

**OREGON PUBLIC HEALTH DIVISION, DHS,
IMMUNIZATION PROGRAM**

**DIPHTHERIA AND TETANUS (TOXOIDS) and PERTUSSIS (ACELLULAR)
VACCINES
AND COMBINATION VACCINES
PEDIARIX®
PENTACEL®
KINRIX™**

Revisions as of 9/08

- New combination vaccines Kinrix™ and Pentacel® added to licensed vaccines (Section II) and the vaccine schedules (Section III)
- Vaccine schedule for Pediarix® in Section III. p.4
- Partial dose warning added to Other Considerations (Section VII.G)
- Children who have recovered from culture+ pertussis no longer need to receive additional doses of pediatric pertussis vaccine (Section VII.D)

I. ORDER:

1. Screen for contraindications.
2. Provide a current Vaccine Information Statement (VIS), answering any questions.
3. Obtain a signed Vaccine Administration Record (VAR).
4. Give DTaP-containing vaccine (0.5 ml), intramuscularly (IM) to infants and children <7 years of age.
 - a. Give according to age-appropriate schedule and anatomic site.
 - b. Give DTaP-containing vaccine simultaneously with all routine childhood immunizations according to age and immunization status of recipient.

Signature

Health Officer or Medical Provider

Date

September 2008

II. LICENSED DTaP (diphtheria, tetanus, and acellular pertussis) VACCINES¹			
Product Name	Vaccine Components	Acceptable Age Range	Thimerosal
Daptacel® (s. pasteur)	DTaP	6 weeks – 6 years of age	None
Infanrix® ² (GSK)	DTaP	6 weeks – 6 years of age	None
Tripedia® ² (s. pasteur)	DTaP	6 weeks – 6 years of age	Trace
Pediarix® ³ (GSK)	DTaP (INFANRIX®), IPV, Hepatitis B (ENGERIX-B®)	6 weeks – 6 years of age	None
TriHIBit® ⁴ (s. pasteur)	DTaP (Tripedia®), Hib (ActHIB®)	12 months – 4 years of age	Trace (Tripedia®)
Pentacel® ⁵ (sanofi pasteur)	DTaP, IPV, HIB(ActHIB®)	6 weeks– 4 years of age	None
Kinrix™ ⁶ (GSK)	DTaP (INFANRIX) & IPV	4–6 Years of age	None

¹ When feasible, the same brand of DTaP vaccine should be used for all doses of the series. If a previous brand is unknown or unavailable, any DTaP vaccine should be used to complete the series rather than defer vaccination.

² Tripedia® and Infanrix® are currently approved for the 5th dose of the DTaP series.

³ Pediarix® is licensed for the primary DTaP series (first three doses) only. It is not approved for the 4th or 5th DTaP dose and should not be administered to an infant < 6 weeks of age or to children ≥7 years of age. Pediarix® can be used interchangeably before or after any individual DTaP, Hep-B, or IPV dose in the primary series.

⁴ TriHIBit® (ActHib® reconstituted with Tripedia®) should only be used for the 4th dose of the DTaP series. TriHIBit® may be used in children ≥12 months of age if the previous dose of Hib was given at least 8 weeks prior and the TriHIBit® dose will be the last (i.e., booster) dose of Hib series, and it has been at least 6 months since the third dose of DTaP. DO NOT give TriHIBit® if the child has had no prior Hib vaccinations.

⁵ Pentacel® is licensed for the first 4 doses of the DTaP series, the first 3 doses of the IPV series and the 4 doses of the Hib series from 6 weeks through 4 years of age.

⁶ Kinrix™ is licensed for the 5th dose in DTaP series and the 4th dose in the IPV series between 4–6 years of age. The tip cap and the rubber plunger of the pre-filled syringes contain dry natural latex rubber.

