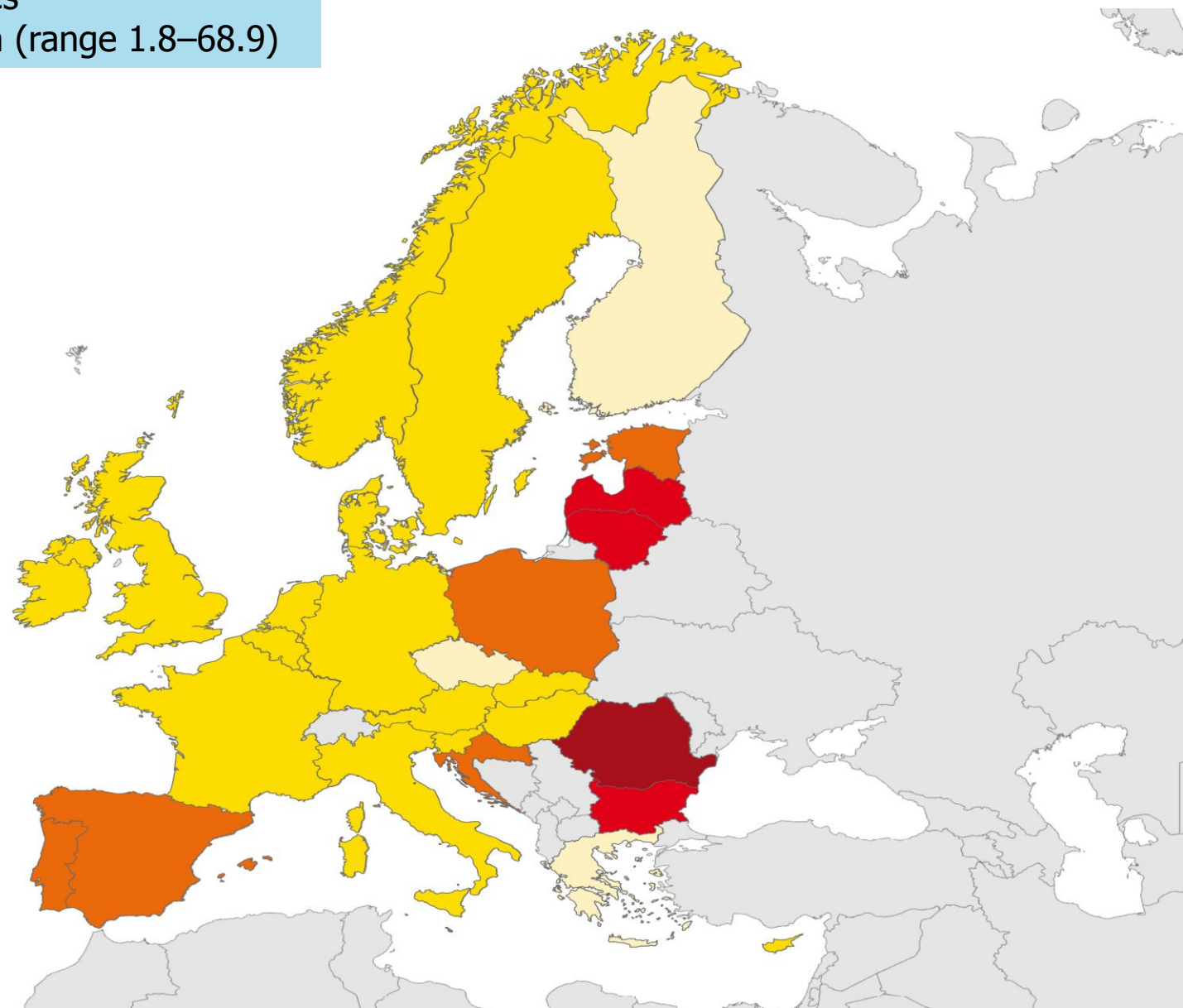
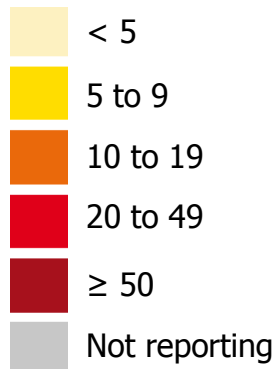
Screening

