Table 1* Age-Based Recommendations for Vaccines and Drugs in Pediatric Travelers

AGE ➲ VACCINE/DRUGS ➲	Birth	1 mo	2 mo	4 mo	6 mo	8 mo	9 mo	1 y	15 mo	18 mo	2 y	3 y	4 y	5 y	6 y	7 y	8 y	9 y	10 y	11 y	12 y	13 y	14 y	15 y	16 y	17 y	18 y	Comments
Diphtheria, Tetanus, Pertussis (DTP) IM			DTaP or DTP	DTaP or DTP	DTaP or DTP				DTaP or DTP[†]				DTaP or DTP							Td								[†]Diphtheria and tetanus toxoids and acellular pertussis vaccine (DTaP) is the preferred vaccine for all doses in the vaccination series, including completion of the series in children who have received 1 or more doses of whole-cell DTP vaccine. Whenever feasible, the same brand of DTaP vaccine should be used for all doses of the vaccination series; refer to: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr4913a1.htm.[7] Whole-cell DTP is an acceptable alternative to DTaP. Give 3 doses (each dosage 0.5 mL, IM) of DTaP or DTP, 1 each at ages, 2, 4, and 6 mo. The fourth dose (0.5 mL, IM) may be administered as early as 12 mo of age, provided 6 mo have elapsed since the third dose, and if the child is considered unlikely to return at 15–18 mo of age. Give 1 dose (0.5 mL, IM) of DTaP (preferred) or DTP at age 4–6 y, prior to school entry. Give the next booster, using tetanus and diphtheria toxoids (Td), adsorbed, for adult use, at a dosage 0.5 mL IM at 11–12 y of age if at least 5 y have elapsed since the last dose of DTP, DTaP, or DT. Subsequent routine Td boosters are recommended every 10 y (0.5 mL, IM). [ACC: 6 wk, 10 wk, and 14 wk; children should receive at least 3 doses prior to travel].
Haemophilus influenzae type b (Hib) IM			Hib	Hib	Hib			Hib																				Three Hib conjugate vaccines are licensed for infant use. If PRP-OMP (PedvaxHIB™) or ComVax™ (combination of PedvaxHIB™ and Recombivax HB™) is administered at 2 and 4 mo of age, a dose at 6 mo is not required; however, a booster is still required at 12–15 mo, and any Hib conjugate vaccine may be used. Because clinical studies in infants have demonstrated that using some combination products may induce a lower immune response to the Hib vaccine component, DTaP/Hib combination products should not be used for primary immunization in infants at 2, 4, or 6 mo, unless FDA approved for these ages. Primary immunization for previously unvaccinated infants aged 2–6 mo: PRP-OMP: Give 2 doses of PRP-OMP, separated by 2 mo (each dosage is 0.5 mL, IM) [ACC: 6 wk and 10 wk] OR HbOC or PRP-T: Give 3 doses, separated by 2-mo intervals (each dosage is 0.5 mL, IM). [ACC: 6 wk, 10 wk, and 14 wks] If immunization of an infant of an HBsAg-negative mother has been delayed until age 2 mo, ComVax™ may be used and continued at 4 mo and 12–15 mo of age. Booster: Give 1 dose of any licensed Hib conjugate vaccine at 12–15 mo of age and at least 2 mo after the last primary dose. For unvaccinated children 15–59 mo: give single dose of Hib before travel.
Hepatitis A[‡] IM											Hep A[§] in selected areas																	[‡]Recommended for routine (nontravel) use in selected states and/or regions in US. Refer to: http://www.cdc.gov/epo/mmwr/preview/mmwrhtml/rr4812a1.htm.[8] [§]See dosage guidelines listed below under Hepatitis A.
