



2015 Science Writers Symposium

Pertussis Reemergence and Our Work To Prevent New Epidemics

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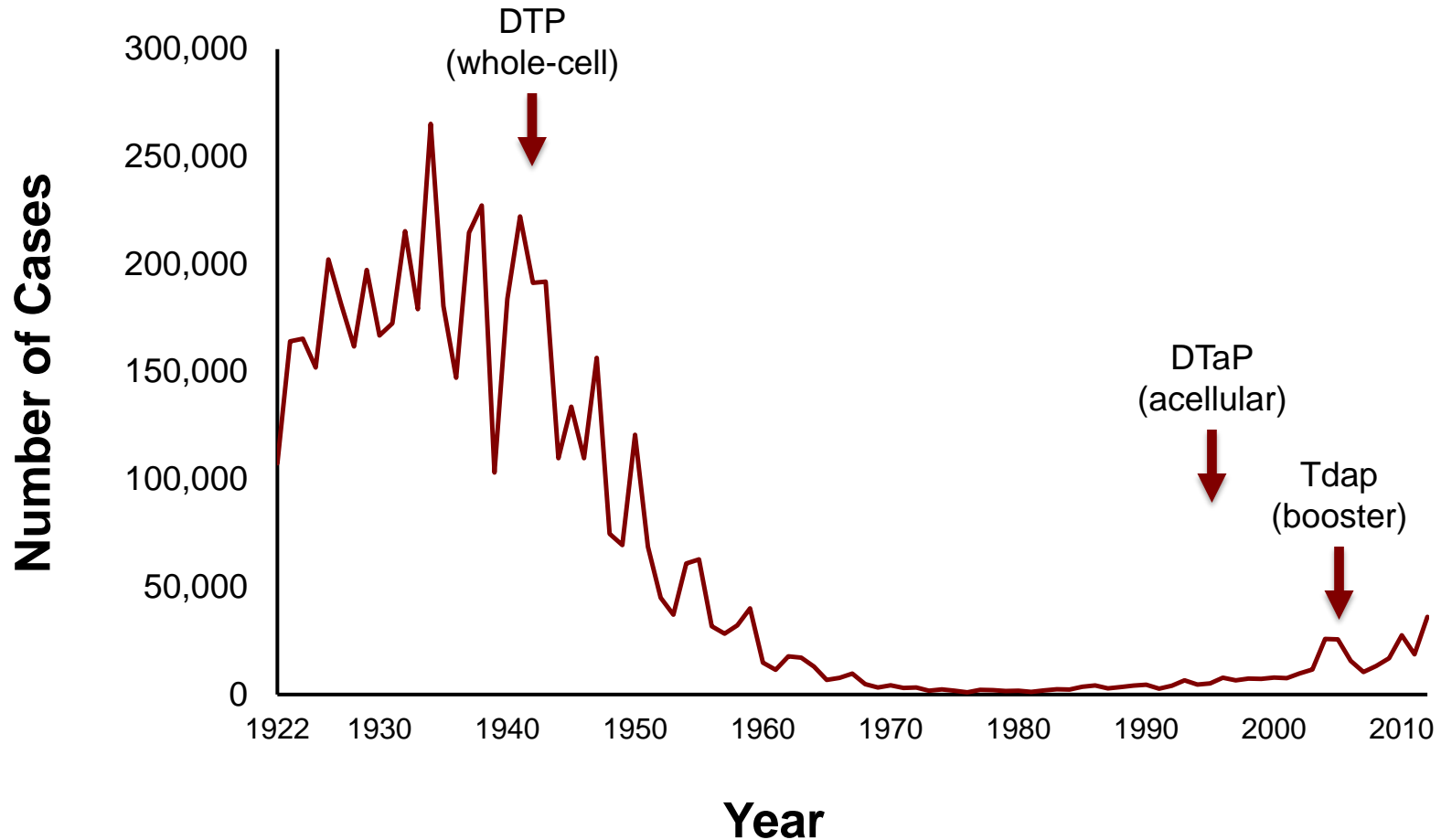


Pertussis

- ❖ Highly contagious respiratory infection caused by *Bordetella pertussis*.
- ❖ In the pre-vaccine era, was nearly universal.
- ❖ Approximately 1 in 10 cases resulted in mortality. Responsible for more deaths than measles and polio combined.
- ❖ Still one of the 10 most common causes of death from infectious disease worldwide. 16 million cases and 200,000 deaths annually according to the World Health Organization.

