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A Semi-parametric Mixed Model for Short-term Projection of Daily COVID-19 Incidence in Canada

During a pandemic, data are very “noisy" with enormous amounts of local variation in daily counts, compared with any rapid changes in trend. Accurately characterizing the trends and reliable predictions on future trajectories are important for planning and public situation awareness. We describe a semi-parametric statistical model that is used for short-term predictions of daily counts of cases and deaths due to COVID-19 in Canada, which are routinely disseminated to the public by Public Health Agency of Canada. We present the model and the method. Performance indicators are defined and evaluated through extensive sensitivity analyses. We also compare our model with other commonly used models such as generalizations of logistic models (e.g. the Richards model and generalization) for similar purposes, followed by discussions on the limitations.