- Active TB
- Latent TB infection





TB notifications, EU/EEA, 2016

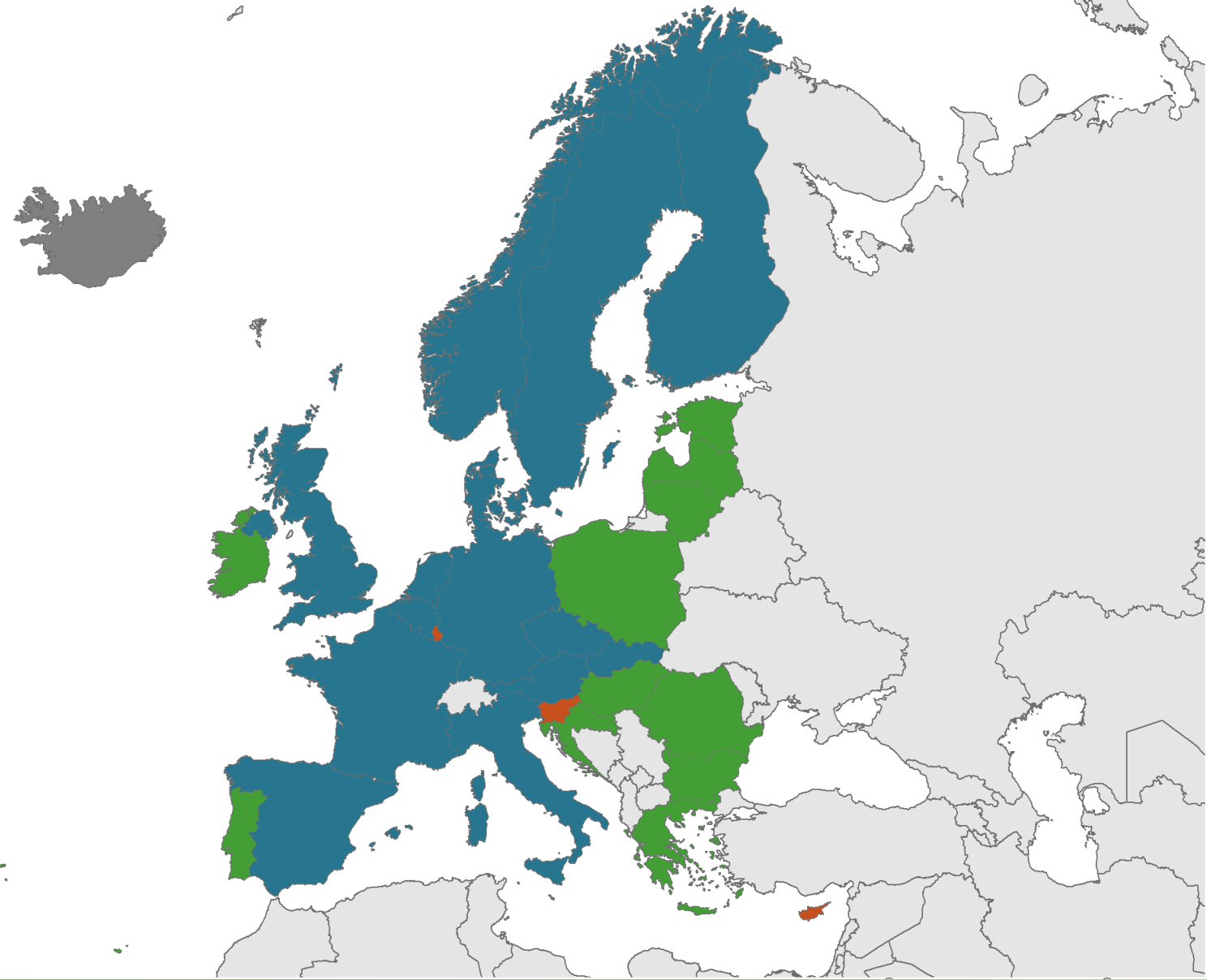
58 994 TB cases notified in 30 EU/EEA countries
Notification rate of **11.4** per 100 000 population (range 1.8–68.9)

