

PHN GUIDELINE: TYPHOID FEVER VACCINE

I. DEFINITION:

Two typhoid vaccines are currently available for use in the United States: (1) an oral, live, attenuated vaccine (Vivotif® vaccine, manufactured from the Ty21A strain of *Salmonella typhi* by Crucell/Berna) and (2) Vi capsular polysaccharide vaccine (ViCPS) (Typhim Vi, manufactured by Sanofi Pasteur) for parental use. Both vaccines have been shown to protect 50% to 80% of recipients.

II. MANAGEMENT PLAN:

A. Criteria for Administration:

1. See PHN ORDER: TYPHOID FEVER VACCINE.
2. Please note that each vaccine has a different lower age limit for use among children.
3. In the United States, immunization is recommended only for the following:
 - a. Typhoid vaccination is not required for international travel, but it is recommended for travelers to areas where there is a recognized increased risk of exposure to *S. typhi*. Risk is greatest for travelers to South Asia (6 to 30 times higher than all other destinations), especially India and Pakistan. Other areas of risk include East and Southeast Asia, Africa, the Caribbean, and Central and South America. Travelers who are immigrants to the United States and return to their home countries to visit friends or relatives are at increased risk for typhoid. In the United States, >75% of typhoid cases occur in travelers visiting friends or relatives mostly from South Asia and Latin America.
 - b. Travelers who will have prolonged exposure to potentially contaminated food and drink. Vaccination is particularly recommended for those who will be traveling in smaller cities, villages, and rural areas off the usual tourist itineraries. Although the risk of acquiring typhoid increases with the duration of the stay, travelers have acquired typhoid fever even during stays of less than 1 week to countries where the disease is endemic. Travelers should be cautioned that typhoid vaccination is not 100% effective and is not a substitute for careful selection of food and drink.
 - c. Persons with intimate exposure to a documented typhoid fever carrier such as occurs with continued household contact.
 - d. Microbiology laboratorians who work frequently with *S. typhi*.

B. POTENTIAL REACTIONS:

Information on adverse reactions is presented in the following table. Information is not available on the safety of these vaccines when they are used during pregnancy; it is prudent on theoretical grounds to avoid vaccinating pregnant women. Live, attenuated Ty21A vaccine should **not** be given to immunocompromised travelers, including those infected with HIV. The intramuscular vaccine presents a theoretically safer alternative for this group. Neither of the available vaccines should be given to travelers with acute febrile illness.

VACCINE	REACTIONS		
	Fever	Headache	Local Reactions
Ty21A*	0%-5%	0%-5%	Not applicable
Vi Capsular (ViCPS) Polysaccharide	0%-1%	16%-20%	7% Erythema or Induration ≤1 cm

*The side effects of Ty21A are rare and mainly consist of abdominal discomfort, nausea, vomiting, and rash or urticaria.

SPECIAL CONSIDERATION:

The PHN must ensure that a competent adult other than a client family member is present before any medication is administered. This individual should be CPR certified if at all possible.

C. Contraindications:

1. Oral Ty21A:

- a. History of severe local or systemic reaction following a previous dose, or hypersensitivity to any component of the vaccine or the enteric-coated capsules.
- b. Pregnancy (see information under Adverse Reactions).
- c. Acute febrile illness.
- d. Child below 6 years of age.
- e. Immuno-suppression, including those infected with HIV or those undergoing treatment with immunosuppressive or antimetabolic drugs.
- f. Vaccination with Ty21a should be delayed for >72 hours after the administration of any antibacterial agent including antimalarial chemoprophylaxis.
- g. Any gastrointestinal disorder.
- h. Nursing mothers – no data to warrant the use of this product in nursing mothers. It is not known if the vaccine is excreted in human milk.

2. ViCPS:

- a. History of severe local or systemic reaction following a previous dose, or hypersensitivity to any component of the vaccine.
- b. Pregnancy (see information under Adverse Reactions).
- c. Acute febrile illness.
- d. Child below 2 years of age.

D. Simultaneous administration of other vaccines:

1. Available data do not suggest that simultaneous administration of oral polio or yellow fever vaccine decreases the immunogenicity of oral, live, attenuated Ty21A. If typhoid vaccination is warranted, it should not be delayed because of the administration of viral vaccines.
2. Simultaneous administration of Ty21A and immune globulin does not appear to pose a problem.
3. Oral Ty21A typhoid vaccine and parenteral live vaccines (i.e., MMR, varicella, yellow fever) can be administered simultaneously or at any interval before or after each other, if indicated.

E. Client Education:

Prior to administration of vaccine, the client or parent should read the “Typhoid Vaccine Information Statement”. After all questions are answered, consent in writing will be obtained. Refer to the “Yellow Book” for answers to client questions.

F. Referral:

Severe reactions should be referred to a physician and reported to the District Nurse Manager. A Vaccine Adverse Event Reporting System (VAERS) form should be completed promptly on line at <http://www.vaers.org>. (CDC will send a copy to the OSDH Immunization Service at a later date if the reaction was severe and requires additional follow-up.)

REFERENCES:

CDC. Health Information for International Travel, 2010

Vivotif® Vaccine, Typhoid Vaccine Live Oral Ty21A, manufactured by Berna Biotech Ltd.package insert, August 2006.

Typhoid Vi Polysaccharide Vaccine Typhim Vi®, manufactured by Sanofi Pasteur SA, package insert, December 2005.

PHN ORDER: TYPHOID VACCINE

I. Dosage and Schedule:

ORAL, LIVE, ATTENUATED TY21A VACCINE					
Vaccination	Age	Dose/Mode of Administration	Number of Doses	Dosing Interval	Boosting Interval
Primary Series	6 yrs or older	1 capsule*/oral	4	48 hours	Not applicable
Booster	6 yrs or older	1 capsule*/oral	4	48 hours	Every 5 years

*Administer with cool liquid no warmer than 37° Celsius (98.6° F), approximately one hour before a meal.

ViCAPSULAR POLYSACCHARIDE VACCINE (ViCPS)					
Vaccination	Age	Dose/Mode of Administration	Number of Doses	Dosing Interval	Boosting interval
Primary Series	2 yrs or older	0.50 mL/I.M.	1	Not applicable	Not applicable
Booster	2 yrs or older	0.50 mL/I.M.	1	Not applicable	Every 2 years

NOTES:

1. Oral Ty21A:
 - a. Primary vaccination consists of a total of 4 capsules, one taken every other day.
 - b. The capsules should be kept refrigerated (not frozen).
 - c. All four doses must be taken to achieve maximum efficacy.
 - d. Capsule should be swallowed, not chewed.
 - e. Ingestion of all 4 doses should be completed at least 1 week prior to potential exposure to *S. typhi*.
 - f. Storage: Oral Ty21A is not stable when exposed to ambient temperatures. It should be shipped and stored between 2° and 8° C (35.6° and 46.4° F). Clients should be instructed to replace the unused vaccine in the refrigerator between doses.

2. ViCPS:
 - a. Dosage for all ages and all doses is 0.5 cc.
 - b. May be given with all age appropriate and necessary vaccines.
 - c. Administer 2 weeks prior to exposure.
 - d. The deltoid muscle is the preferred site for I.M. injection in adults, and either the deltoid or vastus lateralis may be used for children (over 2 years of age).
 - e. Store between 2° and 8° C (35° and 46° F). DO NOT FREEZE.