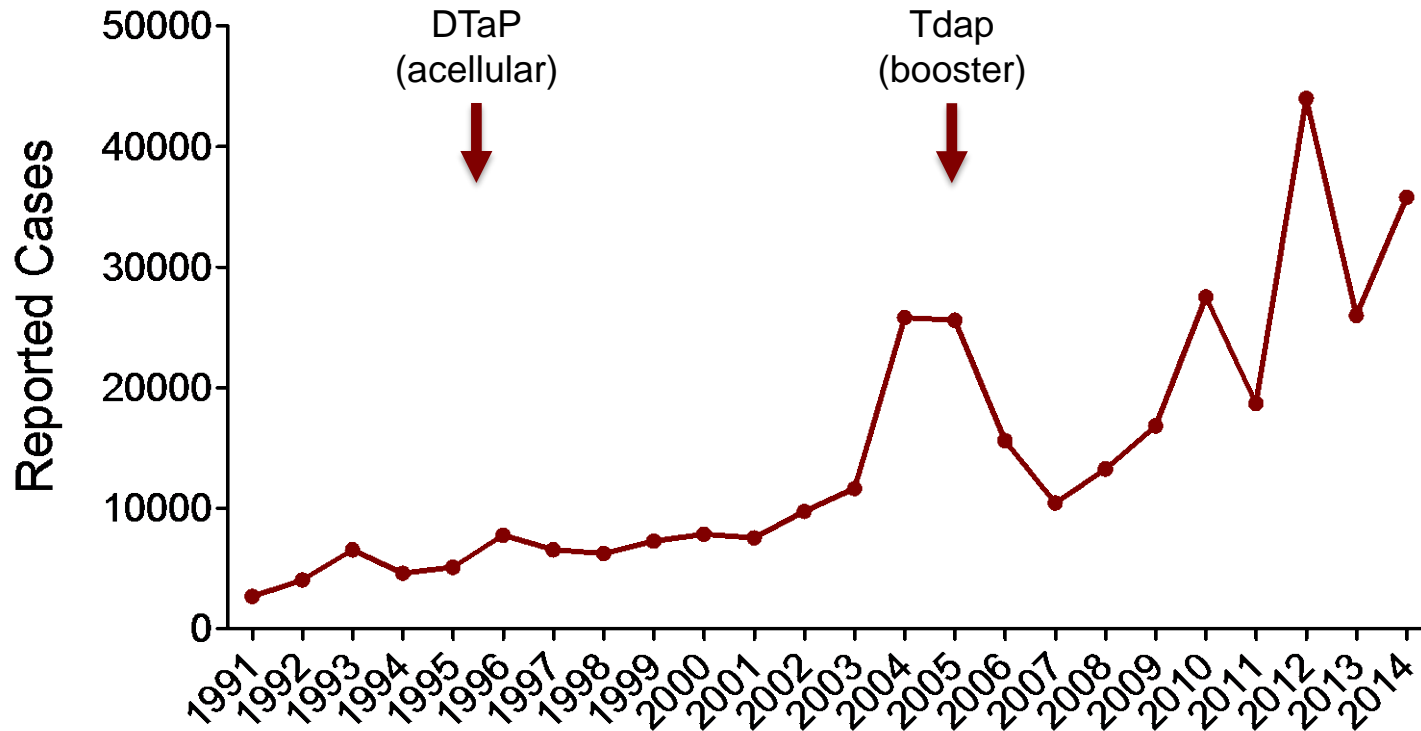


Reported Pertussis Cases: 1922–2012



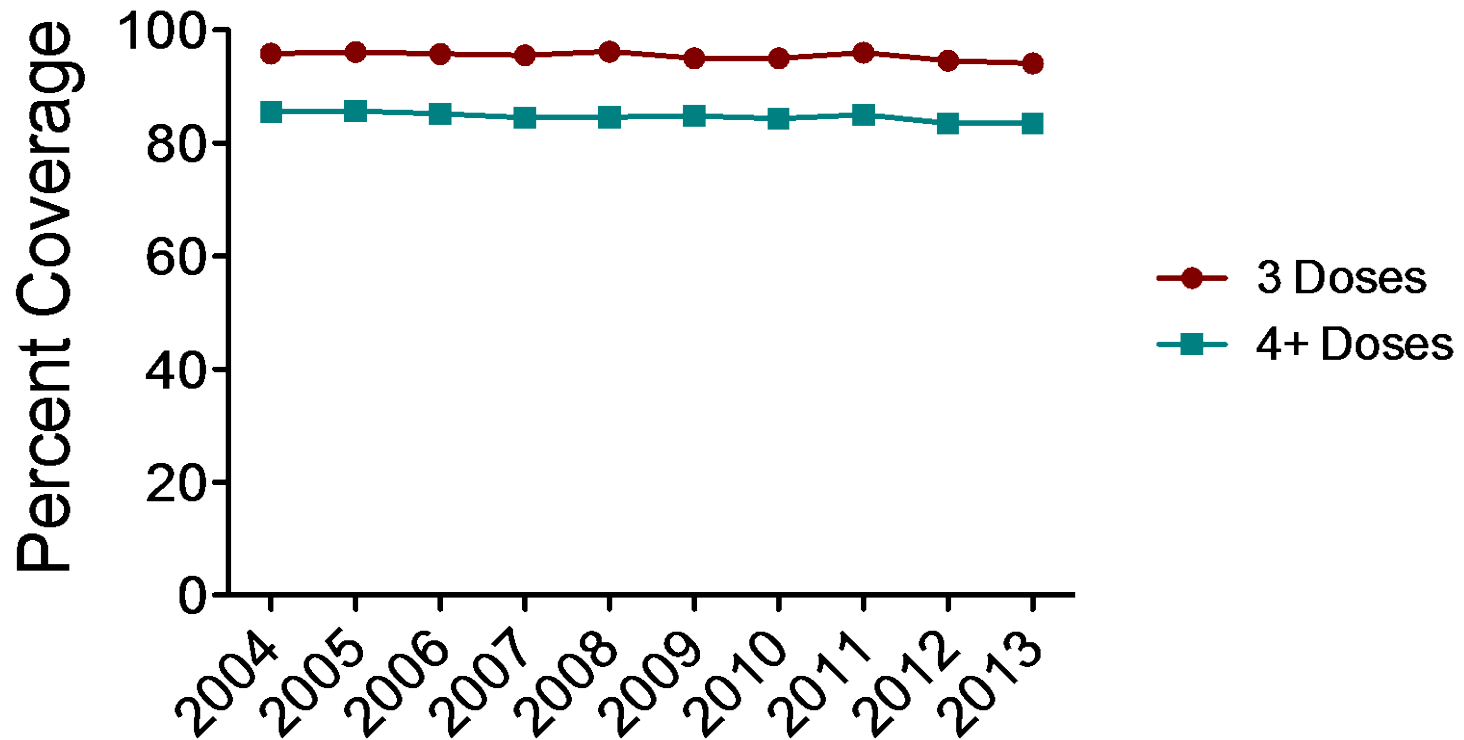


Reported Pertussis Cases: 1991–2013