Cases per
100 000 population



BCG vaccination policy in European Union and European Economic Area countries, 2017

-  Risk group vaccination
-  Unknown
-  Universal vaccination
-  No vaccination



BCG vaccination

Targeted risk groups:

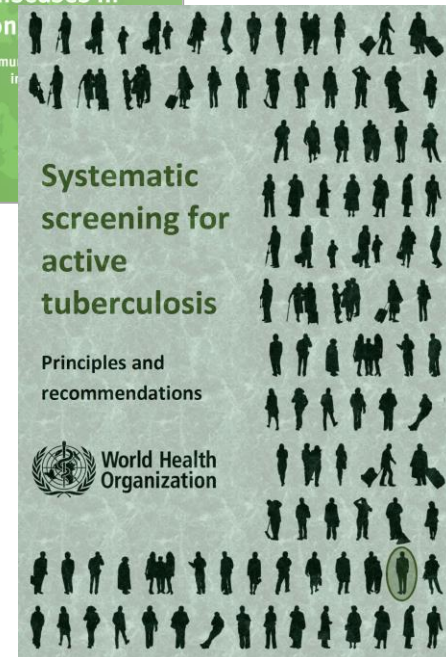
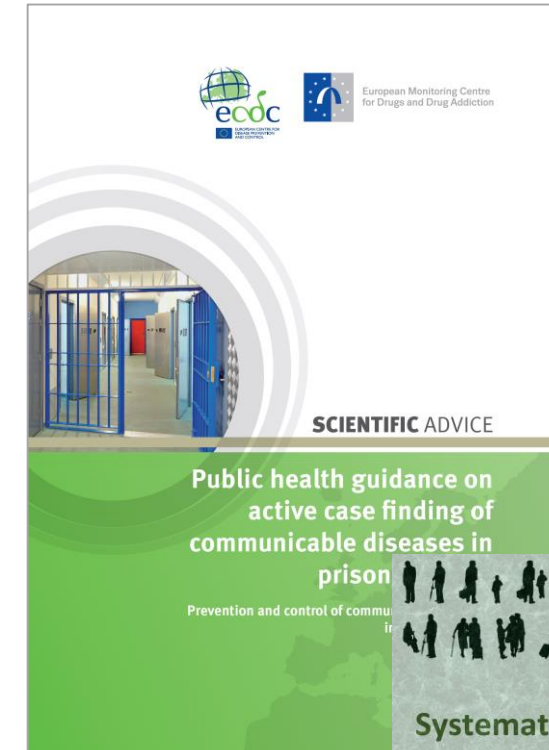
- Children from high risk groups
 - family history of TB
 - from a high TB incidence country
- Health care workers

Challenges:

- Reaching target groups for BCG vaccination
- Coverage

Screening for active TB

- Household contacts of TB patients
- People living with HIV
- Current and former workers in workplaces with silica exposure
- People with an untreated fibrotic chest X-ray lesion
- Prisoners
- Migrants
- Other subpopulations that have very poor access to health care



Screening for latent TB infection

- people living with HIV
- immunocompromised persons
- patients with silicosis
- people with fibrotic lesions
- contacts of confirmed TB cases, based on a risk assessment of their exposure

Additional at-risk groups may be considered depending on the TB epidemiology in specific Member States.

