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Hannah R Biegel* (hbiegel@math.arizona.edu), 617 N. Santa Rita Ave, Tucson, AZ 85721,
and **Joceline Lega**. *Incorporating data assimilation methods in a simple model for
influenza*. Preliminary report.

When trying to fit mathematical models to data at the onset of an epidemic, parameters are often not known and the available data is often noisy. While complex models are useful once their parameters are known, simple models that rely on fewer parameters can be useful to predict an outbreak early in its course. Here we describe a simple model for seasonal influenza. We use variational data assimilation (VDA) to systematically address the issue of imperfect data and fit model parameters and initial conditions.

We present two synthetic data experiments with VDA applied to our model predicting the incidence of influenza in the United States. First, we fix model parameters to their true values and use VDA to fit initial conditions. Then, we use VDA to fit model parameters in addition to initial conditions. We also demonstrate how these techniques can be applied to CDC data from a recent influenza season. We find that incorporation of VDA improves the prediction capabilities of the model, supporting the use of data assimilation as a tool to predict an epidemic when the outbreak is starting and little data is available. We expect that these preliminary results could be improved with further development of the VDA minimization technique. (Received January 31, 2018)