III. A DTaP VACCINE SCHEDULE^{1,2,3,4,5}**Dose/Route: 0.5 mL IM**

DOSE	RECOMMENDED AGE	MINIMUM AGE ⁶	MINIMUM SPACING ⁶
1	2 months	6 weeks	Not applicable
2	4 months	10 weeks	4 weeks dose 1 to 2
3	6 months	14 weeks	4 weeks dose 2 to 3
4	15 months	12 months ⁷	6 months dose 3 to 4 ^{7,8}
5 ⁹	4 years	4 years	6 months dose 4 to 5

¹ If 6 doses of a DTaP-containing vaccine are given before age 7 years, a Tdap booster is due at age 11–12 years. If a child <4 years of age has had 5 doses of DTaP (valid and invalid doses), the 6th dose will be due at 4–5 years of age and 6 months after dose 5.

² Td should not be given at <7 years of age. If a child <7 years of age mistakenly receives Td instead of DTaP, the Td dose will not count and must be replaced with a DTaP dose. If the child is ≥7 but <11 years of age, then wait until the child is eligible for Tdap to administer the next diphtheria, tetanus, and diphtheria containing vaccine.

³ Infants and children with a stable neurologic condition, including well-controlled seizures, may be given DTaP.

⁴ If pertussis vaccine is contraindicated, do not give DTaP; use DT instead.

⁵ The use of a DTaP-containing combined vaccine is acceptable as long as one antigen is indicated and the other antigens are not contraindicated.

⁶ For retrospective checking, doses that violate the minimum spacing or age by 4 or fewer days do not need to be repeated. Doses administered 5 days or earlier than the minimum interval or age should be repeated, as appropriate for age.

⁷ If the spacing between the 3rd and 4th dose is ≥6 months, and the child is not likely to return at the recommended age, the fourth dose of DTaP may be given as early as 12 months of age.

⁸ While the recommended minimum spacing between DTaP3 and DTaP4 is 6 months, if DTaP4 is administered ≥4 months after DTaP3, it does not need to be repeated.

⁹ The final dose of DTaP is due at or before school entry. The 5th dose is not required if the 4th dose was given on or after the fourth birthday.

III. B. COMBINATION PEDIARIX® VACCINE SCHEDULE^{1,2,3,4} (DTaP, IPV, and HepB)

Dose/Route: 0.5 ml IM			
DOSE	RECOMMENDED AGE	MINIMUM AGE	MINIMUM SPACING
1	2 months	6 weeks	
2	4 months	10 weeks	4 weeks dose 1 to 2
3	6–18 months	6 months	8 weeks dose 2 to 3 16 weeks dose 1 to 3

¹Pediarix® is licensed for the first three doses of the DTaP series. It is not approved for the 4th or 5th dose of the DTaP or IPV series. However, if this combination vaccine is misadministered as the 4th or 5th dose of the DTaP or IPV series, ACIP suggests that the dose does not need to be repeated and can be counted as valid.

²Pediarix® can be used interchangeably before or after any individual DTaP, HepB, or IPV dose in the primary series.

³For retrospective checking, doses that violate the minimum spacing or age by 4 or fewer days do not need to be repeated. Doses administered 5 days or earlier than the minimum interval or age should be repeated, as appropriate for age.

⁴Pediarix® should not be administered to children ≥ 7 years of age.

III. C. COMBINATION PENTACEL® VACCINE SCHEDULE^{1,2,3} (DTaP, IPV, and Hib)

Dose/Route: 0.5 ml IM			
DOSE	RECOMMENDED AGE	MINIMUM AGE ⁴	MINIMUM SPACING ⁴
1	2 months	6 weeks	
2	4 months	10 weeks	4 weeks dose 1 to 2
3	6 months	14 weeks	4 weeks dose 2 to 3
4	15–18 months	12 months	6 months dose 3 to 4

¹Pentacel® is approved for the primary DTaP series and the first booster dose (doses 1–4). It is not licensed for children ≥ 5 years of age.