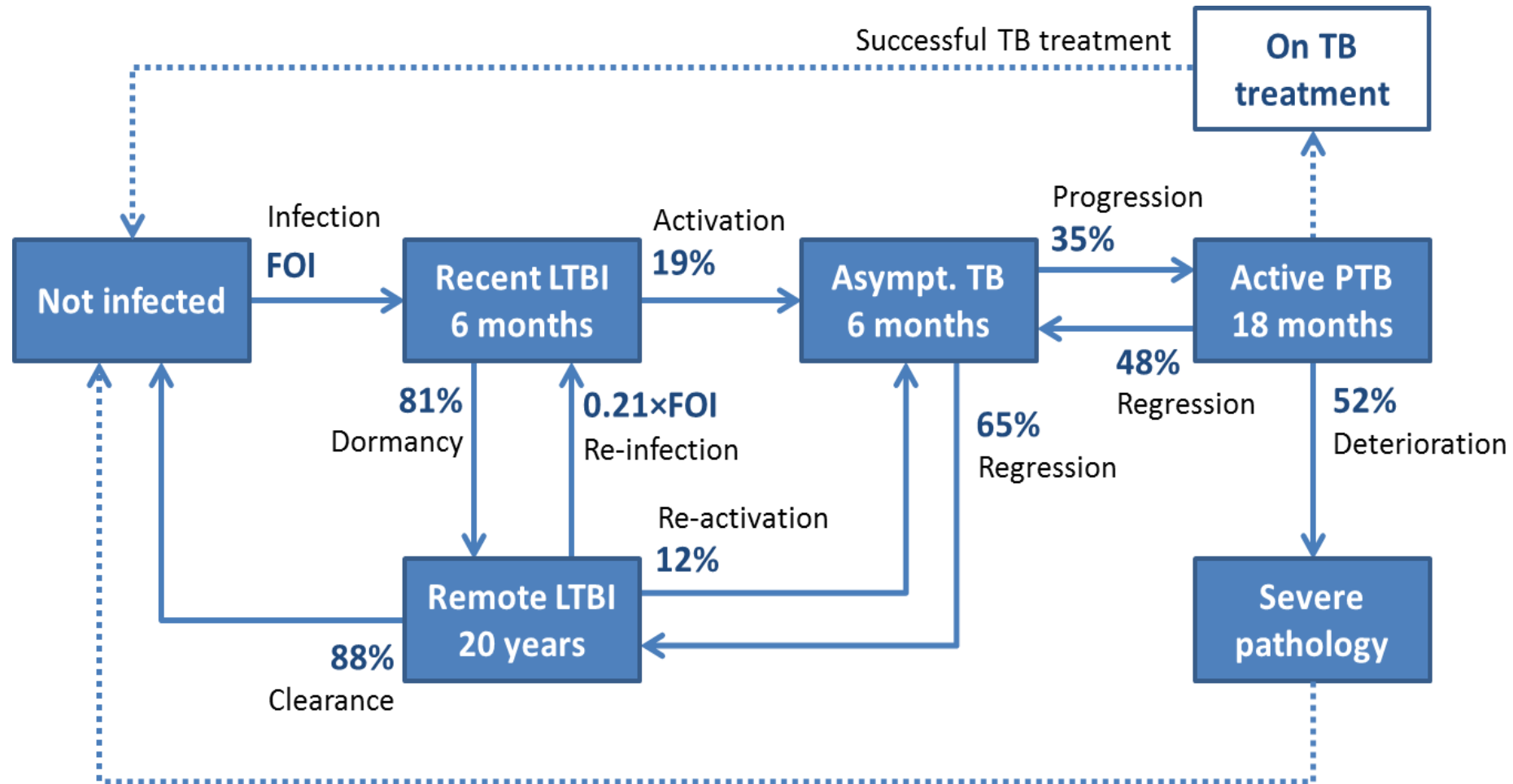
Mathematical modelling

Objective

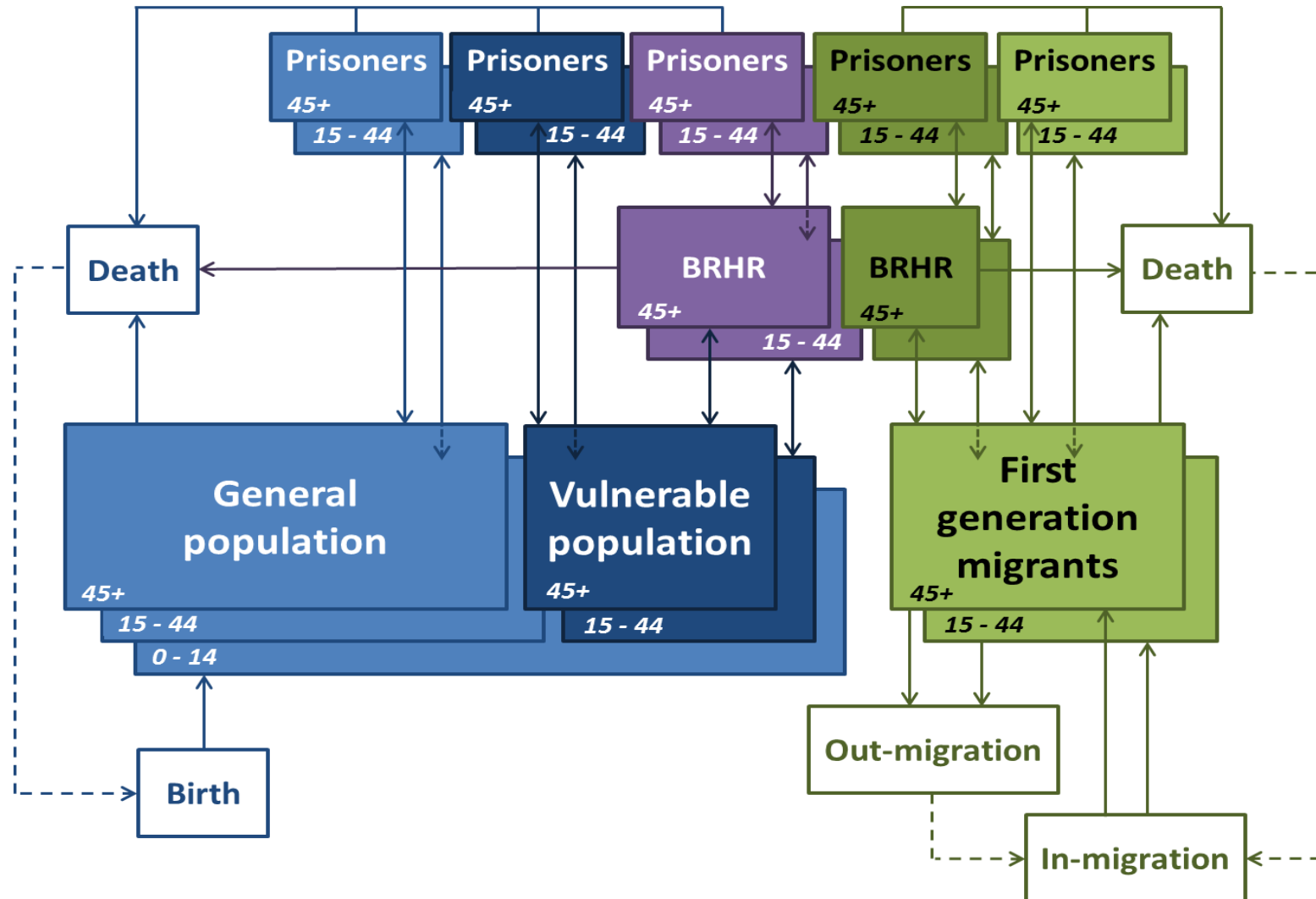
To estimate the potential of various LTBI control strategies to

1. reduce transmission
2. eliminate TB in Europe

Schematic overview of the model for natural history of tuberculosis (TB) infection and disease