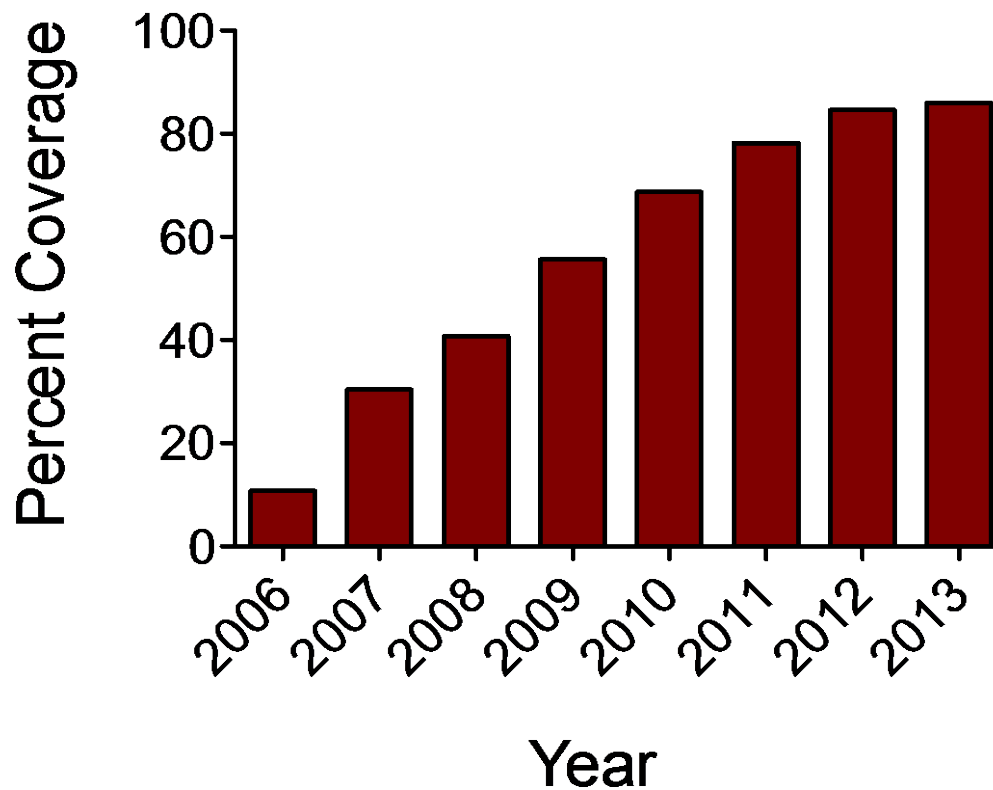


DTaP Coverage Among Children





Tdap Coverage





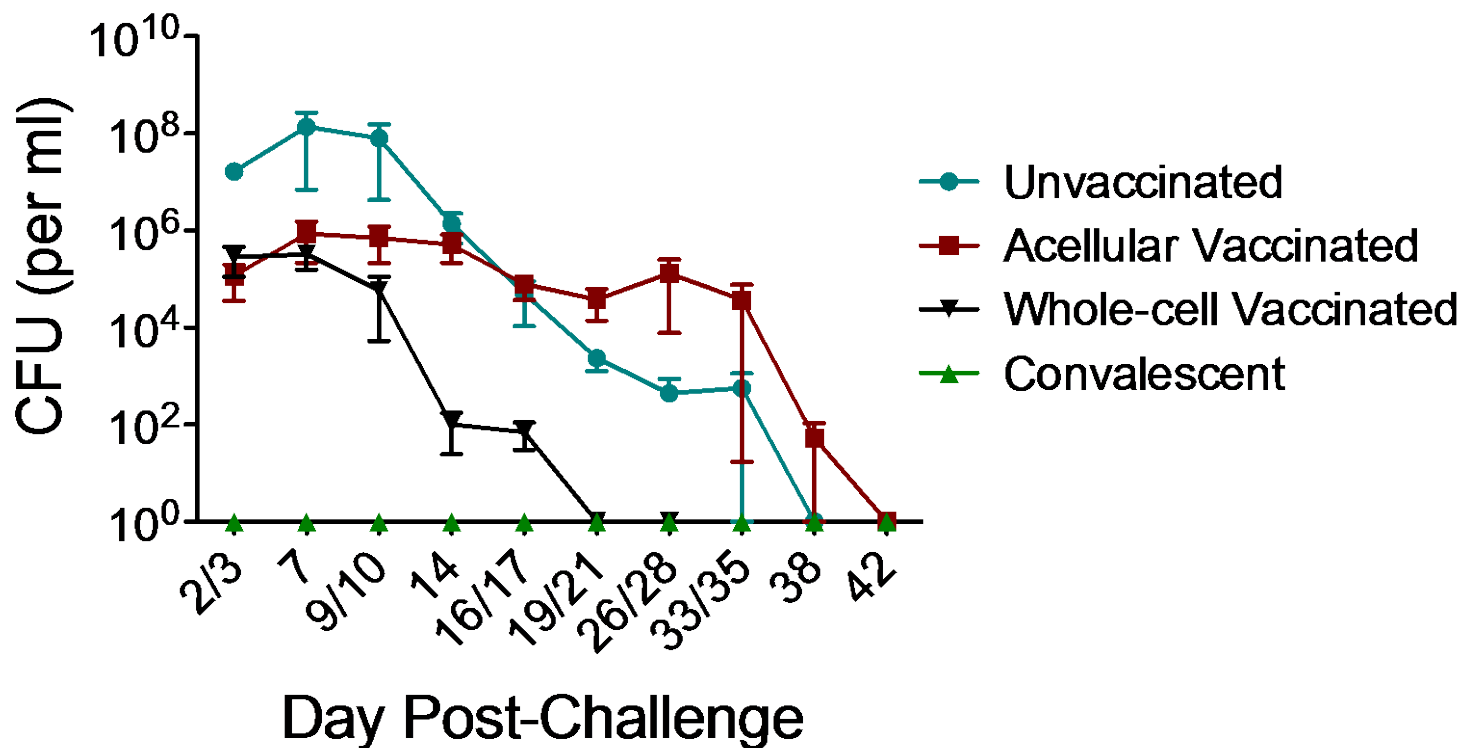
The Baboon Model of Pertussis

