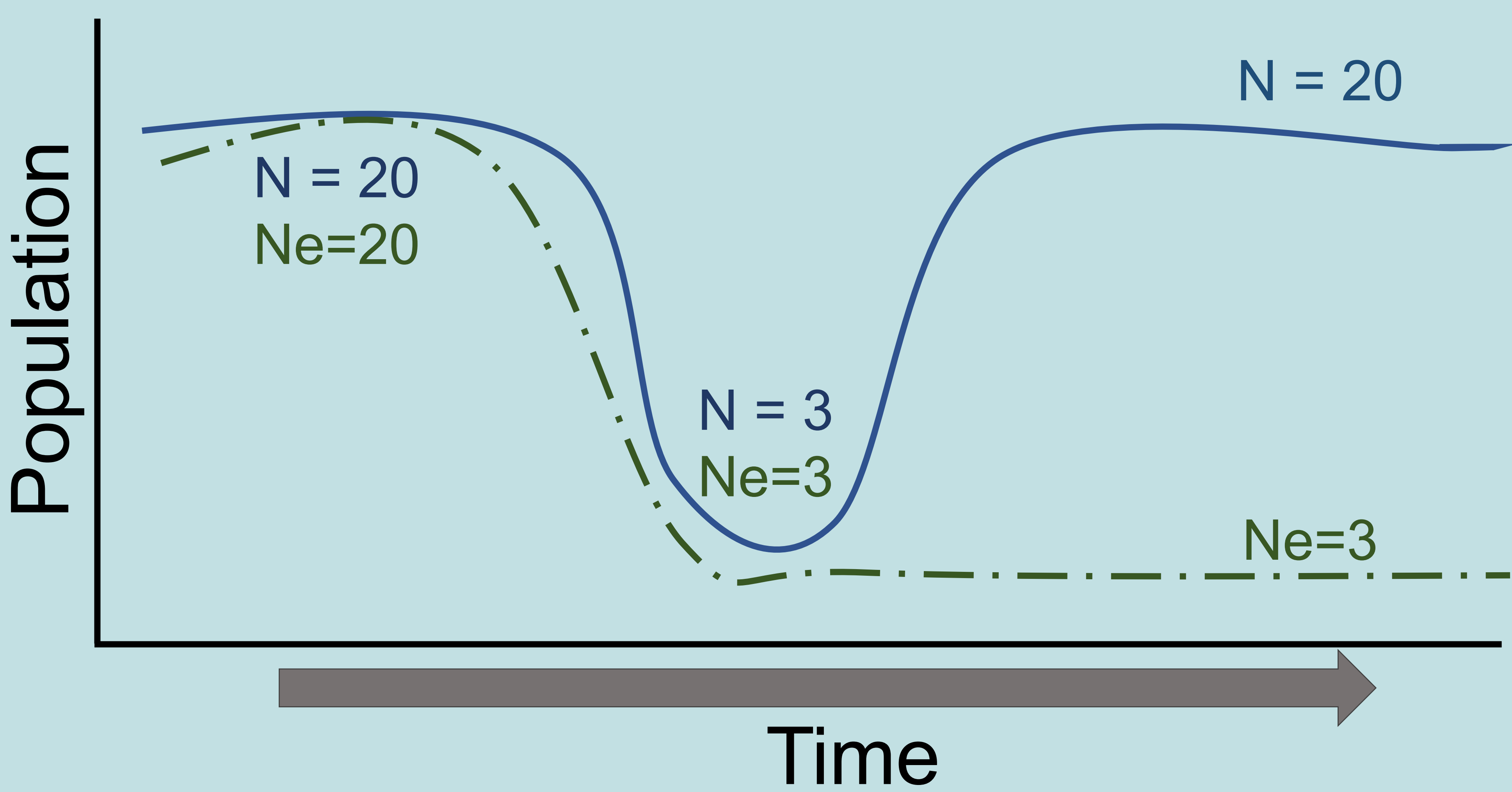
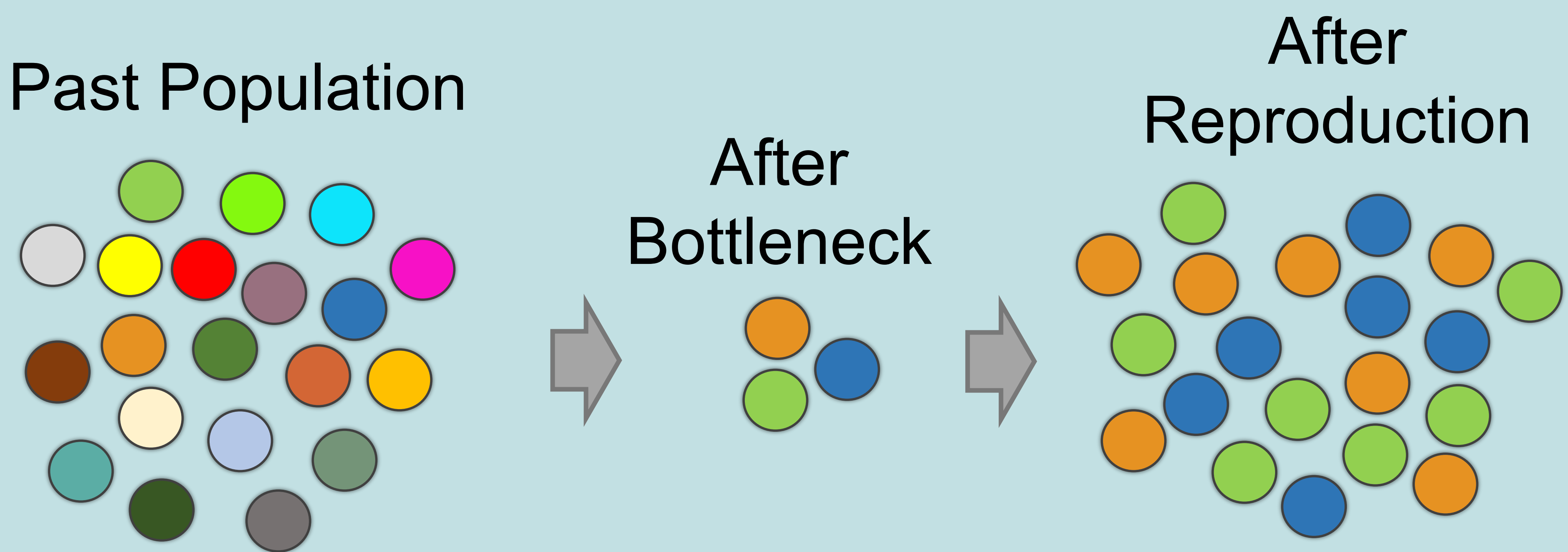
