

## **EVALUATION OF INFLUENZA VACCINATION EFFICACY: A UNIVERSAL EPIDEMIC MODEL**

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By means of a designed epidemic model, we evaluated the influence of seasonal vaccination coverage as well as a potential universal vaccine with differing efficacy on the aftermath of seasonal and pandemic influenza. The results of the modeling enabled us to conclude that, to control a seasonal influenza epidemic with a reproduction coefficient  $R_0 \leq 1.5$ , a 35% vaccination coverage with the current seasonal influenza vaccine formulation is sufficient, provided that other epidemiology measures are regularly implemented.

Increasing  $R_0$  level of pandemic strains will obviously require stronger intervention. In addition, seasonal influenza vaccines fail to confer protection against antigenically distinct pandemic influenza strains. Therefore, the necessity of a universal influenza vaccine is clear. The model predicts that a potential universal vaccine will be able to provide sufficient reliable (90%) protection against pandemic influenza only if its efficacy is comparable with the effectiveness of modern vaccines against seasonal influenza strains (70%–80%); given that at least 40% of the population has been vaccinated in advance, ill individuals have been isolated (observed), and a quarantine has been introduced. If other antiepidemic measures are absent, a vaccination coverage of at least 80% is required.