Stop Paroxysms of Whooping Cough

It may start off as resembling a mere cold, with a runny nose, fever and a mild cough. Then it displays its true colours. An infant may not even cough noticeably but turn blue in the face due to apnoea when they stop breathing intermittently and this can lead to their death. Children close to 10 years cough and produce a rasping sound when inspiring life-sustaining air and then vomit so much that intravenous rehydration is required. An elderly frail person may cough so explosively that they fracture ribs. Even young and middle aged returning travellers with persistent and debilitating cough may have to be hospitalised. This is the reality of the re-emergence of an old disease which was thought to be under control. Call it the one hundred day cough, refer to it as whooping cough or classify it as pertussis; we are learning more about it as the numbers over the last decade has steadily increased. We are however also able to partly counter this threat.

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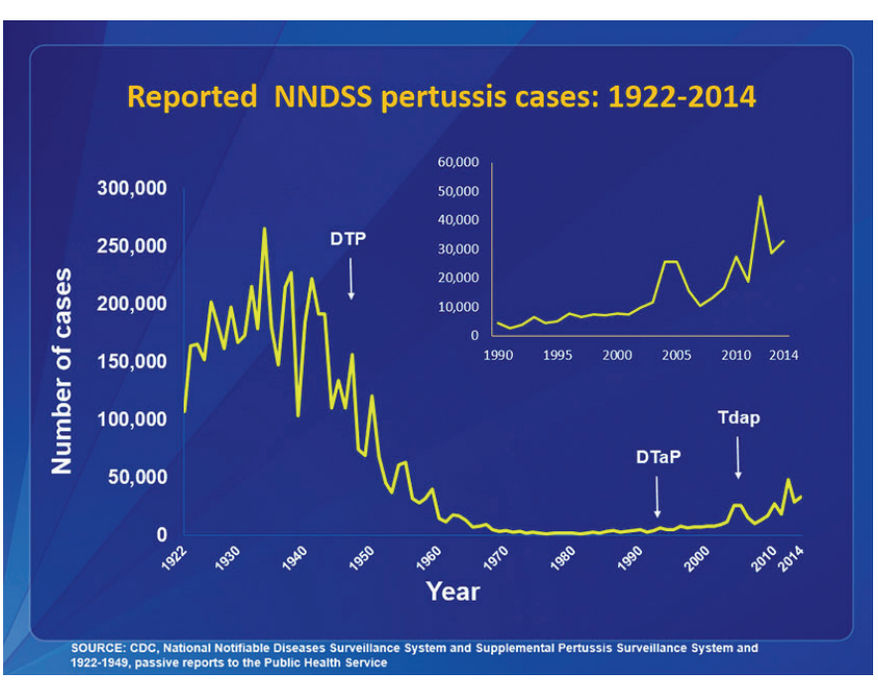
Pertussis is caused by *Bordetella pertussis*, a bacterium. These bacteria attach to the cilia which are tiny, hair-like extensions that line part of the upper respiratory system and release toxins. This damages the cilia causing the lining of the airways to swell. When such an infected person coughs or sneezes, tiny droplets containing the bacteria are sprayed into the air and breathed into the lungs of anyone who happens to be nearby. The initial flu-like catarrhal phase, during which the infected person is highly contagious, is then followed, after about one or two weeks, by fits of many rapid coughs called a paroxysm which is followed by a high pitched inspiratory "whoop" sound. This is called the paroxysmal phase and may last close to three months. Vomiting is frequent after these coughing episodes. These persistent coughing bouts can lead to severe exhaustion. Finally, the patient enters the convalescent phase during which there is increased susceptibility to other infections. This stage lasts between two and three weeks and though symptoms recede, they may occasionally surface.

During the 20th century pertussis was a major cause of morbidity and mortality among infants and children. It was in fact, from 1922 to 1948, the leading cause of death due to an infectious disease among American children younger than 14 years of age. In the 1950s, highly successful vaccines based on whole cell inactivated pertussis cells drove infection rates in countries such as the United States to below one case per 100,000 people. But adverse side effects of those vaccines, such as high pitched screaming in babies and high fevers, led to the development and introduction in the 1990s of acellular pertussis vaccines, which use just a handful of the



TRAVEL MEDICINE

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bacteria's proteins and bypass most of the side effects. It is currently given to children in combination with diphtheria and tetanus vaccines called DTaP as a series of childhood vaccines and forms part of the routine childhood vaccines.

But the statisitics are showing that the acellular vaccine may not be following the pattern predicted. In 2012 the United States recorded the most cases of pertussis compared with the preceding fifty years, including a large outbreak in Washington State. In one analysis, during the period from January 2010 through June 2011, the incidence of pertussis was 115 cases per 100,000 person-years among members younger than 1 year of age. This figure decreased to 29 cases per 100,000 person-years at 5 years of age and then showed a sharp increase to 226 cases per 100,000 person-years at 10 and 11 years of age. It then showed a marked decrease until 15 years of age, and remains low in the age groups after that.

This does not mean that the acellular vaccine is ineffective. Far from it. It is known the vaccine is highly efficacious but that immunity wanes earlier than previously thought. The bacteria are very infective and needs about 99% of the population to be vaccinated in order to protect any unvaccinated people via the herd effect. It is also becoming increasingly evident that though the vaccine protects someone recently vaccinated from the disease itself, it does not always prevent them from carrying the bacterium and spreading it to those not vaccinated or whose immunity has waned. It has also been recently suggested that the practice called cocooning, where parents, carers and siblings are vaccinated to protect newborns, is not as effective as previously thought. The adults are protected but they can still transmit it to the infant who, even though the series of DTaP is commenced early in life, is still vulnerable to infection in the first year due to initially poor development of immunity.

Several strategies can be developed to counter the current threat. It has to be borne in mind that pertussis is a

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cyclical disease and the current surge may be a reflection of that. It is also estimated that up to 20% of prolonged coughs in adolescents and adults are likely due to pertussis and that better detection techniques is shedding light on its true incidence. The primary aim is to protect infants, as the highest incidence and mortality occurs in that age group. Pregnant mothers are currently advised to be vaccinated so that they can confer passive immunity to their infants. In addition those in close proximity to the baby should be vaccinated as it partially protects the infant and boosts their own waning immunity.

Teenagers and adults do not consider vaccination, especially when they are healthy. One of the occasions that they visit a medical practitioner is when they intend travelling and this is an ideal time to raise awareness of the importance of getting vaccinated against pertussis in order to boost their waning immunity. A combination Tdap booster vaccine (the small letters indicating reduced doses as compared to the childhood vaccine) and which also includes a polio booster is currently available and is indicated for adults. This should protect the traveller, partially prevent carriage either to the persons at the destination or back at home on return, and increase herd protection. d

Pertussis Signs and Symptoms

Early symptoms – start mild, similar to a common cold

- runny nose
- sneezing
- low or no fever
- mild cough

After 1–2 weeks – symptoms can get worse fast and can last for months. Bad coughing attacks can lead to:

- vomiting
- a red or blue face
- a "whoop" sound
- problems breathing
- extreme tiredness
- sweating spells

Symptoms in infants are different – infants younger than six months of age often do not have a cough. In the early stages, infants may:

- gasp or gag
- stop breathing
- get very tired
- have seizures