1145-92-879 **Laura Ellwein Fix*** (lellwein@vcu.edu), 1015 Floyd Ave., Richmond, VA 23220. *Parameter identifiability of a respiratory mechanics model in an idealized preterm infant.*

The complexity of mathematical models describing respiratory mechanics has grown in recent years to integrate with cardiovascular models and incorporate nonlinear dynamics, but has rarely been studied in the context of patient-specific observable data. This study investigates parameter identification of a previously developed nonlinear respiratory mechanics model (Ellwein Fix et al, 2018) tuned to the physiology of 1 kg preterm infant, using local deterministic sensitivity analysis, subset selection, and gradient-based optimization. The model consists of 4 differential state equations with 34 parameters to predict airflow and dynamic pulmonary volumes and pressures generated under six simulation conditions. The relative sensitivity solutions were calculated with finite differences and a sensitivity ranking was created for each parameter and simulation. Subset selection found independent parameters that could be estimated for all six simulations. The combined analysis produced a subset of 6 independent sensitive parameters identifiable with observable data. Optimizations performed using pseudo-data with perturbed nominal parameters estimated parameters within 5% of nominal values on average, demonstrating the feasibility of studying patient-specific infant data with these methods. (Received September 16, 2018)