

Reproduction Number for Covid-19 Pandemic on a College Campus

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The rapidly spreading coronavirus pandemic has now become a threat to the world at large. The susceptible-infectious-removed (SIR) model and related models have been used to model the pandemic. However, models that assume time-invariant parameters may not capture the dynamics of transmission well or account for inaccuracies in the reported cases. We used a Poisson model with time-varying transmission and removal rates and estimated the time-varying reproduction number of the coronavirus pandemic in the university town of Pullman in Washington state. This method accounts for randomness in disease transmission and possible misreport in data. We used a simulation method to generate missing recovery counts, and we applied the B-spline approximation method to get a smooth estimate of the reproduction number. Our estimates of the time-varying reproduction number help us understand the spread of coronavirus in small high-density rural towns. It also provides a forecast for the spread of COVID in the future.