Modeling the evolution of COVID-19 in Lithuania

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Models based on data analysis are being developed for the spread of the COVID-19 epidemic. A mathematically based methodology was developed for the analysis and assessment of the spread of potential epidemics and their consequences. It has the potential of becoming one of the tools of the state to manage crisis situations caused by epidemics, especially in the early phase of epidemic spread. We present the model for the spread of COVID-19 in Lithuania for the period March—December, 2020. Our approach is based on the generalized SEIR model which is derived from a set of ordinary differential equations that incorporates the transition rates at which population moves from one compartment to another. It is important to note that in the initial phase of the virus spread, when the data were very limited, it was necessary to rely on the experience of other countries and adapt the used epidemiological models to Lithuania. As the modeling results show, in the early phase the generalized SEIR model showed rather accurate forecasts. Later it became possible to construct more accurate and flexible models due to a wide range of data. As with many mathematical-statistical models, the accuracy of prediction relies heavily on the quality of the available data and the level of model abstraction.