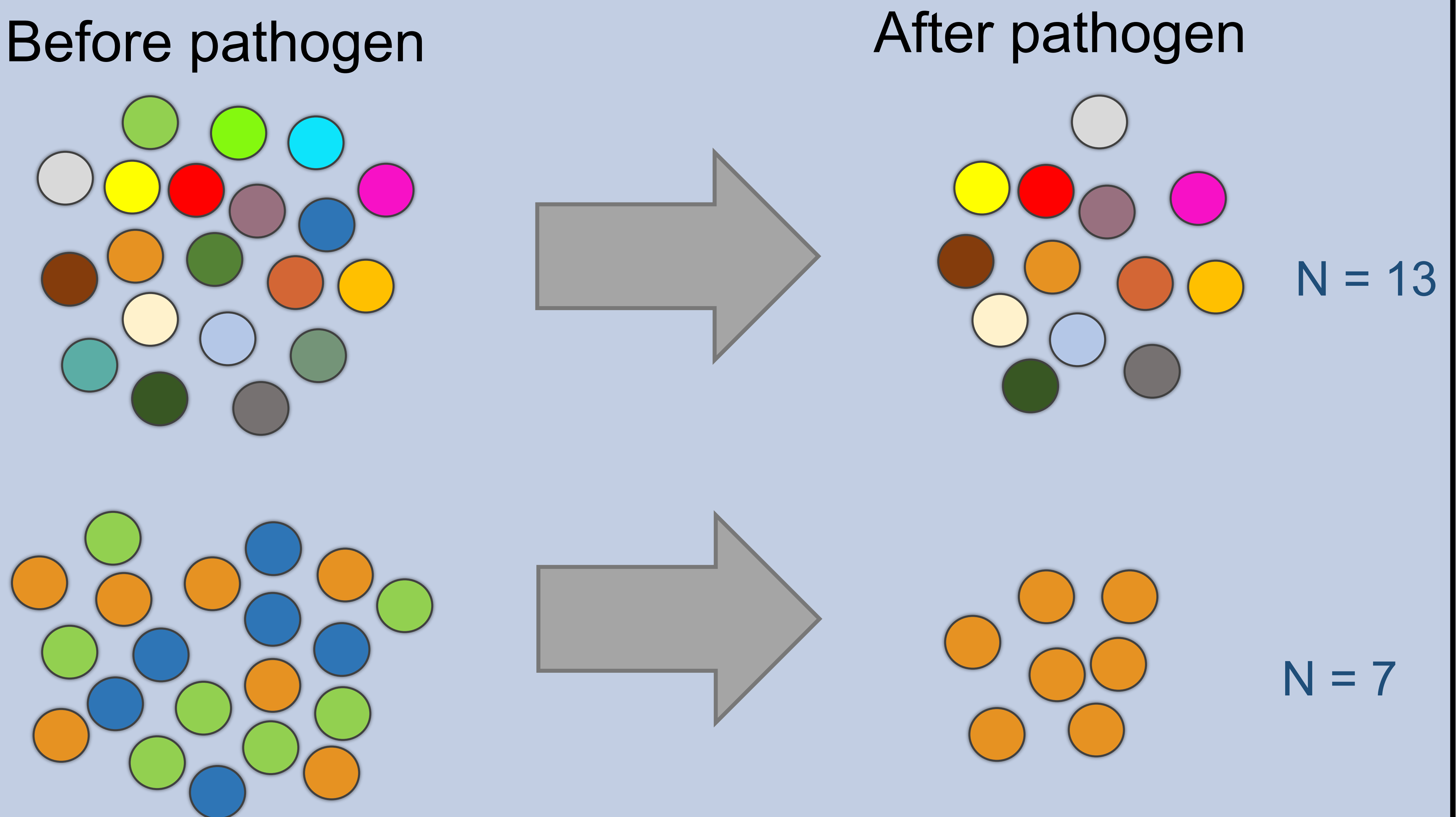