²Pentacel® may be used to complete the vaccination series in children previously vaccinated with one or more doses of any single or combination DTaP or Hib vaccine when other antigens of Pentacel® are also needed and not contraindicated.

³Pentacel's® lyophilized ActHib component needs to be reconstituted with the DTaP-IPV component to prepare for vaccine administration. Shake the reconstituted vial thoroughly until a cloudy, uniform suspension results, then vaccinate immediately.

⁴For retrospective checking, doses that violate the minimum spacing or age by 4 or fewer days do not need to be repeated. Doses administered 5 days or earlier than the minimum interval or age should be repeated, as appropriate for age.

III. D. COMBINATION KINRIX™ VACCINE SCHEDULE^{1,2,3,4,5} (DTaP and IPV)

Dose/Route: 0.5 ml IM		
DOSE	RECOMMENDED AGE ^{6,7}	MINIMUM AGE ⁷
Booster	4–6 years	4 years
<p>¹ This combined DTaP-IPV vaccine is approved for the booster dose of DTaP and IPV (5th dose of DTaP and 4th dose of IPV) at age 4–6 years of age.</p> <p>² This combination booster dose can be administered whenever one of the antigens is recommended and the other is not contraindicated.</p> <p>³ Can be given simultaneously with MMR and varicella-containing vaccines.</p> <p>⁴ The 5th dose of the DTaP series is not required if the 4th dose was given on or after the fourth birthday. Although Kinrix™ is licensed for the 5th dose of the DTaP series, it can be administered for the 4th (and final) dose of the DTaP series if the child is ≥4 years of age. (approved by the Oregon Immunization Program Medical Director).</p> <p>⁵ While ACIP recommends that the DTaP series be completed with the same brand of DTaP vaccine previously given, Kinrix™ can be given to complete the DTaP series following the 3rd or 4th dose of any DTaP vaccine or any DTaP-containing combination vaccine previously administered.</p> <p>⁶ Must be given at <7 years of age.</p> <p>⁷ For retrospective checking, doses that violate the minimum spacing or age by 4 or fewer days do not need to be repeated. Doses administered 5 days or earlier than the minimum interval or age should be repeated, as appropriate for age.</p>		

IV. CONTRAINDICATIONS FOR DTaP-CONTAINING VACCINES¹

- A. Anaphylactic reaction (hives, swelling of the mouth and throat, difficulty breathing, hypotension or shock) after a previous dose of a DTaP-containing vaccine or after the use of any other components of the vaccine. For example:
- neomycin or polymyxin in Pentacel®
 - neomycin, polymyxin B, or latex rubber in syringe plunger of Kinrix™
 - latex rubber in syringe of Pediarix®.

Note: Because of the importance of the tetanus vaccine, persons who experience anaphylactic reactions to tetanus toxoid may be referred to an allergist for evaluation and possible desensitization.

- B. Encephalopathy occurring within 7 days of a previous dose of a DTaP- or DTP-containing vaccine that is not due to another identifiable cause. Encephalopathy is defined as a major alteration in consciousness, unresponsiveness, or generalized or focal seizures that persist more than a few hours, without recovery within 24 hours. After consulting with your Health Officer or client's Primary Care Provider **may give DT vaccine for the remaining doses.**

V. PRECAUTIONS FOR DTaP-CONTAINING VACCINES²

- A. Moderate or severe illness. Delay immunization until illness resolved.
- B. Underlying unstable, evolving neurologic disorder. Consult physician for direction.

Any of these conditions within the specified time after a previous dose of a DTaP-containing vaccine.

