

Preventing pertussis in infants: ACIP's Tdap cocooning recommendations

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National Center for Immunization & Respiratory Diseases

Meningitis and Vaccine Preventable Diseases Branch/Division of Bacterial Diseases



Pertussis immunization in the US

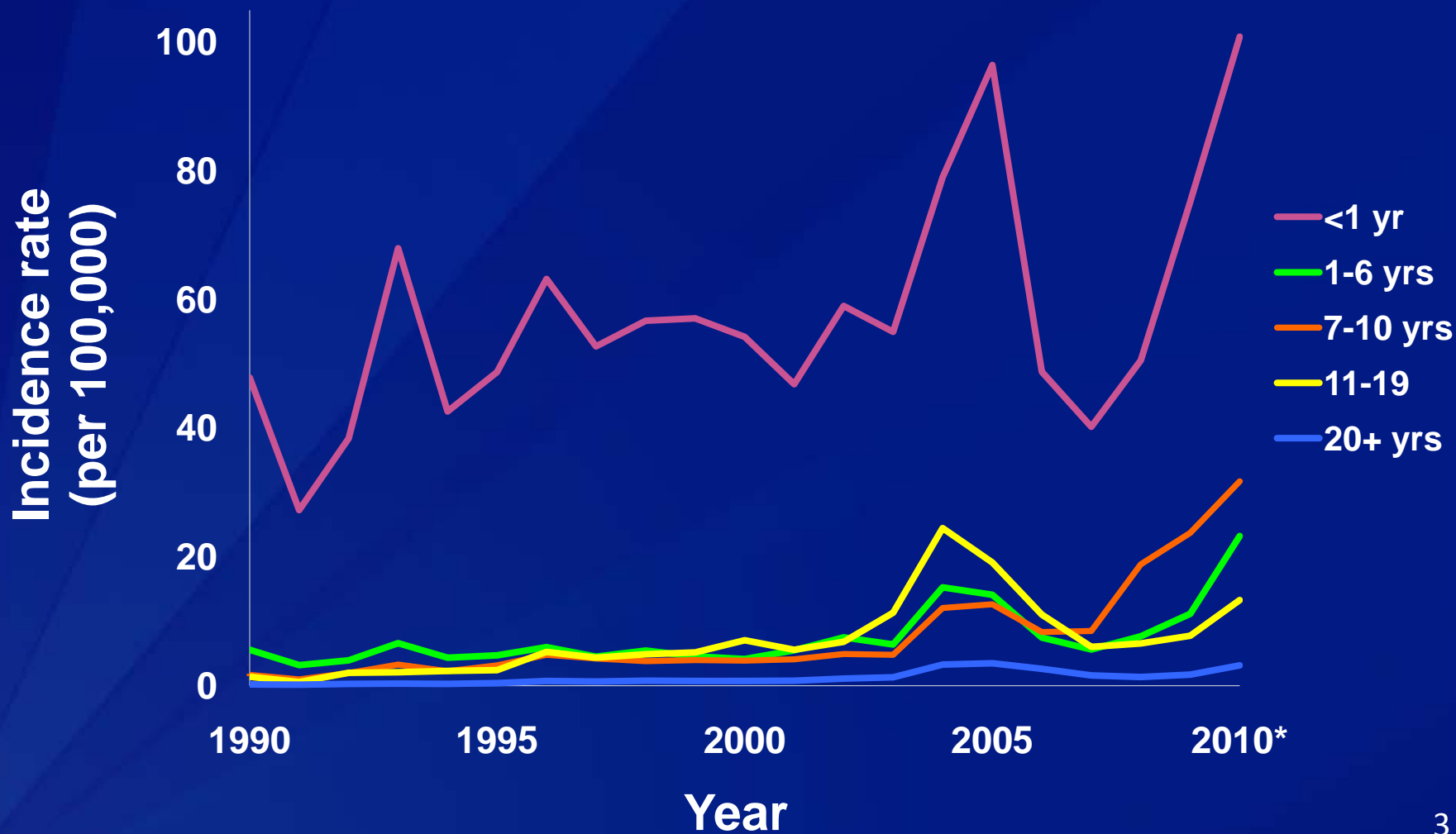
☐ Infants/children

- DTaP at 2, 4, 6 months; 15-18 months; 4-6 years

☐ Adolescents/adults

- Single Tdap, preferred at 11-12 years

Reported pertussis incidence by age group — 1990–2010



SOURCE: CDC, National Notifiable Diseases Surveillance System and Supplemental Pertussis Surveillance System

Reported pertussis-related deaths by age-groups, U.S., 1980-2009

Age-Group	1980-1989 ¹	1990-1999 ¹	2000-2009 ²
0-1 month	38	68	152
2-3 month	11	16	24
4-5 month	5	5	2
6-11 month	7	4	1
1-4 years	13	2	2
5-10 years	1	6	3
11-18 years	0	0	3
>18 years	1	2	8
Total	77*	103	194

* Includes one case with unknown age

¹ Vitek CR et al. *Pediatr Infect Dis J* 2003; 22(7):628-34.

