

# **SIR Models: From Micro to Macro and Back Again**

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## **ABSTRACT**

Recently, there has been considerable interest in both inference and predictions for compartmental epidemic models on multiple physical scales. For instance, one could be interested in analyzing response of immune system to infection within a single host or in describing infectious interactions in a population of hosts. Both viral invasions and global pandemics are often described by similar mathematical constructs known as SIR models. In this talk I will review some basic concepts related to such models across scales and present a simple unifying framework that allows to conceptually connect both deterministic (e.g., population level) and stochastic (e.g., molecular level) SIR models with the help of tools of statistical theory of survival analysis.