

COVID-19 and Challenges to the Classical Theory of Epidemics  
BEERS, 2022

The standard theory of infectious diseases, tracing back to the work of Kermack and McKendrick nearly a century ago, has been a triumph of mathematical biology, a rare marriage of theory and application. Yet the limitations of its most simple representations, which has always been known, have been laid bare in dealing with COVID-19, sparking a spate of extensions of the basic theory to deal more effectively with aspects of viral evolution, asymptotic stages, heterogeneity of various kinds, the ambiguities of notions of herd immunity, the role of social behaviors and other features. This lecture will address some progress in addressing these, and open challenges in expanding the mathematical theory.