1073-92-261 **Howard Weiss*** (weiss@math.gatech.edu), School of Mathematics, 108E Skiles Building, 686 Cherry St, Atlanta, GA 30334, and **Anna Mummert** and **Henry Wan**. *An inverse problem for SIR transmission models and an application to the second wave of the 2009 influenza pandemic.* Preliminary report.

We consider SIR transmission models with time-dependent transmission rate. We prove that given virtually any smooth infection profile, there exist a transmission rate such that the output I(t) of the model coincides with the infection profile. We then show how this theorem provides an explicit method to estimate the transmission rate from a time series. Finally we apply this method to estimate the transmission rate of influenza during the 2009 pandemic. In the US. We note that our recovered transmission rate seems inconsistent with the commonly presumed mechanism responsible for the second wave of the pandemic. (Received August 03, 2011)