**Predicting Infection & Exacerbation Events in Patients w/ Chronic Illness**

Chronic lung and heart diseases patients are burdened with lifelong risk of both acute exacerbation and infection. These episodic disease escalations are a frequent trigger of physician and hospital visits which are both costly and distressing to patients. The need for novel solutions that limit the impact of exacerbations on global health is abundantly apparent.

One emerging approach to addressing at-home chronic disease exacerbation is early detection by way of mobile app technology. Many of these apps, however, utilize rule-based decision frameworks, which are constantly hampered by the size and complexity of the variable space relevant to triage and diagnosis. Iterex has responded to this problem by developing mobile disease management applications that leverage machine learning predictions when guiding patients. This approach has the advantage of incorporating the inherent complexity and interdependencies prevalent in the relevant health variables that influence asthma exacerbations.

In MPI 2019, we are interested in the following problems:

1. Developing a model that classifies a set of signs, symptoms, and baseline health conditions as an exacerbation and/or infection.
2. Developing a model that predicts an exacerbation or infection episode using time series data or establishes the “risk” of a flare-up.
3. Conducting a detailed analysis of the patient vital sign and symptom data. Determine:
   1. Patient groupings by disease severity
   2. Summary statistics on infection/exacerbation frequency
   3. What type of patient is most likely to experience an exacerbation or infection, and what circumstances lead to a potential overlap/confusion of the two diagnoses.
   4. What are the most important features in predicting disease escalations.

\*\*\*\* All data sets will be provided by Iterex Therapeutics and must be removed from local hardware after conference completion \*\*\*\*\*\*