² National Notifiable Diseases Surveillance System, CDC, 2009

Source of pertussis transmission to infants

- ❑ **<50% of infants with pertussis had a potential source identified**
- ❑ **Of identified sources, household members responsible for 75%–83%**
- ❑ **Parents and siblings were common sources**
 - Parents (55%)
 - Siblings (16%-20%)
 - Aunts/uncles (10%)
 - Friends/cousins/others (10%-24%)
 - Grandparents (6%)
 - Caretakers (2%)

Wendelboe AM., et al. Transmission of Bordetella pertussis to Young Infants. *Pediatr Infect Dis J* 2007;26: 293–299

Bisgard KM, Pascual FB, Ehresmann KR, Miller CA, Cianfrini C, Jennings CE et al. Infant pertussis: who was the source? *Pediatr Infect Dis J* 2004; 23(11):985-989.

ACIP 2005 “Cocooning”

- ❑ **The strategy of vaccinating all close contacts of infants aged less than 12 months with Tdap to reduce the risk of transmission of pertussis to these infants.**
 - Ideally at least 2 weeks before contact with the infant.
 - Parents, siblings, grandparents, child-care providers and health-care personnel
 - Pregnant women vaccinated immediately post-partum*



*2005 ACIP Recommendation

Can cocooning work?

- ❑ **Yes**
- ❑ **Successful examples**
 - Houston, TX – Ben Taub General Hospital
 - Nevada - 18 birthing hospitals
- ❑ **Important success factors**
 - Champion for the cause
 - “It’s the right thing to do”
 - Donated healthcare provider time
 - Free Tdap

Challenges to implementation of postpartum immunization & cocooning

- ❑ Immunization platform with little infrastructure
- ❑ Pertussis awareness
- ❑ Two populations
 - Postpartum women
 - Families
- ❑ New immunization providers
- ❑ Reimbursement issues



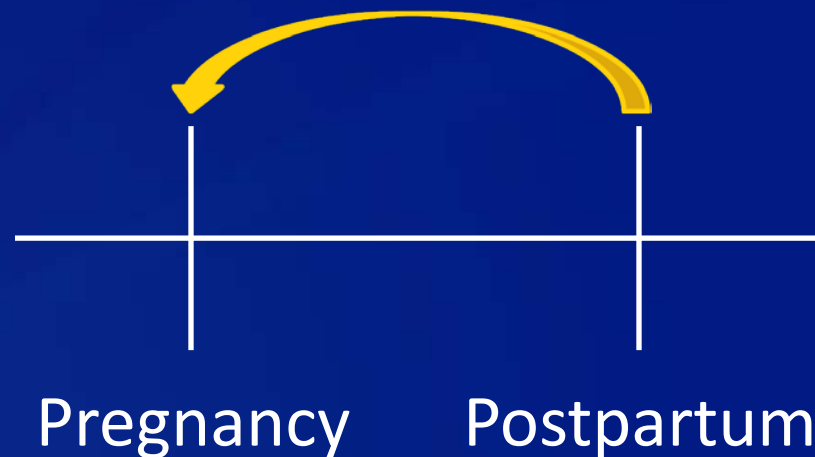
Six years later, is cocooning working?

❑ No, not at a national level

- No wide spread implementation
- Difficult for all close contacts of newborns to be vaccinated
- Poor uptake of Tdap when made available at birthing hospitals
- No demonstration of program sustainability or scale-up
- Effectiveness unknown - no system to measure coverage

Shifting the timing of mother's Tdap dose: postpartum to pregnancy

- ❑ Provides earlier benefit to mother, thereby protecting infant at birth
- ❑ High levels of transplacental maternal antibodies in infants of mothers vaccinated during pregnancy
 - Likely provides direct immunity to infant