- C. Fever of $\geq 40.5^{\circ}\text{C}$ (105°F) within 48 hours (due to unknown cause) after vaccination with a prior dose DTaP. **A physician needs to evaluate the child and write an order to continue the DTaP series. May use pediatric DT to complete the series.**
- D. Collapse or shock-like state (hypotonic or hyporesponsive episode) within 48 hours of receiving a prior dose of DTaP. **A physician needs to evaluate the child and write an order to continue the DTaP series. May use pediatric DT to complete the series.**
- E. Persistent, inconsolable crying lasting ≥ 3 hours and occurring within 48 hours of receiving a prior dose of DTaP. **May give DT (or DTaP with physician's order).**
- F. Seizure or convulsion within 72 hours. **May give DT (or DTaP with a physician's order).**
- G. Guillain-Barré syndrome within 6 weeks of a DTaP-containing vaccine.
- H. Children with impaired immune responses, i.e., immunosuppressive therapies (including irradiation, corticosteroids, antimetabolites, alkylating agents, and cytotoxic drugs), a genetic defect, or HIV infection may experience a reduced immune response to vaccines. Deferring DTaP may be considered for children receiving immunosuppressive therapy.

¹ An acellular pertussis vaccine should NOT be used in children who have a valid contraindication to whole-cell pertussis vaccine.

² In circumstances where the benefits of immunizing outweigh the risks, such as in the event of a pertussis outbreak, DTaP should be given for subsequent doses.

VI. ADVERSE REACTIONS FROM DIPHTHERIA, PERTUSSIS OR TETANUS TOXOID-CONTAINING VACCINES

EVENT	FREQUENCY
<p>Local reactions (pain, erythema, induration, and swelling)</p> <p>More exaggerated Arthus-like reaction¹</p>	<p>More common following 4th or 5th doses 17–56% after 4th dose of Pentacel®² 17–40% after 3rd dose of Pediarix®³</p> <p>Occasionally (most often in adults)</p>
<p>Mild systemic reactions (fever, drowsiness, fretfulness, and anorexia)</p> <p>Temp ≥100°F(38°C)</p>	<p>Occasionally</p> <p>3–5% with DTaP vaccines 7% with Kinrix™⁴ 6–16% with Pentacel®² 28–34% with Pediarix®, Hib and PCV vaccines together³</p>
<p>Moderate to Severe systemic reactions Fever ≥105°F or febrile seizures</p>	<p>Rarely reported with DTaP vaccines</p>
<p>¹ Symptoms present as extensive painful swelling, often from shoulder to elbow; they generally begin 2–8 hours after injection and are usually due to the presence of very high serum antitoxin levels in persons who have received frequent doses of diphtheria or tetanus toxoid.</p> <p>² Pentacel® 2008 package insert, Table 6, p.22.</p> <p>³ Pediarix® 2007 package insert, Table 3, p14.</p> <p>⁴ Kinrix® 2008 package insert, Table 1, p 5.</p>	

VII. OTHER CONSIDERATIONS

- A. Normally no more than 6 doses of a diphtheria/tetanus-containing vaccine are recommended by 7 years of age. However, in some situations, the benefits of a pertussis-containing vaccine being added to a series needs to be weighed against the risk of a local reaction occurring after receiving 7 or 8 doses of a DT-containing vaccine.
- B. Acetaminophen or ibuprofen may be given just prior to DTaP administration, and every 4 hours for 24 hours following immunization, to reduce the risk of post-immunization fever.
- C. Infants and children with a stable neurologic condition, including well-controlled seizures, may be given DTaP-containing vaccines. A family history of convulsions is not a contraindication for pertussis-containing vaccines.
- D. Although well-documented pertussis confers short-term protection against infection, the duration is unknown. Some experts recommend DTaP vaccine to complete the immunization series. At minimum, these children should receive at least DT vaccine to complete the series to provide protection against diphtheria and tetanus (*Red Book*, 27th edition, 2006: p.508).
- E. Internationally Adopted Children: Vaccination providers can revaccinate a child with DTaP without regard to recorded doses; however, if a revaccination approach is adopted and a severe local reaction occurs, serologic testing for specific IgG antibody to tetanus and diphtheria toxins can be measured before administering additional doses. A protective concentration indicates that further doses are unnecessary, and subsequent vaccination should occur as appropriate for age. (Consult the 12/1/06 ACIP General Recommendations (p. 35) for further clarification)
- F. Partial doses of DTaP should not be given to pre-term infants or any other child in an effort to avoid adverse reactions, because antibody response may be inadequate.
- G. Guidance on the best approach to vaccinate following misadministration of DTaP to persons ≥ 7 years of age can be found at: www.cdc.gov/mmwr/pdf/rr/rr5503.pdf, p.27.
- H. For someone with a history of fainting with injections, a 15-minute observational period is recommended after immunization.