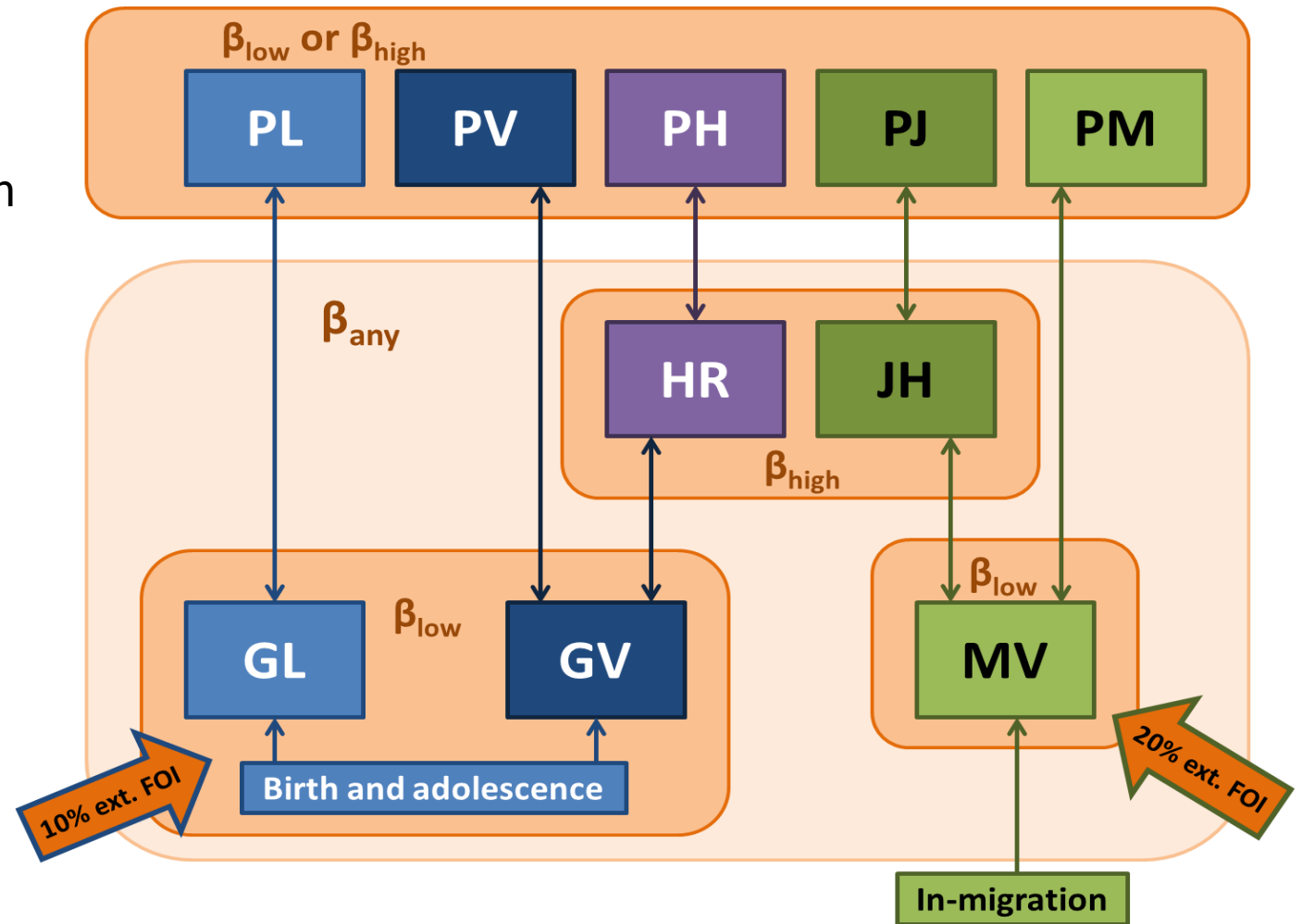


Schematic overview of the population groups included in the TB transmission model



