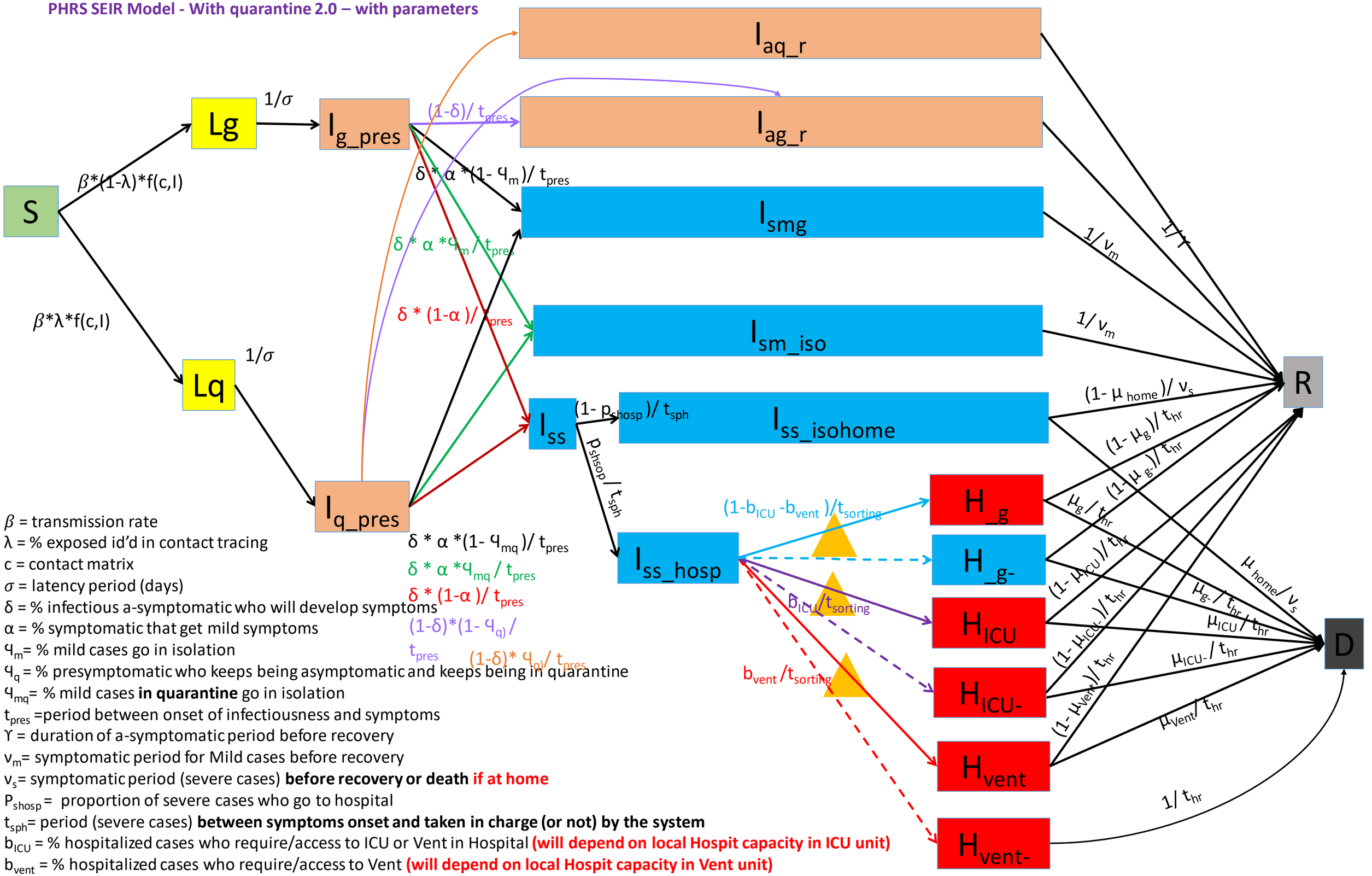
PHRS SEIR Model - With quarantine 2.0 – with parameters



β = transmission rate
λ = % exposed id'd in contact tracing
c = contact matrix
σ = latency period (days)
δ = % infectious a-symptomatic who will develop symptoms
α = % symptomatic that get mild symptoms
q_m= % mild cases go in isolation
q_q = % presymptomatic who keeps being asymptomatic and keeps being in quarantine
q_{mq}= % mild cases **in quarantine** go in isolation
t_{pres} =period between onset of infectiousness and symptoms
γ = duration of a-symptomatic period before recovery
v_m= symptomatic period for Mild cases before recovery
v_s= symptomatic period (severe cases) **before recovery or death if at home**
P_{shosp}= proportion of severe cases who go to hospital
t_{sph}= period (severe cases) **between symptoms onset and taken in charge (or not) by the system**
b_{ICU} = % hospitalized cases who require/access to ICU or Vent in Hospital **(will depend on local Hospit capacity in ICU unit)**
b_{vent} = % hospitalized cases who require/access to Vent **(will depend on local Hospit capacity in Vent unit)**
$t_{sorting}$= time for sorting severe cases (before ICU or Vent or other services)
μ_g = % severe case dying in hospital (general)
μ_{ICU} = % severe case dying in hospital (ICU)
μ_{Vent} = % severe case dying in hospital (Vent)
t_{hr} = Time spent in hospital (general, ICU or Vent) before recover or death
μ_g = % severe case dying in hospital (general)
μ_{ICU-} = % severe case dying in hospital because of missing access to ICU
μ_{home}= % severe cases dying at home
μ_{g-}= % severe cases dying because they don't access to hospital

$$dS$$
$$= -\left[\beta*(1-\lambda)*c_{gg}\left(I_{ag}+I_{smg}\right)+c_{gq}\left(I_{aq}\right)\right]-\left[\beta*\lambda*c_{gg}\left(I_{ag}+I_{smg}\right)+c_{gq}\left(I_{aq}\right)\right]$$

$$dLg=+\left[\beta*(1-\lambda)*c_{gg}\left(I_{ag}+I_{smg}\right)+c_{gq}\left(I_{aq}\right)\right]-\left[\frac{1}{t_{\sigma}}\right]$$

$$dLq=+\left[\beta*\lambda*c_{gg}\left(I_{ag}+I_{smg}\right)+c_{gq}\left(I_{aq}\right)\right]-\left[\frac{1}{t_{\sigma}}\right]$$