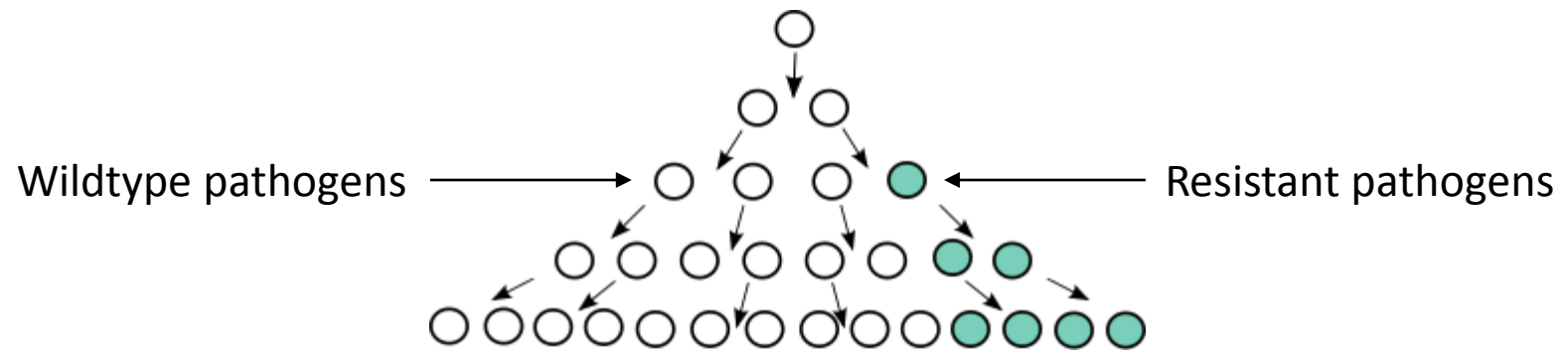


# Notes to accompany the AMR simple mathematical modelling code

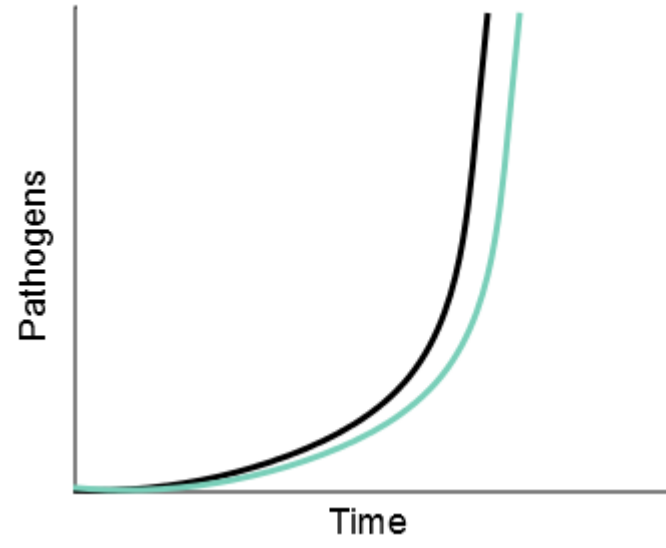
Dr Laith Yakob

London School of Hygiene & Tropical Medicine



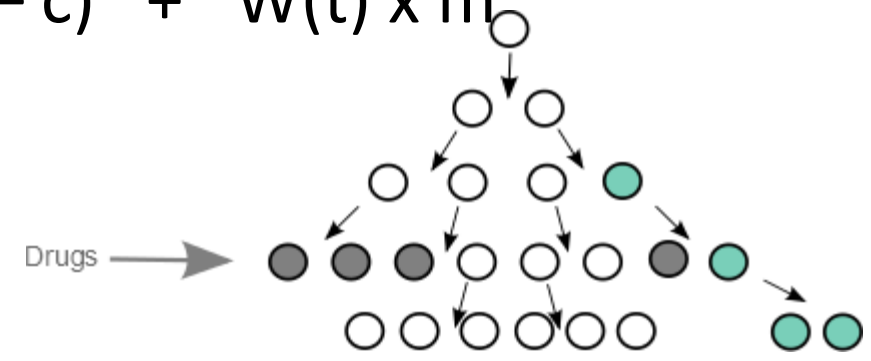
# Maths

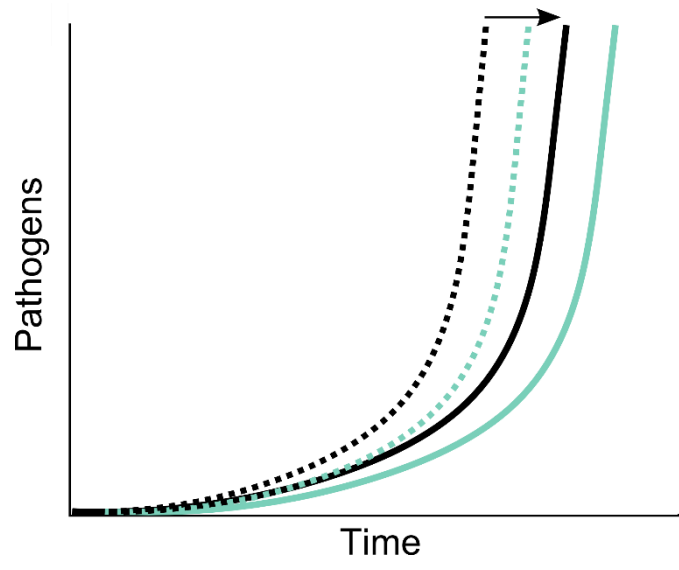
- Call wildtype and resistant pathogens W and R
  - $W(\text{in future time}) = W(\text{now}) \times \text{growth}$   
