Title:

A nonlinear model for chronic disease care optimization

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Abstract:

In the face of a myriad of approaches to create efficiencies in the health care system, we present a model of chronic disease that recognizes the unpredictable (non-linear) pattern of exacerbations of heart failure patients, the most common reason that people over 65 are admitted to the hospital. In observing fundamental optimization approaches utilized in other non-linear systems, a sine-qua-non is suggested for the optimization of the care of heart failure patients.

By observing similar non-linear patterns in other chronic diseases and appreciating that chronic disease represents a substantial portion of health expenditures, we posit that substantial improvements in health care cost and quality require a non-linear optimization model. This model is appropriately generalized to essentially all chronic disease conditions.

The optimization model to be illustrated in the figures will show that repetitive, interactive, clinical evaluations can deliver early warning of an impending clinical exacerbation. Early warning of an impending clinical exacerbation produces the opportunity to provide very low-cost interventions that can avert the clinical exacerbation completely and eliminate the need for the costly care that would have been required. This model is the basis of disease management and suggests significant value for much wider application of very low-cost symptom monitoring for chronic disease patients with a wide range of diagnoses.

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