Schematic representation of transmission between groups

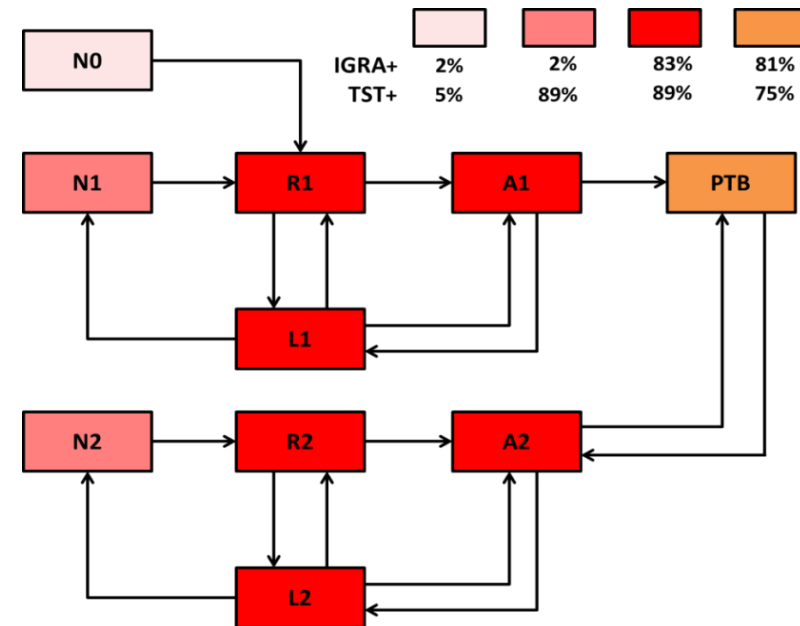
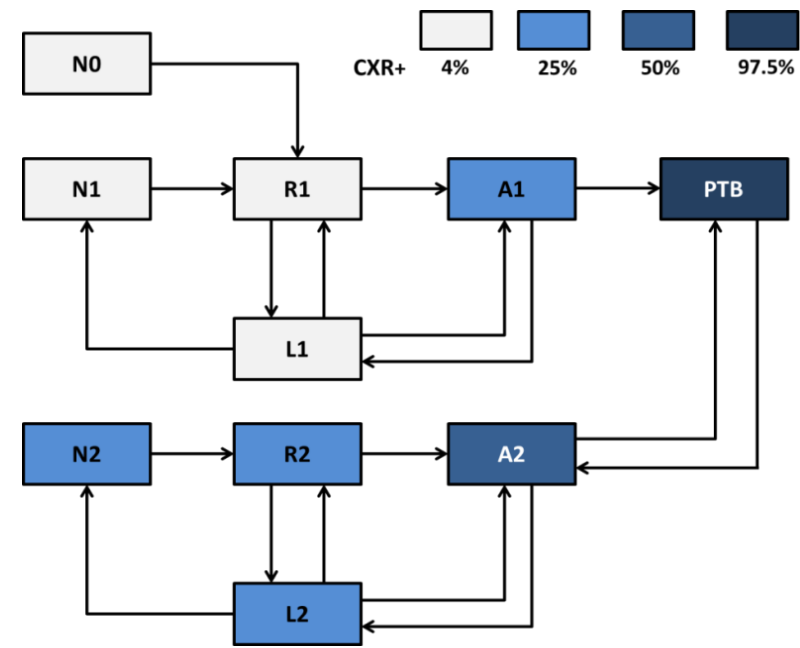
- GL** general native population low-risk
- GV** general native population vulnerable
- HR** BRHR from the general native population
- MV** migrant vulnerable
- JH** BRHR from the migrant population
- PL** prisoner from GL
- PV** prisoner from GV
- PH** prisoner from HR
- PM** prisoner from MV
- PJ** prisoner from JH



Probability to test positive with CXR and IGRA/TST for individuals with different history of TB infection

N: not infected
 R: recent LTBI
 L: late (remote) LTBI
 A: asymptomatic TB
 PTB: active pulmonary TB

History with TB
 0: no experience
 1: having been infected
 2: having had TB disease

