**Compartments and Variables**

Defining compartments and dynamic variables in our model:

* S(t): Number of **Susceptible** individuals at time t.
* E(t)): Number of **Exposed** individuals (infected but not yet infectious) at time t.
* I(t): Number of **Infectious** individuals at time t.
* R(t): Number of **Recovered** individuals at time t.
* V(t): Number of **Vaccinated** individuals at time t.
* y(t): **Willingness to vaccinate**, a dynamic variable in the range [0,1] at time t.

**Parameters**

* **β**: Transmission rate
* **σ**: Rate of progression from exposed to infected (i.e., 1 / incubation period)
* **γ**: Recovery rate (i.e., 1 / infectious period)
* **κ**: Social learning rate (influences speed of behavior change)
* **v₍base₎**:Baseline vaccination rate
* **a₁**: Weight of infection-driven awareness
* **a₂**: Weight of misinformation effect
* **a₃**: Weight of incentive-based encouragement
* **N**: Total population