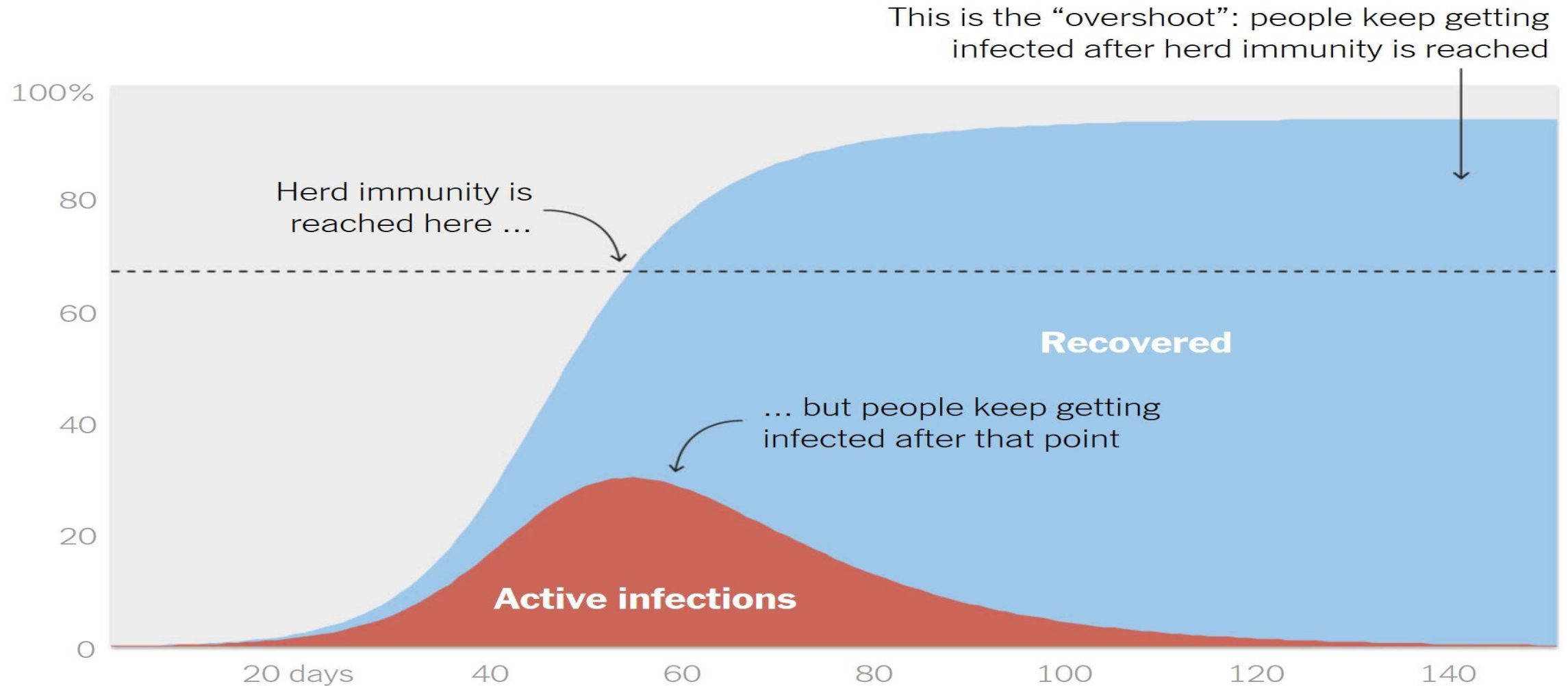


# After Herd Immunity ... More Infections

Herd immunity doesn't stop a virus in its tracks. The number of infections continues to climb after herd immunity is reached.



By The New York Times

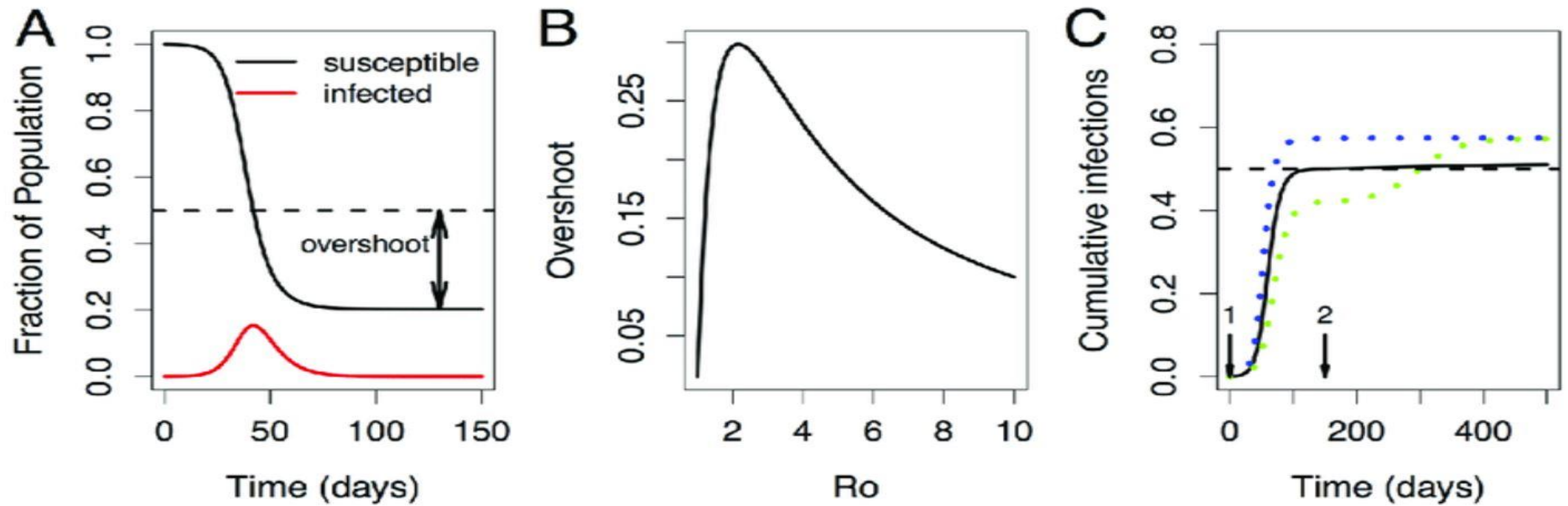


Illustration of the "overshoot" effect. Panel A shows the number of susceptibles and infecteds during an outbreak with  $R_0 = 2$ . The initial growth phase of the epidemic is approximately characterized by an exponential increase in the number of infecteds, accompanied by a decline of susceptibles. The dashed horizontal line indicates the threshold level of susceptibles below which population immunity prevents further outbreaks for this given set of parameters. Once the number of susceptibles crosses a threshold level, the average number of new infections caused by an infected person falls below 1 and the epidemic wanes. The arrow indicates the difference between the number of susceptibles at the end of the outbreak and the threshold line. This difference was termed as the "overshoot" [45]. Panel B shows how the magnitude of overshoot depends on  $R_0$ . For the simple SIR model, the number of prevented infections is found to be highest for intermediate values of  $R_0 > 2$ . Panel C considers the optimal level of vaccination for the limiting case which is easy to analyze. We choose an infection with  $R_0 = 2$ ,