Hepatitis B (Hep B)[‖] IM		Hep B - 1	Hep B - 2		Hep B - 3															Hep B[#]	Alternate Two-Dose Schedule[**]							[‖]**Infants born to HBsAg-negative mothers** should receive 5 μg of Recombivax HB™ or 10 μg of Engerix-B™. The second dose should be administered at least 1 mo after the first dose. The third dose should be given at least 2 mo after the second, but not before the age of 6 mo. **Infants born to HBsAg-positive mothers** should receive 0.5 mL hepatitis B immune globulin (HBIG) within 12 hr of birth, and either 5 μg of Recombivax HB™ or 10 μg of Engerix-B™ at a separate site. The second dose is recommended at 1–2 mo of age and the third dose at 6 mo of age. **Infants born to mothers whose HBsAg status is unknown** should receive either 5 μg Recombivax HB™ or 10 μg of Engerix-B™ within 12 hr of birth. The second dose of vaccine is recommended at 1 mo of age and the third dose at 6 mo of age. The mother's HBsAg status should be determined at the time of delivery; if the mother is HBsAg positive, the infant should receive HBIG as soon as possible (no later than 1 wk of age). The dosage and timing of subsequent vaccine doses should be based upon the mother's HBsAg status. [#]All children and adolescents (though 18 y) who have not been vaccinated against hepatitis B may begin the series during any visit. Those who have not previously received 3 doses of hepatitis B vaccine should initiate or complete the series during the 11- to 12-y-old visit, and unvaccinated older adolescents should be vaccinated whenever possible. The second dose should be administered at least 1 mo after the first dose, and the third dose should be administered at least 4 mo after the first dose and at least 2 mo after the second dose: Recombivax HB™: dose 5 μg/0.5 mL, IM or Engerix-B™: dose 10 μg/0.5 mL, IM; schedule: total of three doses at 0, 1–2, and 4–6 mo. [**]Optional two-dose schedule of Recombivax HB™ using the adult dose (1.0 mL dose containing 10 μg of HBsAg for adolescents 11–15 y, with the second dose given 4–6 mo after the first dose. Children and adolescents who have begun vaccination with a dose of 5 μg of Recombivax HB™ should complete the 3-dose series with this dose. Refer to: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4912a5.htm.[9] The two licensed hepatitis B vaccines are interchangeable when given in doses recommended by manufacturer. [ACC: birth, 1 mo and 4 mo] Infants < 6 mo should receive hepatitis B vaccines that do not contain thimerosal as a preservative (no longer used as a preservative in any pediatric Hep B vaccines); refer to: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4927a5 htm[10] and http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4928a4.htm.[11]
Measles, Mumps, Rubella (MMR) Ⓛ SC					Monovalent measles vaccine [ACC][††]			MMR					MMR[‡‡]							MMR[‡‡]							[††]Although MMR is the vaccine of choice for routine immunization, under certain circumstances, single antigen vaccines may be warranted. Infants age 6–11 mo should receive a single dose of monovalent measles vaccine rather than MMR vaccine when exposures to measles are likely or before departure when they are traveling to endemic or epidemic areas. Dose: 0.5 mL SC. Children initially vaccinated before the first birthday should be revaccinated at 12–15 mo of age and an additional dose of vaccine should be administered at the time of school entry or according to local policy. Doses of MMR or other measles-containing vaccines should be separated by at least 1 mo. [‡‡]The second dose of MMR is routinely recommended at 4–6 y of age but should be given early to children who will travel to developing countries provided at least 1 mo has elapsed since receipt of the first dose and that both doses are administered at or after 12 mo of age. Those who have not previously received the second dose should complete the schedule at no later than 11–12 y of age. Dose: 0.5 mL SC. Delay administration of MMR and its component vaccines for at least 3 mo after IG administration given in doses to prevent hepatitis A, hepatitis B, or tetanus prophylaxis, at least 4 mo after rabies IG, at least 5 mo after measles or varicella prophylaxis, and at least 6 mo after receipt of whole blood or packed red blood cells or measles prophylaxis in an immunocompromised person. For recommendations about other IG preparations and blood products, refer to: http://www.cdc.gov/epo/mmwr/preview/mmwrhtml/00053391.htm.[12]
Pneumococcal[§§] IM			PCV7	PCV7	PCV7			PCV7			PCV7[‖‖]																[§§]Not recommended for travelers unless other indications exist. Prevnar™, a 7-valent pneumococcal conjugate vaccine (PCV7), is recommended for all children 2–23 mo (infants receiving their first dose at age ≤ 6 mo should receive 3 doses of PCV7 at intervals of approximately 2 mo, followed by a fourth dose at age 12–15 mo [each dosage 0.5 mL]). [‖‖]ACIP also recommends that Prevnar™ be used for children 24–59 mo who are at increased risk for pneumococcal disease (i.e., sickle cell disease): administer 2 doses of PCV7, 2 mo apart, followed by 1 dose of 23-valent polysaccharide (PPV23) vaccine administered ≥ 2 mo after second dose of PCV7. Also recommended that vaccine be considered for all other children aged 24–59 mo (refer to guidelines for priority consideration and schedule: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr4909a1.htm).[13] [##]Persons ≥ 5 y at increased risk for serious pneumococcal disease should continue to receive PPV23: single 0.5 mL dosage.