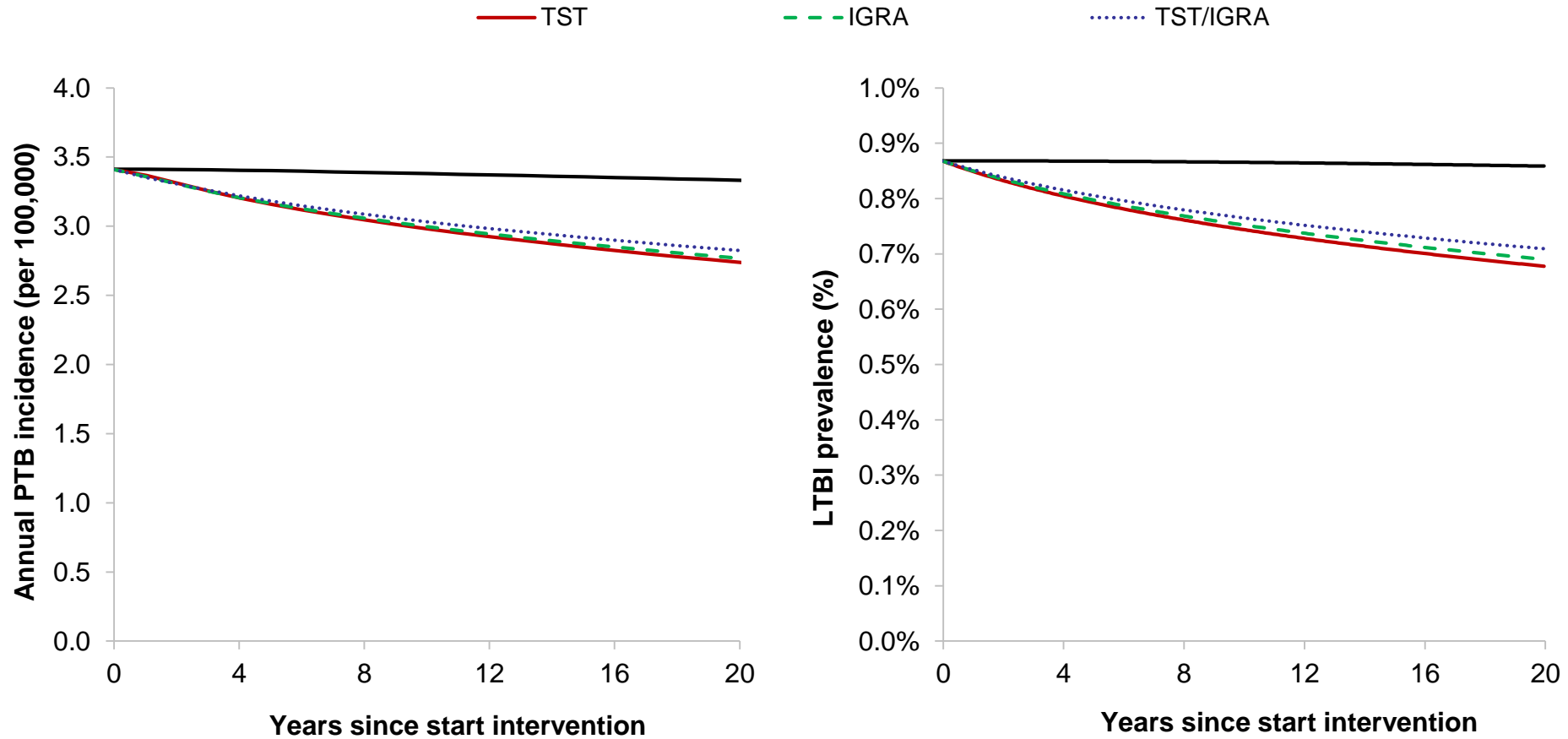


LTBI screening strategies

- Entry screening of migrants from high-endemic countries
- Entry screening of prisoners
- Periodic screening – annually or every three years – of the PWID/homeless group
- A combination of the three strategies above

Compared to current screening practice

Example Netherlands - Screening of migrants at entry



Challenges

- Quality of data sets and country specific data for fitting of the model
- Lack of representative data of LTBI prevalence in population (risk) groups, thus not possible to assess whether the underlying levels of LTBI in the different population groups are close to reality
- Used data sources may not be representative anymore, especially given the currently observed declining trends
- Multidrug-resistance, HIV and other key populations (health workers, travellers, etc.) not included in the model
- Numbers of TB patients not corrected for possible under notification

Key considerations for models of TB prevention in the EU and similar regions

Size of the risk group population

Implementation coverage and quality of interventions

Cascade of prevention: identifying risk population – screening – reporting back screening result – referral for treatment – treatment initiation – treatment completion

Mixing between general population and risk groups

Increase in diagnostic delay (and transmission?) with decrease in TB incidence?

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