VIII. TETANUS WOUND MANAGEMENT AMONG CHILDREN

Vaccination History	Clean, minor wounds		All other wounds	
	DTaP	TIG	DTaP	TIG
Unknown or < than 3 doses	Yes	No	Yes	Yes
≥ 3 doses	No*	No	No**	No

* Yes, if >10 years since last tetanus-containing vaccine dose
** Yes, if >5 years since last tetanus-containing vaccine dose

TIG: tetanus immune globulin.

Taken from the 2007 10th edition "Pink Book" page 74

IX. ADVERSE EVENT REPORTING

Adverse events following immunization should be reported by public providers to the Oregon Public Health Division's Immunization Program, using a Vaccine Adverse Events Reporting System (VAERS) form, according to state guidelines. Private providers report all adverse events directly to VAERS at 800-822-7967, and the website address is <http://vaers.hhs.gov>.

Events Reportable to VAERS:**Vaccine Injury Table**

Vaccine	Illness, disability, injury or condition covered	Time period for first symptom or onset of significant reaction following vaccine administration
Tetanus toxoid-containing vaccines (e.g., DTaP, Tdap, DTP-Hib, DT, Td, TT)	<ol style="list-style-type: none"> 1. Anaphylaxis or anaphylactic shock 2. Brachial neuritis 3. Any acute complication or sequela (including death) 	<p>0–4 hours</p> <p>2–28 days</p> <p>Not applicable</p>
Pertussis antigen-containing vaccines (e.g. DTaP, Tdap, DTP, DTP-Hib)	<ol style="list-style-type: none"> 1. Anaphylaxis or anaphylactic shock 2. Encephalopathy (or encephalitis) 3. Any acute complication (including death) 	<p>0–4 hours</p> <p>0–72 hours</p> <p>Not applicable</p>

Reference: <http://www.hrsa.gov/vaccinecompensation/table.htm>

X. REFERENCES

1. Diphtheria, tetanus, pertussis. In: *Epidemiology and Prevention of Vaccine-Preventable Diseases* (“Pink Book”). Atkinson W, Hamborsky J, Wolfe S, eds. 10th ed. Washington, DC: Public Health Foundation, 2008: 59–99. Available at www.cdc.gov/vaccines/pubs/pinkbook/default.htm.
2. Pertussis. In: Pickering LK, Baker CJ, Long SS, McMillan JA, eds. *Red Book: 2006 Report of the Committee on Infectious Diseases*. 27th ed. Elk Grove Village, IL; American Academy of Pediatrics; 2006: 508. Available at <http://aapredbook.aappublications.org>.
3. CDC. General Recommendations on Immunizations. Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR* 2006; 55 (RR-15):1–48. Available at www.cdc.gov/mmwr/PDF/rr/rr5515.pdf.
4. Pediarix® 2007 package insert. Available at http://www.us.gsk.com/products/assets/us_pediarix.pdf.
5. Pentacel® 2008 package insert. Available at

<http://www.fda.gov/CbER/label/pentacellLB.pdf>.

6. Kinrix™ 2008 package insert. Available at
<http://www.fda.gov/cber/label/kinrixLB.pdf>.

For more information or to clarify any part of the above order, consult with your health officer or call the Oregon State Public Health Division Immunization Program at 971-673-0300.

To download a copy visit our website at

<http://oregon.gov/dhs/ph/imm/provider/stdgordr.shtml>

To request this material in an alternate format (e.g., Braille),
Please call 971-673-0300.