Exploring Health Policies to Prevent Another SARS Outbreak in Hong Kong

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Abstract

The paper will introduce a unique way of interpreting and modeling the data from the SARS outbreak in Hong Kong and actually extend the traditional methodology. The "double epidemic hypothesis" suggests that a scientific community in Hong Kong should be aware of the next steps for future prevention policies. This project will provide a unique interpretation of the traditional framework of SEIR (susceptible-exposed-infected-removed) and SEIRP (susceptible-exposed-infected-removed-vaccinated) in order to formulate a policy that can be implemented to prevent another SARS (Severe Acute Respiratory Syndrome) outbreak. The study suggests that an outbreak can be prevented by investigating the number of vaccinated people. The paper will also introduce a unique model for disease systems in Hong Kong that can be formulated to test cases against new data. A double epidemic model for the SARS propagation is presented. For the SARS outbreak, the number of infected people is significantly higher than the expected number. The paper suggests that in order to prevent another outbreak, the number of vaccinated people should be increased.

Explaining the Equations

\[ \text{Rate of change for the susceptible population: } r_S(t) = -\frac{\beta_S S(t) I(t)}{N} \]

\[ \text{Rate of change for the exposed population: } r_E(t) = \frac{\beta_S S(t) I(t)}{N} - \alpha_E E(t) \]

\[ \text{Rate of change for the infected population with disease A: } r_I(t) = \frac{\beta_I I(t) S(t)}{N} - (\gamma_I + \mu_I) I(t) \]

\[ \text{Rate of change for the removed population with disease A: } r_R(t) = \gamma_I I(t) \]

\[ \text{Rate of change for the vaccinated population: } r_V(t) = \frac{\beta_V V(t) S(t)}{N} - (\gamma_V + \mu_V) V(t) \]

\[ \text{Rate of change for the exposed population with disease A: } r_X(t) = \frac{\beta_X X(t) S(t)}{N} - (\gamma_X + \mu_X) X(t) \]

\[ \text{Rate of change for the infected population with disease A: } r_Y(t) = \frac{\beta_Y Y(t) S(t)}{N} - (\gamma_Y + \mu_Y) Y(t) \]

\[ \text{Rate of change for the removed population with disease A: } r_Z(t) = \gamma_Y Y(t) \]

Optimal Immunization Strategy Against SARS

The paper will examine preventive strategies with respect to "dual epidemic" strategies. Through "dual epidemic" strategies, we are looking at the role of vaccination and the role of medical treatments. The parameter \( \gamma_I \) describes the number of medical treatments that can be given to the sick patients. The parameter \( \gamma_I \) describes the number of people who are vaccinated during the outbreak. If we have \( \gamma_I = 0 \), it means that we have a "dual epidemic" strategy. If we have \( \gamma_I > 0 \), it means that we have a "dual epidemic" strategy with vaccination. If we have \( \gamma_I = 1 \), it means that we have a "dual epidemic" strategy with vaccination and medical treatments.

Discussion

The paper will discuss the role of vaccination and medical treatments in preventing another SARS outbreak in Hong Kong. The paper will also discuss the role of vaccination and medical treatments in preventing another SARS outbreak in other regions. The paper will also discuss the role of vaccination and medical treatments in preventing another SARS outbreak in the future. The paper will also discuss the role of vaccination and medical treatments in preventing another SARS outbreak in other regions.

References