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To formulate a mathematical model that accurately represents the physiology of a wound, the model must easily predict the most influential factors that affect the wound-healing process. Using a differential-equation model that describes the interactions among matrix metalloproteinases, their inhibitors, the extracellular matrix, and fibroblasts (Krishna et al., 2015), this work focuses on two approaches using global sensitivity analyses. In the first approach, two matrices are constructed and then filled with quasi-random numbers chosen from a specified uniform distribution. From this, Sobol or “sensitivity” indices are computed for each patient, and then results are evaluated. The next method is Morris screening, which measures the change in the state variables when a specific parameter is slightly modified from the predicted value. This change can be obtained by finding the difference between the original model and the model with the modified parameter. A sum of squares of these differences can be used to give the overall influence each parameter has on the model. Overall, these methods have allowed us to find the most significant factors in the wound-healing process, which can further be used to more accurately predict the healing process for individual patients. (Received September 20, 2018)