Pneumococcal[§§] SC or IM															PPV23[##]												
Polio SC or IM			IPV	IPV	IPV								IPV														Two poliovirus vaccines are currently licensed in the US: inactivated poliovirus vaccine (IPV) and oral poliovirus vaccine (OPV). As of January 1, 2000, ACIP recommends that all children should receive 4 doses of IPV at 2 mo, 4 mo, 6–18 mo, and 4–6 y. Each dose of IPV is 0.5 mL, SC or IM, and each dose of OPV is 0.5 mL, po. OPV is acceptable only for unvaccinated child ≥ 6 wk of age who will travel to polio-endemic areas in < 4 wk; refer to: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr4905a1.htm.[14] [ACC: 6 wk, 10 wk, and 14 wk]
Varicella zoster Ⓛ SC		Var Efficacy has not been established in children < 12 mo						Var Single 0.5 mL SC dose												Var Single 0.5 mL SC dose	Var ≥ 13 y: 0.5 mL SC initially and a second dose (0.5 mL) 4–8 wk later							Vaccine can be administered to susceptible children at any visit after the first birthday; those who lack a reliable history of chickenpox should be vaccinated at the 11–12-y-old visit. Children 13 y of age or older should receive 2 doses, at least 1 mo apart. Use of salicylates should be avoided for 6 wk after vaccination. Vaccination should be deferred for at least 5 mo following blood or plasma transfusions or administration of IG or varicella zoster IG (VZIG). Following administration of varicella vaccine, any IG, including VZIG, should not be given for 2 mo thereafter unless its use outweighs the benefits of vaccination (see also IGIM). Administer varicella at the same visit as MMR or yellow fever or separate by interval of at least 28 days.
Cholera (killed parenteral) SC or IM		Not recommended in infants < 6 mo			2 doses, ≥ 1 wk apart; Dose: 0.2 mL SC or IM; Booster: 0.2 mL								2 doses ≥ 1 wk apart; Dose: 0.3 mL SC or IM; Booster: 0.3 mL							> 10 y: 2 doses ≥ 1 wk apart; Dose: 0.5 mL SC or IM; Booster: 0.5 mL							Current vaccine provides limited protection and is rarely recommended. Cholera and yellow fever vaccines should be separated by an interval of 3 wk, if feasible. Booster doses are recommended every 6 mo if risk continues. Alternative in children ≥ 5 y is 0.2 mL, ID (2 doses ≥ 1 week apart); booster: 0.2 mL ID.
Hepatitis A (also refer to IGIM guidelines below and in Table 2) IM		Not approved in US for use in children < 2 y											(2–18 y) VAQTA Schedule: Primary: 1 dose 0.5 mL (25 units), IM, deltoid muscle preferred. Administer at least 2 wk (per package insert) or 4 wk (per ACIP) prior to expected exposure to HAV. Booster: 0.5 mL, IM, 6–18 mo after first dose. (2–18 y) HAVRIX Schedule: Primary: 1 dose 0.5 mL (720 ELISA units), IM, deltoid muscle preferred. Administer at least 2 wk (per package insert) or 4 wk (per ACIP) prior to expected exposure to HAV. Booster: 0.5 mL, IM, 6–12 mo after first dose.													Two inactivated-virus vaccines give long-term protection against hepatitis A: VAQTA™ (Merck & Co., Inc.), Pediatric/Adolescent formulation (each 0.5 mL dose contains approximately 25 units of hepatitis A virus antigen) and HAVRIX™ (SmithKline Beecham), Pediatric formulation 720 ELISA units/0.5 mL dose. Early studies suggest good antibody response when series is started with 1 HAV vaccine and completed with the other. IG and HAV vaccine can be given at the same time (different injection sites); antibody responses to the vaccine are protective though not as high as when the vaccine is given without IG.
