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Ayush Prasad* (ayush.prasad520@topper.wku.edu). *Using Individual Patient Data to Quantify a Mathematical Model for the Interactions of Matrix Metalloproteinases and Their Inhibitors in a Wound*. Preliminary report.

Because the medical treatment of diabetic foot ulcers remains a challenge for clinicians, a quantitative approach using patient data and mathematical modeling can help researchers understand the physiology of the wounds. In this work, we extend a previously developed mathematical model describing the interactions among matrix metalloproteinases, their inhibitors, extracellular matrix, and fibroblasts (Krishna et al., 2015). In the previous work, the model was curve-fitted to the averaged data of patients with diabetic foot ulcers from Muller et al. (2008), and the model parameters were estimated using ordinary least-squares. The model and parameter values were then analyzed using global and local sensitivity analyses, which were used to describe how sensitive each parameter value of the model was to changes in the system. This work uses the individual patient data obtained from Muller for curve-fitting a modified model using similar techniques from the previous work. The goal of this work is to quantify and understand differences between patients in order to predict future responses and individualize treatment for each patient. (Received September 18, 2016)