Concerns about use of Tdap in pregnant women

❑ Safety to woman and fetus

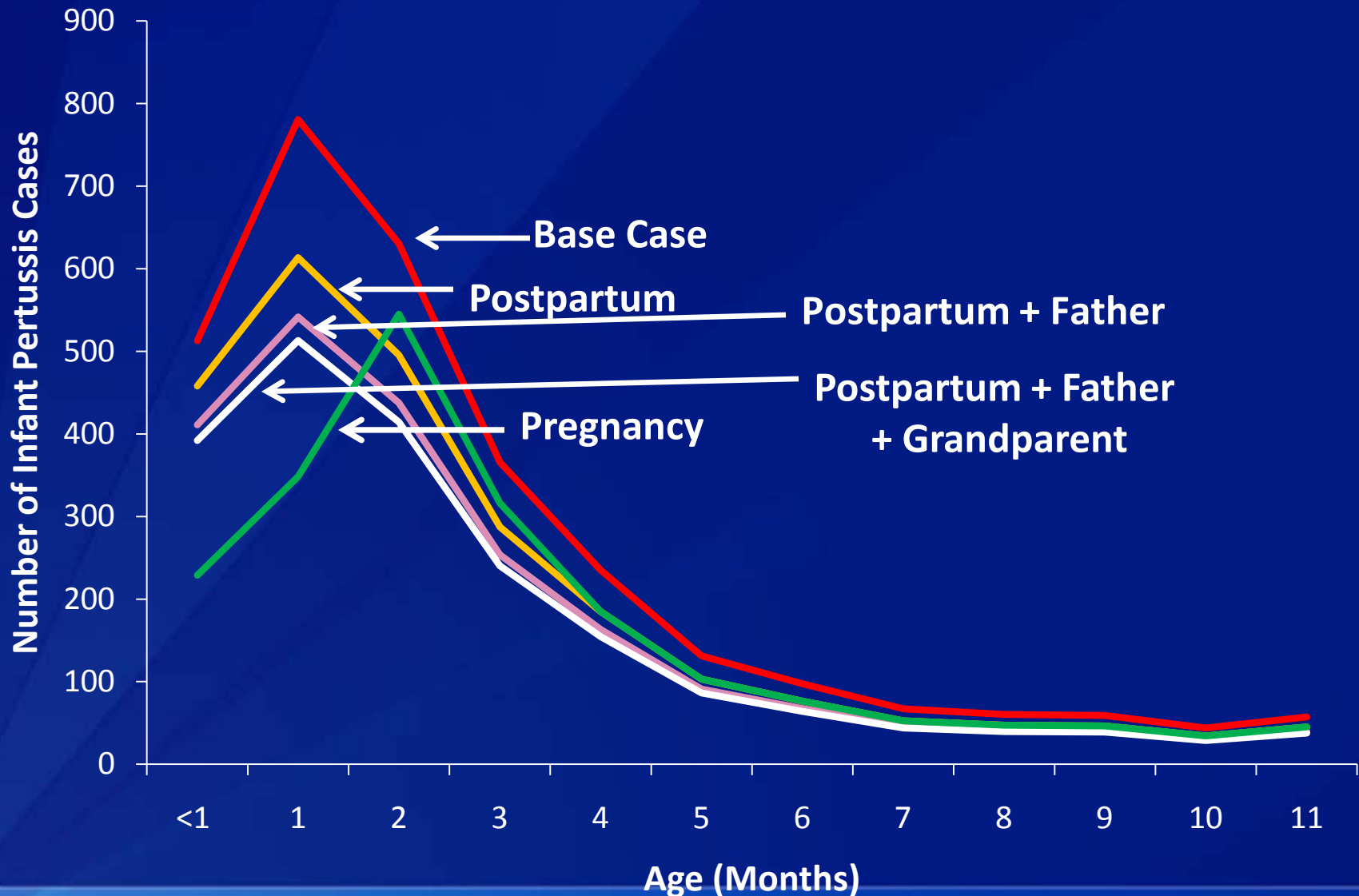
- Td and TT used extensively in pregnant women
- Data and expert opinion support Tdap acceptably safe to pregnant woman and fetus

❑ Effectiveness of maternal antibodies preventing infant pertussis not yet known

❑ Blunting of infant immune response to primary DTaP

- Transplacental antibodies may interfere with infant's antibody production following DTaP
- Degree of interference not yet known
- Clinical importance not clear
- Benefits of protection outweigh risk of less protection later in infancy

Decision Analysis: Tdap Vaccination to Prevent Pertussis in Infants - Number of Infant Cases



Cost Effectiveness Study: Mean Reduction in Pertussis Morbidity and Mortality Relative to Base Case

	Pregnancy	Postpartum	+ Father	+Grandparent
Cases	33%	20%	29%	32%
Hospitalizations	38%	18%	28%	32%
Deaths	49%	16%	25%	29%
Program cost (72% coverage)	\$171 million	\$171 million	\$342 million	\$513 million

Tdap during pregnancy prevents the most infant pertussis at less program cost

ACIP 2012 “Cocooning”

- ❑ **The strategy of vaccinating all close contacts of infants aged less than 12 months with Tdap to reduce the risk of transmission of pertussis to these infants.**
 - Ideally at least 2 weeks before contact with the infant.
 - Parents, siblings, grandparents, child-care providers and health-care personnel
 - Pregnant women vaccinated preferably during the third or late second trimester. Alternatively, administer Tdap immediately postpartum.

Thank you

For more information please contact Centers for Disease Control and Prevention

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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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