Immune globulin IM (IGIM) IM		Pre-exposure prophylaxis: < 2 y: see Table 2.											Pre-exposure prophylaxis: Exposure duration < 3 mo or 3–5 mo: see Table 2. HAV vaccine is the preferred way to protect against HAV (see HAV).															IG is recommended for < 2 y of age and for ≥ 2 y of age if inadequate time exists to give vaccine. IG should be administered deep into a large muscle mass. IG can inhibit the immune responses to live-attenuated vaccine viruses such as measles, mumps, rubella, and varicella; the duration of inhibition is related to the dose of IG (see MMR and varicella listing). IG does not interfere with the immune response to either OPV or yellow fever vaccines.
Influenza IM		Not recommended in infants < 6 mo			6 mo–35 mo: 0.25 mL IM 1 or 2 doses[***]							3–8 y: 0.5 mL IM 1 or 2 doses[***]							9–12 y: 0.5 mL IM dose		> 12 y: 0.5 mL IM dose							Recommended that only split virus vaccine be used in children ≤12 y. [***]Children < 9 y receiving the vaccine for the first time should receive 2 doses at least 4 wk apart.
VACCINE/DRUGS ➲ AGE ➲	Birth	1 mo	2 mo	4 mo	6 mo	8 mo	9 mo	1 y	15 mo	18 mo	2 y	3 y	4 y	5 y	6 y	7 y	8 y	9 y	10 y	11 y	12 y	13 y	14 y	15 y	16 y	17 y	18 y	

Table 1*

AGE ➲ / VACCINE/DRUGS ➲	Birth	1 mo	2 mo	4 mo	6 mo	8 mo	9 mo	1 y	15 mo	18 mo	2 y	3 y	4 y	5 y	6 y	7 y	8 y	9 y	10 y	11 y	12 y	13 y	14 y	15 y	16 y	17 y	18 y	Comments
Japanese encephalitis SC	Infants < 1 y, no data on safety and efficacy; whenever possible, defer until > 1 y							1–2 y: Series of three SC doses of 0.5 mL each on days 0, 7, and 30; Booster: 1.0 mL				≥ 3 y: Series of three SC doses of 1.0 mL each on days 0, 7, and 30; Booster: 1.0 mL																For travelers with imminent departures, an abbreviated schedule of days 0, 7, and 14 may be used. The series should be completed at least 10 days before departure. Booster dose is recommended at 3 y if risk of exposure remains.
Lyme disease IM																								≥ 15 y: Primary immunization 30 μg/0.5 mL IM dose of LYMErix given at 0, 1, and 12 mo.				Recombinant OspA (LYMErix™ [SmithKline Beecham]) ≥ 15 y: Primary immunization against Lyme disease consists of a 30 μg/0.5 mL IM dose of LYMErix™ given at 0, 1, and 12 mo. Recommended for persons whose place of residence and activities in the US place them at risk for Lyme disease. Efficacy of LYMErix™ against European strains is unknown.
Meningococcus SC	Not generally recommended in children < 2 y due to limited efficacy											Single 0.5 mL SC dose. May be required for travel to Saudi Arabia.																Vaccine currently used in US is polysaccharide quadrivalent A/C/Y/W-135. Recommended prior to travel to certain high-risk regions of the world. Some US colleges recommend vaccine for students. Revaccination should be considered after 3–5 y if risk persists (after 2–3 y for children first vaccinated at < 4 y of age).