Baboons are infected and develop classic symptoms of pertussis:

- ❖ High numbers of bacteria in the airway
- ❖ Coughing
- ❖ High white blood cell counts
- ❖ Mucus production
- ❖ Transmission

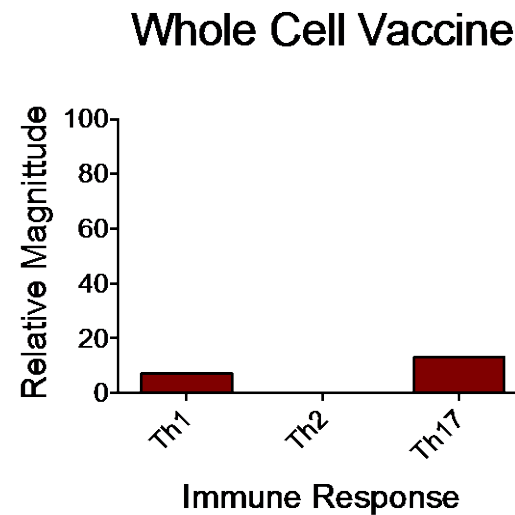
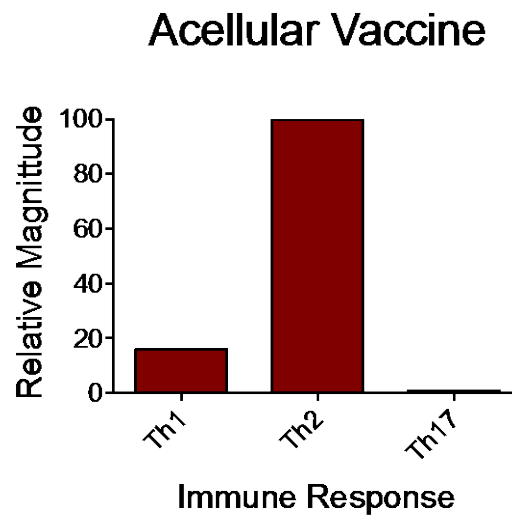
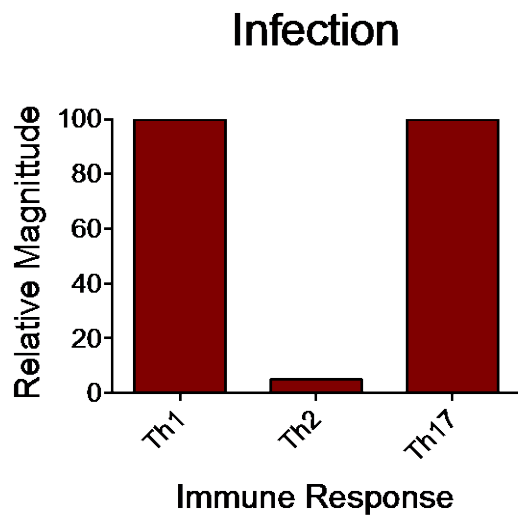


