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**Xi-Chao Duan, Xue-Zhi Li and Maia Martcheva\*** (maia@ufl.edu), Department of Mathematics, University of Florida, Gainesville, FL 32611. *Coinfection dynamics of heroin transmission and HIV infection in a single population*. Preliminary report.

We propose a model of a joint spread of heroin use and HIV infection. The unique disease-free equilibrium always exists and it is stable if the basic reproduction numbers of heroin use and HIV infection are both less than 1. The semi-trivial equilibrium of HIV infection (heroin use) exists if the basic reproduction number of HIV infection (heroin use) is larger than 1 and it is locally stable if and only if the invasion number of heroin use (HIV infection) is less than 1. When both semi-trivial equilibria lose their stability, a coexistence equilibrium occurs, which may not be unique. We compare the model to US data on heroin use and HIV transmission. We conclude that the two diseases in the US are in a coexistence regime. Elasticities of the invasion numbers suggest two foci for control measures: targeting the drug abuse epidemic and reducing HIV risk in drug-users. (Received December 25, 2019)