Rabies IM or ID	May be given as young as needed. Pre-exposure prophylaxis: For IM route: 1.0 mL of PCEC, HDCV (IM), or RVA may be used. Series is 3 injections of 1.0 mL each, given on days 0, 7, and 21 or 28 in the deltoid area for older children; for infants and small children the anterolateral thigh may be used. For ID route: only use HDCV for ID administration (0.1 mL). Series is 3 ID injections of 0.1 mL each, given on days 0, 7, and 21 or 28. Booster dose consists of a single injection of either 1.0 mL PCEC, RVA, or HDCV (IM) or of 0.1 mL HDCV (ID).																											Three inactivated-virus, cell culture vaccines are available in the US for pre-exposure and postexposure prophylaxis against rabies: Chick Embryo Culture Vaccine (PCEC): 1.0 mL for IM use only Human Diploid Cell Vaccine (HDCV): available in both IM (1.0 mL) and ID (for pre-exposure use only) (0.1 mL) formulations Rabies Vaccine Adsorbed (RVA): 1.0 mL for IM use only Human Rabies IG (HRIG) is a special IG formulation used in postexposure treatment of persons not previously immunized with rabies vaccine. Pre-exposure: After the primary series, persons in the frequent risk category (e.g., veterinarian) should receive booster doses or be tested for antibody titers every 2 y. Booster: dose consists of a single injection of either 1.0 mL PCEC, RVA, HDCV (IM), or 0.1 mL HDCV (ID). Per ACIP, the acceptable antibody titer is > 1:5 titer (complete inhibition in RFFIT at 1:5 dilution). For persons who will be receiving antimalarial prophylaxis, the ID regimen should be initiated long enough before travel to allow for completion of the full three-dose vaccine series before antimalarial prophylaxis begins. The IM regimen should be used if malaria prophylaxis will be started before completion of vaccine series. Note: Additional doses of rabies vaccine must be given if a vaccinated person has exposure to a rabid animal (2 IM doses used in US).
Typhoid IM	Typhim Vi: Not recommended in children < 2 y.											Typhim Vi: 0.5 mL IM; Booster dose of 0.5 mL IM every 2 y if under conditions of continued or repeated exposure.																Three typhoid vaccines are available. Heat-phenol inactivated vaccine, if available, is the only option available in the US for children < 2 y. Typhim Vi (capsular polysaccharide) vaccine is the preferred vaccine for children between 2 and 6 y of age. Oral live, attenuated Ty21a vaccine should not be given to immunocompromised patients, including HIV-infected persons, but does not pose risks to household contacts of the vaccinee. Primary series: 1 oral capsule on an empty stomach (at least 1 hour before eating) with a cold or lukewarm drink every other day for a total of 4 doses. Capsule does not contain dyes; store in refrigerator at all times. Mefloquine and chloroquine do not interfere with oral Ty21a, though proguanil should be administered only if ≥ 10 days have elapsed since the final dose of oral Ty21a was ingested. Concomitant administration with oral polio, yellow fever, or MMR vaccine does not suppress the immunogenicity of Ty21a.
Typhoid SC or ID	Heat-phenol inactivated: Not recommended in children < 6 mo.			Heat-phenol inactivated vaccine: 0.25 mL SC for 2 doses given at least 4 weeks apart or 3 doses given weekly. Booster: 0.25 mL SC or 0.1 mL ID; Booster interval 3 y.								0.5 mL SC for 2 doses given at least 4 weeks apart or 3 doses given weekly. Booster: 0.5 mL SC or 0.1 mL ID; Booster interval 3 y.															
Typhoid Ⓛ ○	Oral Ty21a: Not recommended in children < 6 y.														Oral live-attenuated vaccine-oral Ty21a: Primary series consists of 4 oral doses. In cases of repeated or continued exposure to typhoid fever, boost every 5 y (4 capsule series).											
Yellow fever Ⓛ SC	Infants < 4 mo should not receive vaccine (risk of encephalitis)			Consider for vaccination (see comments)				Single dose of 0.5 mL SC; Booster: 0.5 mL after 10 y																			Required for entry into some countries. Children 4–9 mo: Consider vaccination if travel is anticipated to areas with epidemic disease and if protective measures against mosquitoes cannot be guaranteed. International Health Regulations require revaccination at intervals of 10 y. Vaccination valid 10 days after administration. Yellow fever and cholera vaccines should be separated by an interval of 3 wk, if feasible. MMR and varicella vaccines should be given at same visit as yellow fever or deferred for at least 28 days.
