

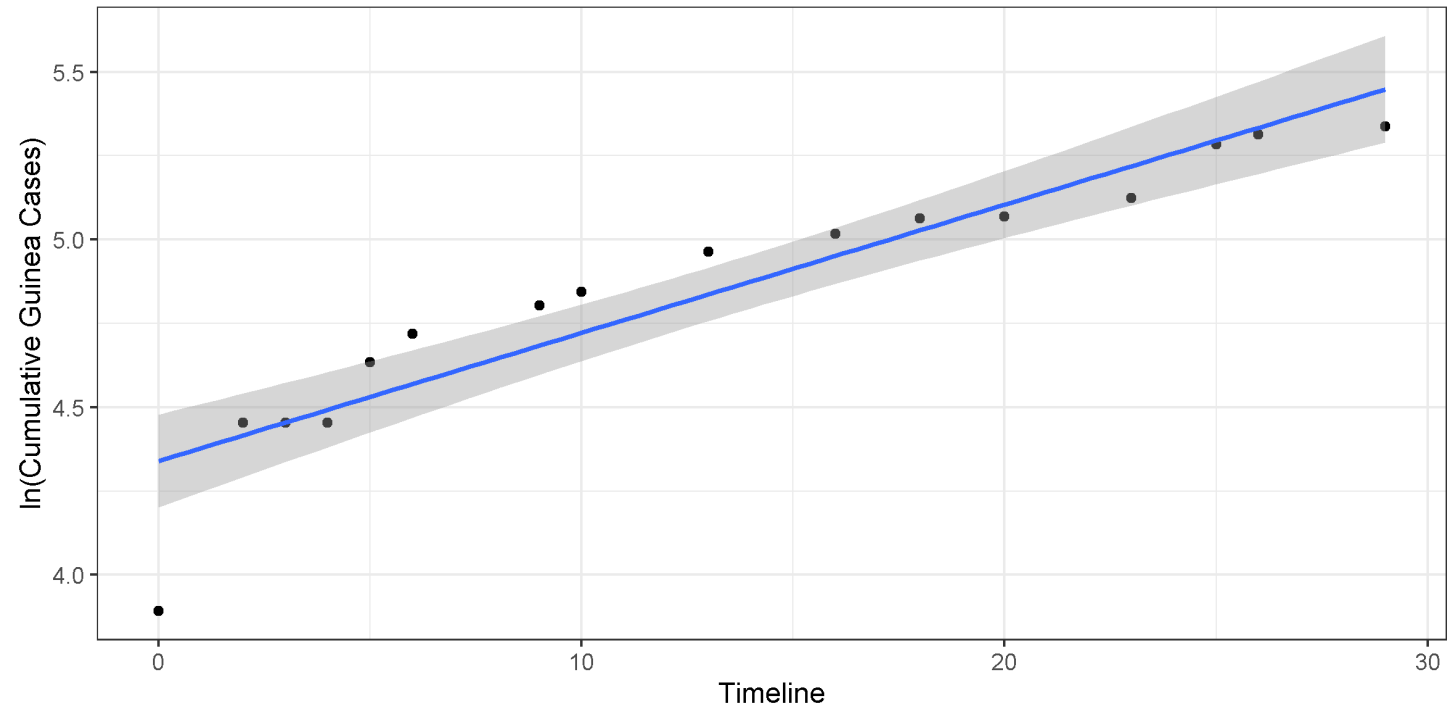
# Extraction of epidemic growth rate to estimate R0

## SIER model parameters

The four compartments of this epidemiologic model are changed over time by four parameters, three of which are constant ( $\sigma$ ,  $\gamma$ ,  $\delta$ ) and one ( $\beta$ ) a function of time (Althaus et al, 2014).

$1/\sigma$  and  $1/\gamma$  describe the incubation and the infectious period respectively, whereas  $\delta$  describes the epidemiologic growth rate. During the initial stages of the epidemic there is a linear relationship between the natural log of the cumulative number cases and  $\delta$ . Combining knowledge about  $\sigma$ ,  $\gamma$  and  $\delta$  allows one to extract the basic reproduction number ( $R_0$ ).

$$R_0 = (1 + \sigma * \delta) * (1 + \gamma * \delta)$$



**Figure:**  $\delta$  in blue describes the increase of Guinea Cases (ln – transform). Based on the formula on the left,  $R_0 = 1.46$ , which is close to the literature value 1.51 (Althaus et al, 2014), was extracted. This makes sense as a positive epidemiologic growth infers an basic reproduction number greater than 1.