Background: Repeat Tdap vaccination

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Overview

- Pertussis epidemiology
- Available vaccines for adults and adolescents (Tdap and Td)
- Current ACIP recommendations for Tdap
- Previous work group and ACIP consideration of repeat Tdap vaccinations
- Rationale for revisiting repeat vaccination issue
U.S. Reported Pertussis Cases: 1922-2017

*2017 data are provisional and subject to change.

SOURCE: CDC, National Notifiable Diseases Surveillance System and 1922-1949, passive reports to the Public Health Service
U.S. Reported Pertussis Cases 1990-2017

*2017 data are provisional and subject to change.

SOURCE: CDC, National Notifiable Diseases Surveillance System and 1922-1949, passive reports to the Public Health Service
### Tdap and Td vaccines licensed in the United States

<table>
<thead>
<tr>
<th>Vaccine type</th>
<th>Trade name</th>
<th>Manufacturer</th>
<th>Pertussis antigens (µg)</th>
<th>Diptheria Toxoids (Lf)</th>
<th>Tetanus Toxoids (Lf)</th>
<th>Age for licensed use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tdap</td>
<td>Adacel*</td>
<td>Sanofi</td>
<td>2.5 5 3 5</td>
<td>2</td>
<td>5</td>
<td>10—64 yrs</td>
</tr>
<tr>
<td>Tdap</td>
<td>Boostrix*</td>
<td>GSK</td>
<td>8 8 2.5 -</td>
<td>2.5</td>
<td>5</td>
<td>≥10 yrs</td>
</tr>
<tr>
<td>Td</td>
<td>Tenivac</td>
<td>Sanofi</td>
<td>2 5</td>
<td>2</td>
<td>5</td>
<td>≥7 yrs</td>
</tr>
<tr>
<td>Td</td>
<td>n/a</td>
<td>MassBiologics</td>
<td>2 2</td>
<td>2</td>
<td>2</td>
<td>≥7 yrs</td>
</tr>
</tbody>
</table>

* Licensed for single use only

**Abbreviations:** Pertussis toxin (PT); filamentous haemagglutinin (FHA); pertactin (PRN); fimbriae (FIM)
Current ACIP Recommendations for Tdap in adolescents and adults in the United States

- **Single dose of Tdap:** Persons aged ≥11 years
  - Preferably at aged 11-12 years

- **Booster dose of Td every 10 years**
  - Single Tdap can replace decennial Td booster dose
  - Dose administered regardless of interval since last Td vaccine
  - 5 years if needed for tetanus prophylaxis for wound management

- **Tdap during every pregnancy**
  - No interval between repeat Tdap doses
  - Off label recommendation

Pertussis Vaccination Coverage* Among The U.S. Population, 2004-2016

*CDC National Immunization Survey: DTaP among children aged 19 through 35 months, Tdap coverage among adolescents aged 13 through 17 years; National Health Information Survey: Tdap among adults aged 19 through 64 years
Adolescent and adult Tdap recommendations for in the United States

* Recommended during pregnancy for women who had not previously received a Tdap vaccination
** For the general population (2013); healthcare workers and those with contact with infants (2014)
Previous Work Group and ACIP discussions of repeat Tdap vaccination

- Evolving pertussis epidemiology
- Vaccine effectiveness and duration of protection
- Immunogenicity
- Safety of repeat Tdap vaccination
- Potential impact on pertussis disease burden
- Economic impact
Previous Work Group and ACIP discussions: Changing pertussis epidemiology

- Improved diagnosis and reporting
- Possible changes in circulating pertussis strains
- Evidence of waning of protection from acellular pertussis vaccines
  - Changes in age distribution of cases
  - Emergence of disease in adolescents who had received Tdap
Previous Work Group and ACIP discussions: Vaccine effectiveness (VE) and duration of protection

- Initial Tdap VE in adolescents:
  - Tdap VE high (~75%) within first year
  - Substantial waning in 2-4 years
- VE data consistent with pertussis epidemiology

Previous Work Group and ACIP discussions: Immunogenicity

- Initial Tdap
  - Rapid decline in first 1-2 years, slower decline over 10 years
  - Antibody levels higher than pre-vaccination, but after 10 years close to pre-vaccination
  - Antibody contributes to protection, but no well-established level of antibody correlates with protection

- Second Tdap
  - Antibody response similar to first Tdap in cohorts boosted after 5 or 10 years
  - Tetanus and diphtheria: Robust antibody response, persistence comparable to Td

Previous Work Group and ACIP discussions: Safety of repeat vaccination

- Second Tdap
  - Response at 5- and 10- year intervals:
    - Local reactions common, systemic reactions less common
      - Mild to moderate and self-limited
      - Frequency generally comparable to first Tdap
  - Serious AEs rare, not related to vaccine
  - Safety profiles comparable at the 5 and 10 year interval

Previous Work Group and ACIP discussions: Impact on disease burden and economic impact

- Initial Tdap:
  - Evidence of direct protection
  - Potentially limited impact on disease transmission and herd immunity
    - Evidence from animal models
    - Lack of epidemiologic data

- Second Tdap:
  - Specific revaccination strategies were not likely to be cost-effective
    - Economic impact of revaccinating a cohort at 16 and 21 years old
    - Reduction of disease burden would likely be limited

Previous Work Group and ACIP discussions: 2013 and 2014 Summary

- Increase in pertussis expected to continue
- First Tdap vaccination has high initial VE, but substantial waning of protection wanes within 2-4 years
- Second Tdap is safe and immunogenic
- Reduction of disease burden would likely be limited with second Tdap
- Given cost of Tdap compared with Td, specific revaccination strategies were not likely to be cost-effective

**Conclusion:** Data did not support recommendation for second Tdap
Why consider repeat Tdap vaccination now?

- Application for FDA label change to remove “single use” language
  - Manufacturer of one Tdap product filed a Biologics License Application (BLA)
  - FDA accepted the application
  - Review expected to be complete by January 2019

- Repeat Tdap vaccination in clinical practice
  - Large retrospective study of repeat Tdap doses
  - Many providers not stocking both Td and Tdap
  - Allowing Tdap for the decennial Td booster would be easier for providers

Questions to be addressed by ACIP

- Should the current recommendation that non-pregnant adults receive a single lifetime dose of Tdap and Td boosters every 10 years be changed to allow any Td-containing vaccine (Tdap or Td) to be used for the decennial Td booster in adults?
- Should any Td-containing vaccine (Tdap or Td) be allowed for use for tetanus prophylaxis in the setting of wound management?
Questions for ACIP

- Are there specific data ACIP would like presented?
- Are there specific options or other considerations the Work Group should address?
For more information, contact CDC
1-800-CDC-INFO (232-4636)

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.