# How does evolution help to explain why we get sick?

Genetic diversity is important for the health of a population.



Let's compare a pathogen that attacks all shades of blue and green.

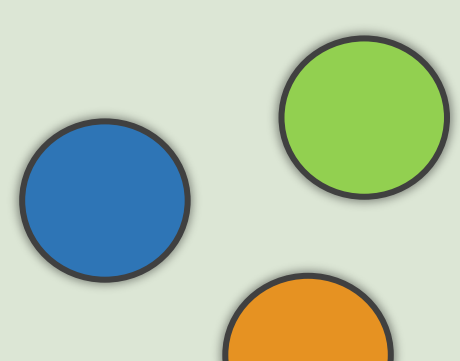


Effective population ( $N_e$ ) is different than population size ( $N$ ).  $N_e$  is the evolutionary potential of a population and can be related to the genetic diversity of that population. The population with the higher *effective* population size survived better. In other words it was more evolutionarily healthy.

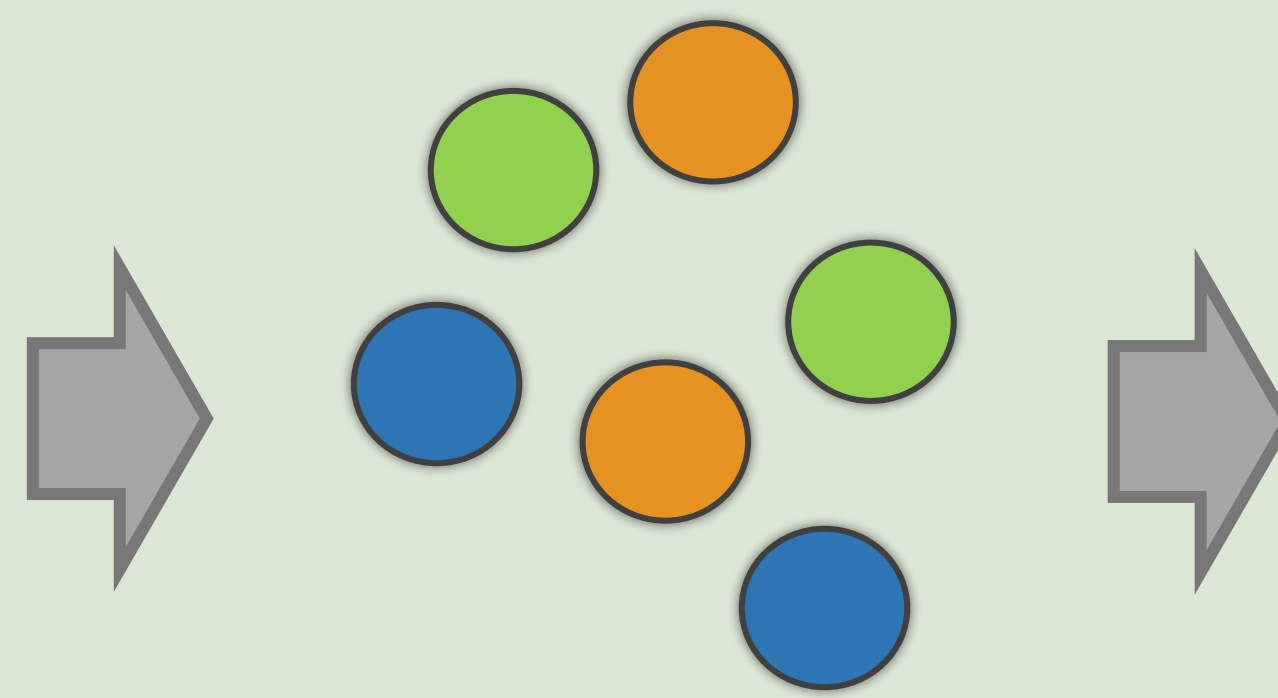


# So what about humans?

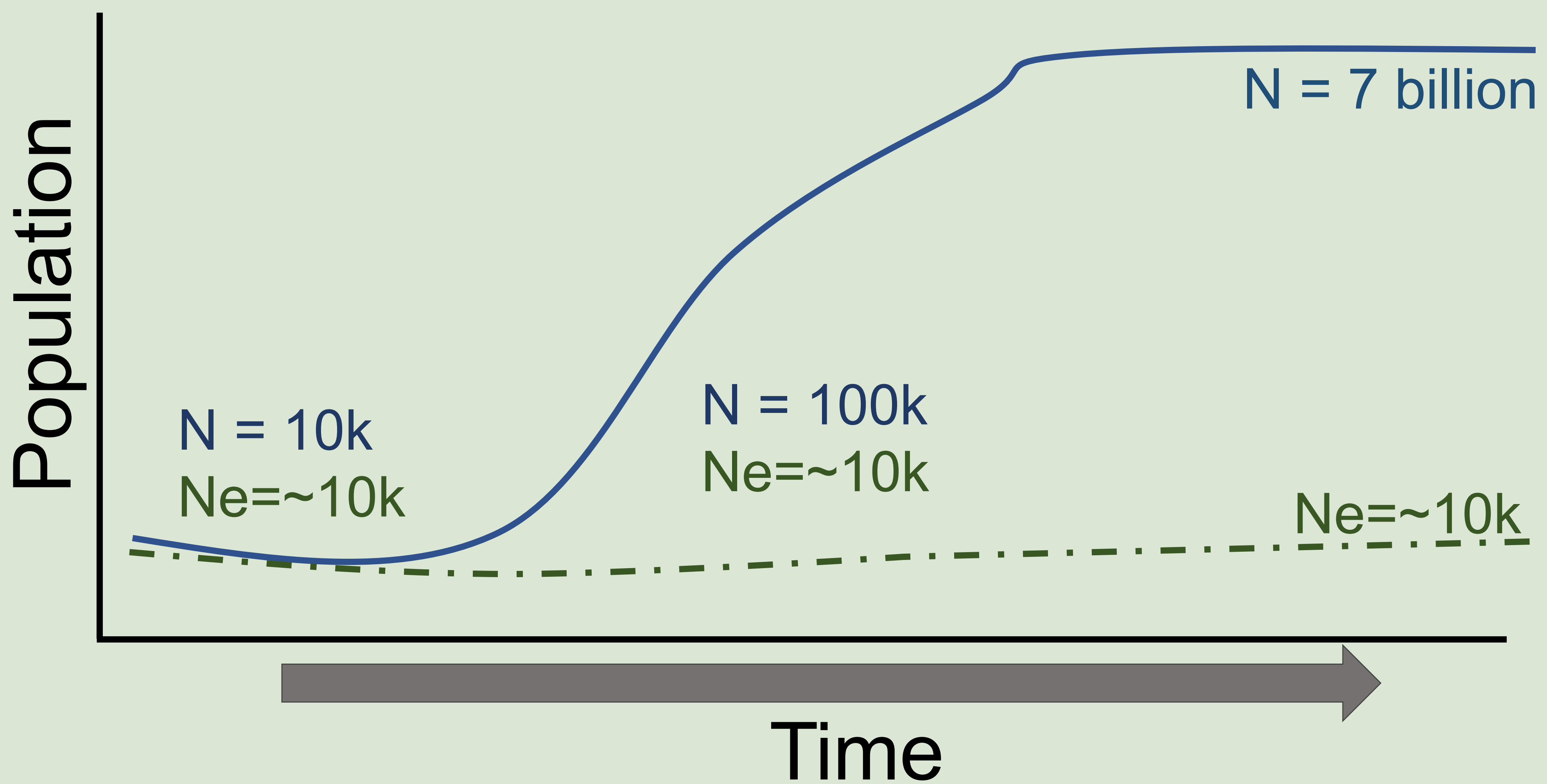
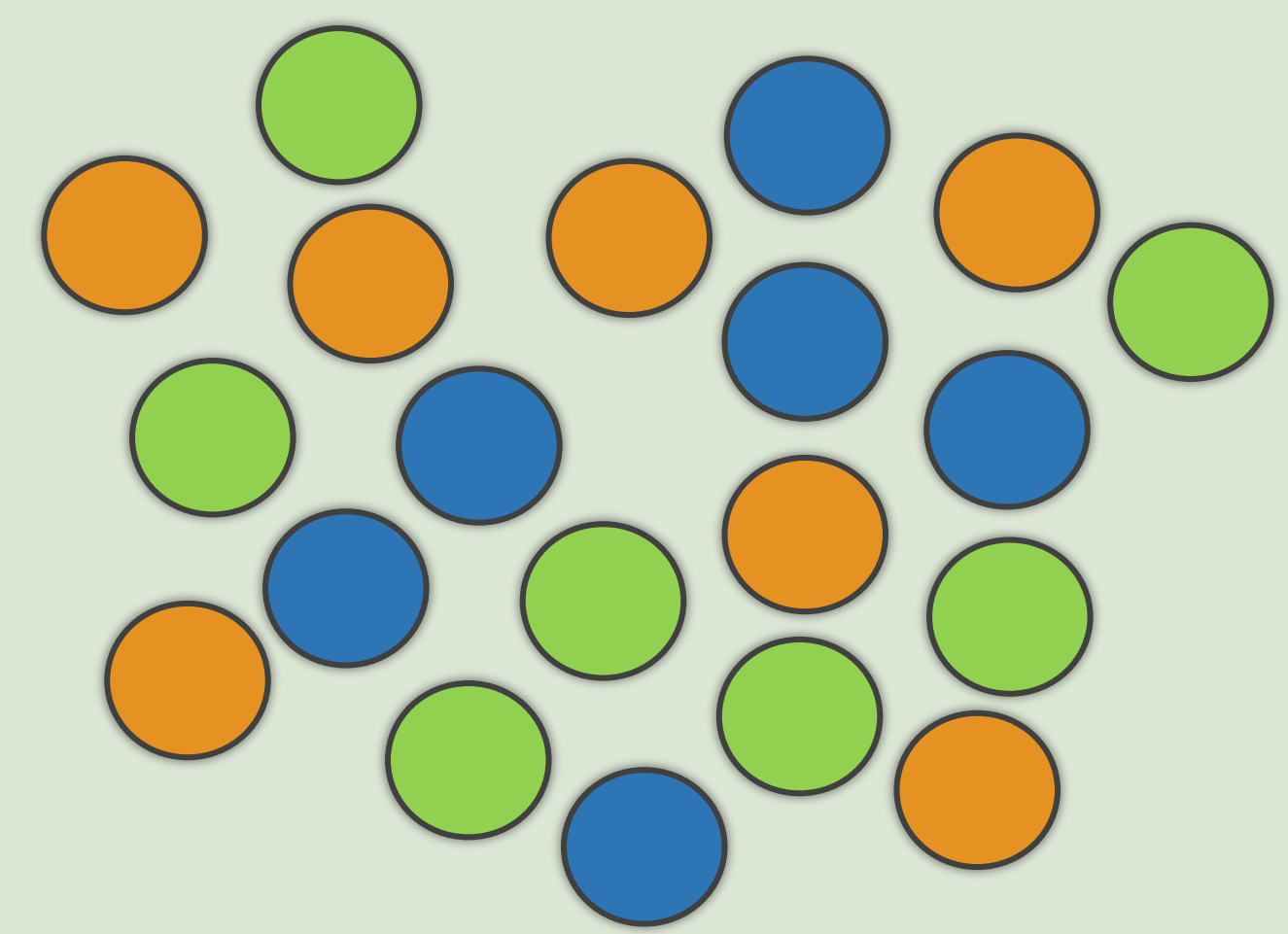
Past Population  
>100k years ago



Out of Africa  
~100k years ago



Rapid growth  
Present



## Lack of diversity shapes our population health: Sickle Cell Anemia (SCA)



The HbS allele (form of a gene) causes SCA which generates mishappen red blood cells. Genetic diversity for HsB is important because if you inherit one copy of HsB from one parent, but not the other, it confers a selective advantage because that combination creates resistance to malaria. In this case genetic diversity is important to human health because inheriting different types of alleles aids in survival.

