

Chronic Disease Modeling Software and the Michigan Model for Diabetes

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Policy makers and researchers use computer models to forecast disease progression. A disease model can estimate healthcare costs and quality of life, and compare interventions by their effect on the forecast. A computer model is especially useful for long duration chronic diseases where there are a few longitudinal studies spanning the entire duration of the disease. The Michigan Model for Diabetes falls into this category of models.

The Michigan Model for Diabetes, in its latest form, was created using new chronic disease modeling software. The software allows the user to model a disease as a set of states (such as angina or myocardial infarction), transition probabilities between states, nested sub-processes (such as cardiovascular disease), and covariates (such as age and gender). The model can include user generated expressions and additional rules using a simple language. This model, along with a user specified population, can then be compiled into a Monte-Carlo simulation program.

Additional software tools allow the user to estimate model parameters from summary data provided by published clinical studies. The estimation method assumes an extended Markov model and uses the Maximum Likelihood Estimation technique. This is implemented by the software using symbolic math tools and constraint optimization.

The software tools are free and are available for download online. The Michigan Model for Diabetes is also available for download along with documentation and results. For downloads and additional information, please visit the project web site at:

<http://www.med.umich.edu/mdrtc/cores/DiseaseModel/>

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