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**W. Christopher Strickland\*** (cstric12@utk.edu), 227 Ayres Hall, 1403 Circle Drive, Knoxville, TN 37996-1320, and **Tricia Phillips, Nicholas Battista, Leigh Percy** and **Suzanne Lenhart**. *Modeling the prescription opioid epidemic.*

Opioid addiction has become a national health crisis in recent years, with involvement in 66% of all drug overdose deaths in 2016 and high economic costs. In contrast to the dynamics of a classic disease or illicit drug epidemic, opioid addiction has its roots in legal, prescription medication - a fact which greatly increases the exposed population and mathematically suggests non-contact based routes of infection.

In this talk, I will present a first epidemic model for opioid addiction and treatment. Through analysis of our model, we show that existence of an addiction-free equilibrium requires transforming the opioid dynamics into that of a purely illicit drug epidemic and that lacking prescription-induced addiction, the prescription drug epidemic may not be self-sustaining. Numerical analysis suggests specific targets for control, including average prescription length and the rate of entering treatment, even when the probability of treatment success is low. In addition to this model, I will also present preliminary results from a model including heroin and fentanyl addiction which has been successful in capturing more recent trends in the opioid epidemic. (Received August 15, 2019)