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Comparative estimation of the reproduction number for pandemic influenza from daily case notification data.

Recurrent epidemics of influenza are observed seasonally around the world with considerable health and economic consequences. Major changes in the influenza virus composition through antigenic shifts can give rise to pandemics. The influenza pandemic of 1918 was responsible for at least 20-100 million deaths worldwide. The reproduction number, R , defined as the average number of secondary cases generated by a primary case, is a crucial quantity for identifying the intensity of interventions required to control an epidemic. Here we estimate R using the daily case notification during the fall wave of the influenza pandemic (Spanish flu) in the city of San Francisco, California, from 1918-19. In order to elucidate the effects from adopting different estimation approaches four different methods are used. Our analysis indicates that the reproduction number for pandemic influenza, aggregated at the level of San Francisco, lies in the range of 2.0 to 3.0. Our estimates of the reproduction number for pandemic influenza strongly suggest a tighter range of uncertainty than has previously been assumed, as well as targets for public health interventions in the case of future similar pandemics that while very challenging may not be impossible to tackle. (Received September 22, 2006)