Vaccine-Mediated Protection Against Infection



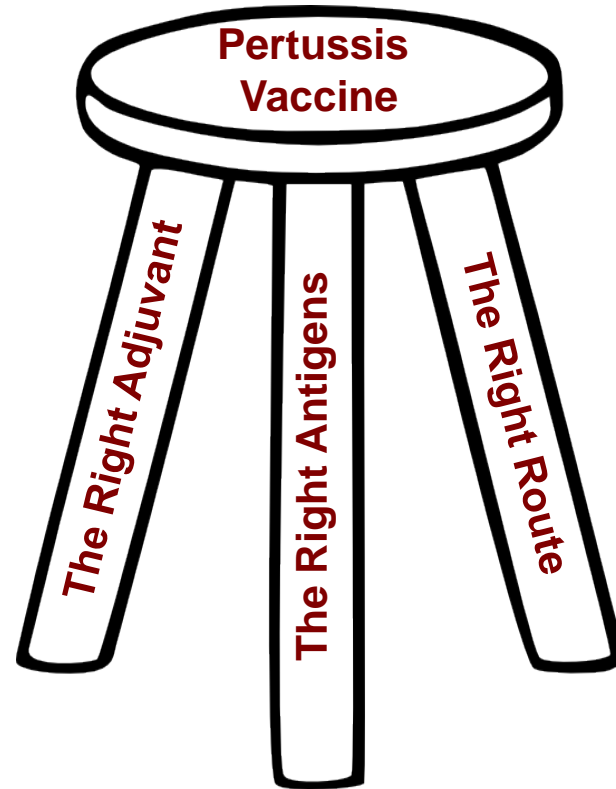


Different Vaccines Induce Different Immune Responses



Ongoing and Future Work

Ongoing and future work relates to finding the right adjuvant, the right antigens, and the right route of immunization to achieve a pertussis vaccine that protects against disease symptoms and prevents infection and transmission





Pertussis in Newborns

- ❖ The majority of severe cases of pertussis and deaths occur in children too young to be vaccinated.
- ❖ The Advisory Committee on Immunization Practices (ACIP) recommends all pregnant women be vaccinated in the third trimester of every pregnancy.
- ❖ This recommendation is based on:
 - a) Human studies showing antitoxin is efficiently passed to the infant.
 - b) Epidemiology from an English outbreak showing infants born to vaccinated mothers were less likely to get pertussis.
 - c) Baboon studies demonstrating protection of newborns following challenge.



The Baboon Model of Pertussis

- ❖ Provides a powerful tool for studying pertussis pathogenesis.
- ❖ Provides a powerful tool for studying the immune response to pertussis infection and vaccination.
- ❖ Provides a very relevant model for testing new strategies using existing vaccines and assumptions driving development of new vaccines.
- ❖ May provide data in support of effectiveness of new vaccines.