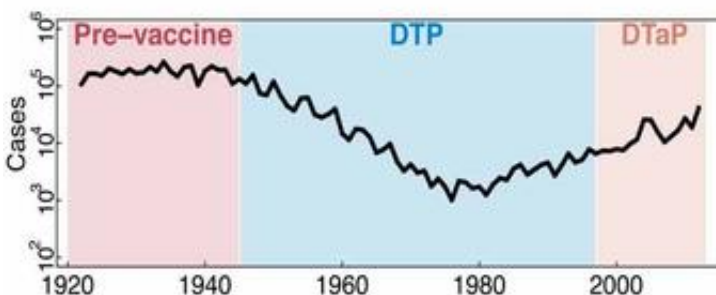


# Asking why pertussis is back, complex systems style

March 22 2016

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Pertussis, the bacteria that causes whooping cough, has made quite the comeback in recent years in the United States, but understanding its reemergence and global prevalence isn't a simple matter. This week a group of researchers, diverse even by SFI standards, have converged to address pertussis and other reemerging infectious diseases at an invitation-only workshop in Santa Fe.

Workshop organizer and former SFI Omidyar Fellow Sam Scarpino and fellow researchers want to tackle one of the more peculiar aspects of pertussis: In some parts of the world, the disease is on the rise, while in others, it's in decline. Globally, Scarpino says, "it's not clear how one accounts for all this data."

There are plenty of hypotheses, including the possibility that pertussis evolved in a way that makes the current vaccine ineffective, or perhaps, as Scarpino and fellow former SFI Omidyar Fellow Ben Althouse recently proposed, it's because the vaccine allows the disease to spread even when people don't develop symptoms, such as the persistent coughing fits most commonly associated with the bacteria.

But, Scarpino says, "We're not looking for one mechanism. We're looking for how they work together in concert," he says. Most likely, researchers will have to look at many mechanisms and their interactions – a classic complex system challenge, making SFI an ideal place to hold the [workshop](#), he says.

Scarpino and his fellow co-organizers, including Aaron King (University of Michigan), have invited mathematicians, public health experts, ecologists, biologists, geneticists, and even computer scientists, many of them from outside the U.S., and some who haven't studied [pertussis](#) before. Their outside perspectives, Scarpino says, could help everyone come to a better understanding of the disease.

For fresh insights, "I think you have to have all those people in the room," Scarpino says.

The broader purpose of the workshop, Scarpino says, is to understand how the various facets of infectious disease, from infection dynamics to the evolution of pathogens, work together and result – or don't result – in outbreaks.

"Pertussis is how we're trying to focus that question," Scarpino says.

Provided by Santa Fe Institute

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