

## What is tuberculosis?

- Tuberculosis (TB) is the **second** most deadly infectious disease in the world.
- In 2015, 10.4 million people **fell ill** from TB and 1.8 million people **died** from TB.
- Current estimates say that **30%** of the global population is infected with TB.
- A carrier can go **decades** without displaying symptoms or being infectious before the disease activates.
- Active TB predominantly affects the **lungs** causing areas of the lung tissue to scar making it difficult to breath and resulting in **organ failure**.
- Treatment of TB is a minimum **6 month** regimen of severe antibiotics.

## Who is affected?

60% of TB cases **worldwide** in 2015 occurred in just SIX COUNTRIES



2015 saw 6600 new cases in the UK and 300 deaths. In Europe there were 323,000 new cases and 32,000 deaths.

The proportion of cases that result in death ranges from 5% in high income areas to over 25% in lower income areas.



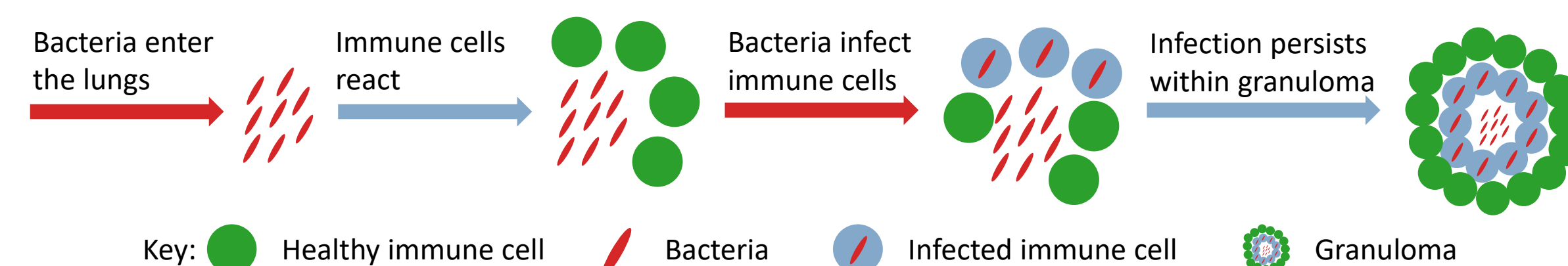
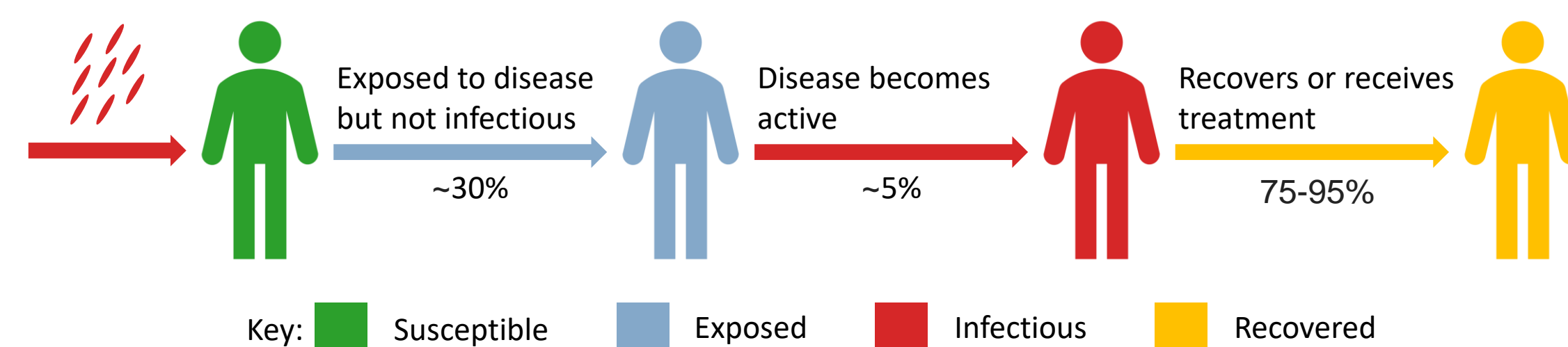
# Tuberculosis: Developing a Mathematical Model

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## How does the infection persist?



## My research

- Using experimental data it is possible to define the rates of different events, such as when an immune cell kills a bacterium.
- Simulating these events multiple times and averaging over the realisations gives the plot to the right.
- The plot shows that an initial 2 bacteria will be able to grow and infect the majority of 100 initially healthy immune cells after only 140 hours.
- The bacterial load of an individual can impact how likely they are to infect others.
- We would like to be able to accurately model the bacterial load of an individual so that we can then predict the rate at which TB is spread through a population.