 $\rightarrow W(t+1) = W(t) \times g$
  - $R(\text{in future time}) = R(\text{now}) \times \text{growth} \quad \text{PLUS} \quad W(\text{now}) \times \text{spontaneous mutation}$   
 $\rightarrow R(t+1) = R(t) \times g + W(t) \times m$



- $W(t+1) = W(t) \times (g - c)$

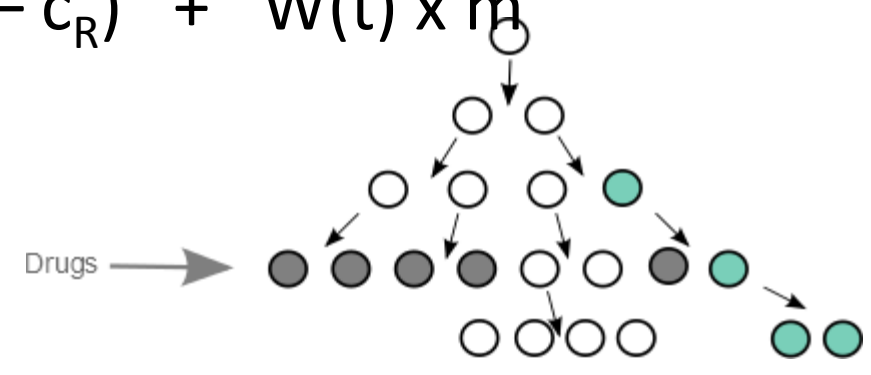
- $R(t+1) = R(t) \times (g - c) + W(t) \times m$

