Title: Modeling Populations for Micro Simulation from Publicly Available Data
Alternative Title: Populations in the MIST!

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Individual medical data has restricted access. However, a lot of summary data is public through clinical trial results publications or other statistical tables. This summary data is valuable for baseline inputs for simulation models or for understanding population compositions. There are benefits from generating mock individual populations from the available distribution data: 1) Aggregating public information that otherwise would not be accessible. 2) Studying observed phenomenon under given hypotheses. 3) Micro-simulation at the individual level models non linear model effects.

The Micro Simulation Tool – MIST is free software that has various population generation capabilities. Specifically two techniques to model populations using micro-simulation are presented:

1) Mental Health Model: Where population size changes due to incoming and outgoing patients. MIST allows maintaining a wait state where individuals are held before entering simulation and accounting for lost populations using terminal states. MIST reporting system allows following the flowing population in each state. The Mental Health Model implementation is joint work with Stephen Leff from HSRI. A web portal containing the original model that this work re-implements and enhances towards using microsimulation is available in: http://model.planningbythenumbers.org/

2) The Reference Model for disease progression: In this case populations are generated from distributions. MIST uses evolutionary computation by INSPYRED to match the distribution statistics to given objectives. This allows coping with inclusion/exclusion criteria of clinical trials skewing distributions. The Reference Model uses those populations as input and calculates fitness of different models to those populations. Differences in model fitness are studies when generating the populations with and without evolutionary computation towards objectives. MIST capability of using evolutionary computation is joint work with INSPYRED creator Aaron Garrett from Jacksonville State University: http://mcis.jsu.edu/faculty/agarrett/