Title:	Anticipating persistent infection
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Abstract:	We explore the emergence of persistent infection in a closed region where the disease progression of the individuals is given by the SIRS model, with an individual becoming infected on contact with another infected individual within a given range. We focus on the role of synchronization in the persistence of contagion. Our key result is that higher degree of synchronization, both globally in the population and locally in the neighbourhoods, hinders persistence of infection. Importantly, we find that early short-time asynchrony appears to be a consistent precursor to future persistence of infection, and can potentially provide valuable early warnings for sustained contagion in a population patch. Thus, transient synchronization can help anticipate the long-term persistence of infection. Further we demonstrate that when the range of influence of an infected individual is wider, one obtains lower persistent infection. This counterintuitive observation can also be understood through the relation between synchronization and infection burn-out.
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