Can we predict IVF outcomes?

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The most commonly asked question by IVF patients is "What are my chances of success?". Far too many variables influence IVF success, than can be realistically considered by the human mind and therefore we sought to develop a computer-based system capable of integrating disparate variables and predicting the probability of success for the individual patient. Here we present a comparison of the use of advanced statistical and data-mining techniques to interrogate a comprehensive IVF database and identify the most predictive IVF parameters. Statistical and data-mining approaches consistently yielded rubrics that reliably predicted 65-75% of the outcomes of ~400 IVF cycles, demonstrating that computer aided model construction and feature selection can facilitate prognosis determination. Some of the variables identified as predictive using statistical approaches were similar to those identified by data mining techniques (ex. age), while others were not shared by the modeling techniques suggesting that both modeling techniques have specific biases and that neither approach alone identifies all relevant relationships within the IVF data set. Both approaches identified fixed patient-specific variables that cannot be altered by fertility treatment (ex. body-mass index (BMI)) and variables that can be clinically manipulated (ex. initial gonadotropin dose) suggesting opportunity for computer algorithms to assist in clinical decision making.