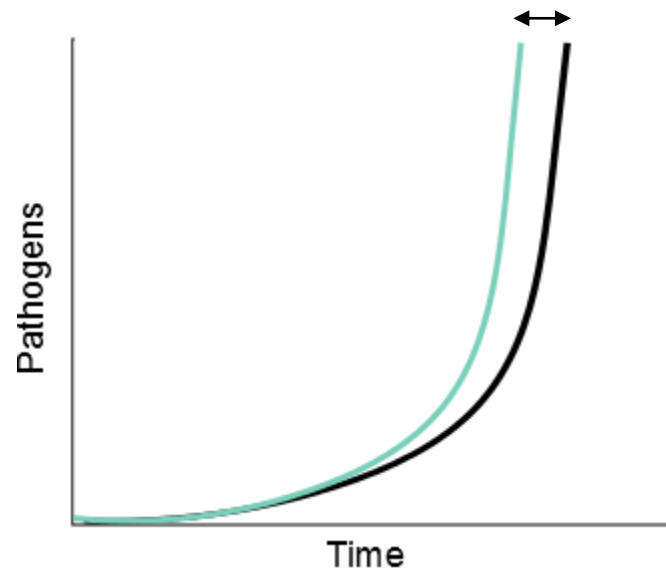




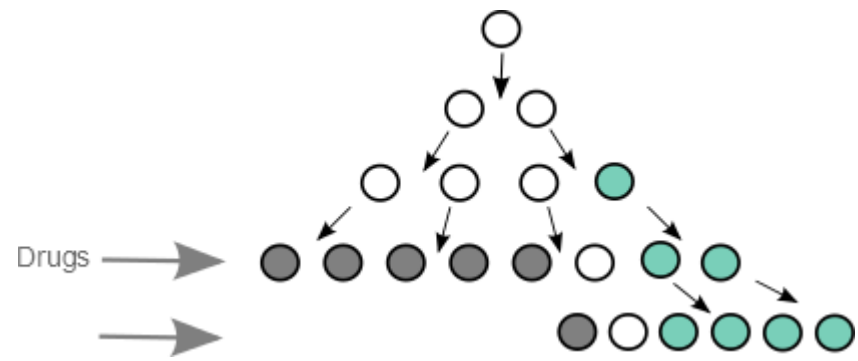
- $W(t+1) = W(t) \times (g - c)$

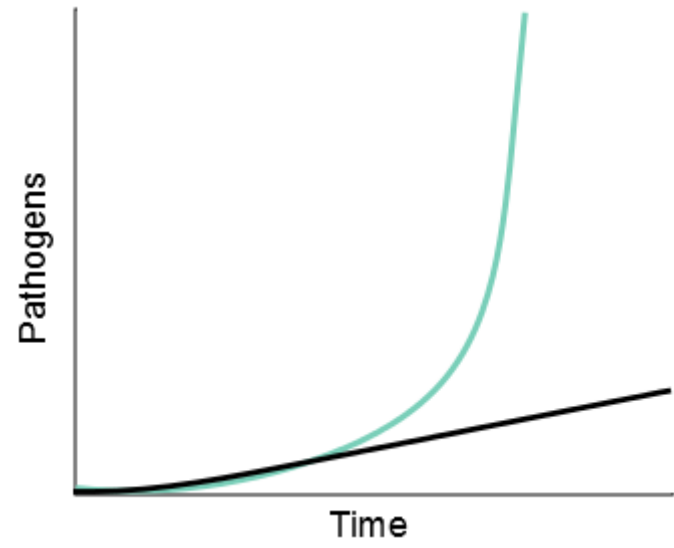
- $R(t+1) = R(t) \times (g - c_R) + W(t) \times m$

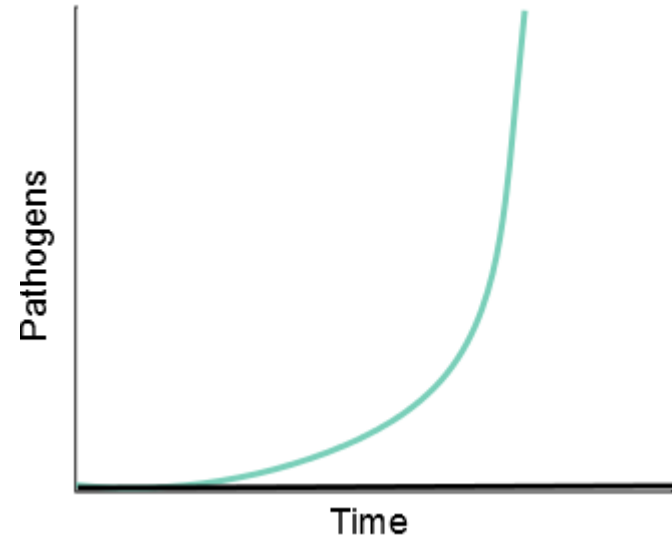












# Trade-offs

- $W(t+1) = W(t) \times (g - c)$
- $R(t+1) = R(t) \times (g_R - c_R) + W(t) \times m$

