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### **Speeding up spontaneous disease extinction**

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The dynamics of epidemic in a susceptible population is affected both by the random character of interactions between the individuals and by environmental variations. As a consequence, the sizes of the population groups (infected, susceptible, etc.) fluctuate in the course of evolution of the epidemic. In a small community a rare large fluctuation in the number of infected can result in extinction of the disease. We suggest a novel paradigm of controlling the epidemic, where the control field, such as vaccination, is designed to maximize the rate of spontaneous disease extinction. We show that, for a limited-scope vaccination, the optimal vaccination protocol and its impact on the epidemics have universal features: (i) the vaccine must be applied in pulses, (ii) the spontaneous disease extinction is synchronized with the vaccination. We trace this universality to general properties of the response of large fluctuations to external perturbations.

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