Bismuth subsalicylate (Pepto Bismol™)	< 3 y, consult a physician											3–6 y: 1 tsp (5 mL) of regular suspension, ⅓ tab (chewable) or ⅓ caplet			6–9 y: 2 tsp (10 mL) of regular suspension, ⅔ tab (chewable) or ⅔ caplet				9–12 y: 3 tsp (15 mL) of regular suspension, one tab (chewable), or 1 caplet				Adults: 2 tbsp (30 mL) or 2 chewable tablets or 2 caplets				Avoid if history of aspirin allergy. Repeat every ½ to 1 hr as needed to a maximum of 8 doses in a 24-hour period. Use with caution in patients on moderate or high doses of aspirin (salicylate toxicity). Stools and tongue may turn black. Liquid formulation contains dyes (D & C Red 22, D & C Red 28); chewable tablets (D & C Red 27, FD & C Red 40 [in cherry only]), caplet (D & C Red 27).
Doxycycline	Not FDA approved in children < 8 y																8–13 y: see Table 2 (2 mg/kg/day)								≥ 14 y & ≥ 50 kg: 100 mg daily				See Table 2 for recommended dosages of doxycycline for malaria prophylaxis by the CDC and WHO. Prophylaxis should begin 1–2 days before exposure and continue for 4 wk after last exposure.
Loperamide HCl (Imodium A-D™)	Not recommended in children < 2 y											2–11 y: see Table 2																Available in US without a prescription in generic and brand name (Imodium A-D™); several other brands and generics may be available worldwide. Loperamide can be taken concomitantly with antimicrobial. Avoid taking loperamide alone if diarrhea is bloody or associated with fever. Liquid formulation contains no dyes but contains alcohol as an inactive ingredient. Caplet contains dyes (FD & C Blue #1 and D & C Yellow #10).
																					≥ 12 y and adults: Take 2 caplets (4 mg), then 1 caplet (2 mg) after each loose stool, to a maximum of 16 mg per day, if directed by physician.							
Proguanil (Paludrine™)	< 2 y: 50 mg/d											2–6 y: 100 mg/d				7–10 y: 150 mg/d								>10 y: 200 mg/d				CDC-recommended prophylactic dosage is provided in this row. Administer proguanil daily in combination with weekly chloroquine. See Table 2 for WHO recommendation. Prophylaxis should begin at least 24 hr before entering a malarious region and continue for 4 wk after last exposure. Administer with food and 8 ounces of water. Currently available only in combination with atovaquone as Malarone™ in the US.
Pyrimethamine-sulfadoxine (Fansidar™)	Not recommended in infants < 2 mo			≥ 2 mo: see Table 2																								Avoid if history of sulfa allergy. 25 mg pyrimethamine and 500 mg sulfadoxine per tablet. Occasionally used for standby therapy of malaria, though increasing resistance limits its usefulness.
Quinolones	Not FDA approved in children < 18 y																											Avoid if history of seizures.
Trimethoprim/ sulfamethoxazole (TMP/SMX) or Co-trimoxazole	Not recommended in infants < 2 mo			See Table 2 for children < 40 kg. Children ≥ 40 kg (88 lb), dose is 1DS tab or 20 mL suspension (160 mg TMP/800 mg SMX) every 12 hr																								Avoid if history of sulfa allergy. For empiric treatment of diarrhea during travel.
VACCINE/DRUGS ➲ / AGE ➲	Birth	1 mo	2 mo	4 mo	6 mo	8 mo	9 mo	1 y	15 mo	18 mo	2 y	3 y	4 y	5 y	6 y	7 y	8 y	9 y	10 y	11 y	12 y	13 y	14 y	15 y	16 y	17 y	18 y	

*This schedule indicates the recommended age for routine administration of currently licensed childhood vaccines. Bars indicate range of acceptable ages for vaccination. Providers should consult the manufacturer's package insert, ACIP statements, and the Red Book for detailed recommendations. [ACC]: Accelerated Schedules for Travel (see text).
IM = intramuscular; SC = subcutaneous; ID = intradermal; ○ = oral; Ⓛ = live vaccine; po = orally; mo = month; y = year; wk = week; hr = hour; ACIP = Advisory Committee on Immunization Practices; CDC = Centers for Disease Control and Prevention; WHO = World Health Organization; FDA = Food and Drug Administration.