Epidemiology 501: Homework 1

Consider the following two scenarios.

Around 60 people have been infected and time series of case detection for the first 10 days appears as below. Write down the equation for the basic reproduction number, $\mathcal{R}_0$, and calculate the value. Suppose the delay from symptom onset and case detection is two days on average. Calculate $\mathcal{R}_0$.

You live in a nearby community of a similar size and none of the cases has been detected. Government announed that a flu vaccine is supposed to be effecitve against this emerging disease. What proportion of the population would you suggest to vaccinate? Write down equations to support your answer.