FLASH FACTS: VACCINES & IMMUNIZATION — 2024

… INCLUDES TRAVEL HEALTH !

SAMPLE PAGES

A12. HEPATITIS A: HEPATITIS A VIRUS

Disease: Hepatitis A
Synonyms: Hep A, HAV. Infectious hepatitis, epidemic jaundice, catarrhal jaundice
Microbe: Hepatitis A virus
Microbiology: Non-enveloped, single-stranded RNA virus, an enterovirus
Disease: Acute infection of liver, involving jaundice, fever, nausea, vomiting, loss of appetite, fatigue, dark urine, and diarrhea. Complications include liver failure, joint pain, disorders of kidney, pancreas, or blood.
Transmission: Via swallowing water or food tainted with feces or vomitus of a case.
Geography: Hepatitis A is widely distributed in Latin America, Africa, eastern Europe, Asia (except Japan), and Pacific islands. Most common infection of travelers that is vaccine preventable. Consume only safe food and beverages to avoid infection.
Timeline: 1945: Stokes and Neefe show value of IGIM in preventing hepatitis A.
1947: Immune globulin intramuscular (IGIM) licensed in the U.S.
1972: Feinstone identifies hepatitis A virus by electron microscopy.
1995: Hepatitis A vaccine licensed in the U.S.
1999: Routine childhood vaccination against hepatitis A begins in the U.S.
Counseling: Advise traveler how to follow safe food and water guidelines. See cdc.gov/travel

B18. Meningococcal Serogroup B Vaccine: Bexsero, Trumenba

Setting: Vaccine for teenagers and certain others
Products: Meningococcal serogroup B vaccine: Bexsero (MenB-4C, GSK), Trumenba (MenB-fHbp, Pfizer)
Category: Vaccine, inactivated, polysaccharides, with aluminum adjuvant
Microbe: *Neisseria meningitidis* serogroup B (bacteria)
Dosage Form: Suspension
Packaging:

Package Contents	Concentration	Storage	Handling
Bexsero: 0.5-mL syringe	25 or 50 mcg of each antigen per 0.5 mL (see below)	Refrigerate	Swirl until uniform
Trumenba: 0.5-mL syringe	60 mcg of each fHbp per 0.5 mL (see below)	Refrigerate	Swirl until uniform

Excipients:

- Bexsero (MenB-4C): Neisserial adhesin A (NadA), neisserial heparin-binding antigen (NHBA), factor H binding protein (fHbp), outer membrane vesicles (OMV). Aluminum hydroxide (adjuvant). Sodium chloride, histidine, sucrose, kanamycin
- Trumenba (MenB-fHbp): Two recombinant lipidated factor H binding protein (fHbp) variants (subfamilies A05 and B01). Aluminum phosphate (adjuvant). Histidine-buffered sodium chloride, polysorbate 80

Indication: Prevention of meningococcal disease caused by serogroups included in the vaccine
Contraindication: Severe hypersensitivity to a component

Dosing, Route, & Schedule:

Age Group	Dose	Route	Series	Schedule	Booster Doses
Bexsero: 10—25 y	0.5 mL	IM	2 doses	1 mo apart	Little data
Trumenba: 10—25 y	0.5 mL	IM	2 doses or 3 doses	0, 6 mo apart or 0, 1—2, 6 mo apart	Little data

CDC recommendations: Healthy adolescents and adults 16–23 y, based on shared clinical decision making. People ≥ 10 y with a damaged or missing spleen, infected with HIV, or with complement disorders or receiving a complement inhibitor (see Flash Fact D27) should receive either the 2-dose Bexsero series or the 3-dose Trumenba series, then a MenB booster dose 1 y after completing the primary series, and then booster doses every 2—3 y thereafter, as long as increased risk remains.

See also catch-up schedules published by CDC.

Efficacy: Induces bactericidal antibody concentrations protective against several prevalent strains.

Pregnancy: Little data, harm unlikely

Breastfeeding: Inactivated vaccines generally considered safe during lactation

Adverse Events:

Injection Site	Systemic	Uncommon
Pain, erythema, induration	Muscle ache, fatigue, headache, nausea, joint ache, syncope	Anaphylaxis

Safety Issues: Meningococcal B vaccines do not prevent serogroup ACWY disease.

Drug Interactions:

Interacting Agent	Mechanism	Clinical Management
Immune-suppressing treatments	Immune suppression could reduce vaccine efficacy	Delay vaccination until therapy stopped, if possible

c13. Rabies Immune Globulin (RIG): HyperRAB, Imogam Rabies, Kedrab

Setting: Passive immunization for prophylaxis of rabies
Products: Rabies Immune Globulin (RIG): HyperRAB (Grifols), Imogam Rabies (Sanofi), Kedrab (Kamada)
Category: IgG antibodies, human, polyclonal
Microbe: Rabies virus
Dosage Form: Solution
Packaging:

Package Contents	Concentration	Storage	Handling
HyperRAB: 1-mL vial, 3-mL vial, 5-mL vial	300 units per mL	Refrigerate	Do not shake
Imogam Rabies: 2-mL vial	150 units per mL	Refrigerate	Do not shake
Kedrab: 2-mL vial, 10-mL vial	150 units per mL	Refrigerate	Do not shake

Excipients: Glycine
Indication: Passive immunization for prophylaxis of rabies when given in combination with rabies vaccine.
Contraindication: None. Do not give to people who completed pre- or post-exposure prophylaxis, to avoid interfering with anamnestic response to vaccination.

Dosing, Route, & Schedule:

Age Group	Dose	Route	Regimen
All ages	20 units per kg	Infiltrate wound with full dose. Inject any remainder IM	Inject any remaining RIG IM at site distant from vaccination. Post-exposure rabies prophylaxis requires several doses of rabies vaccine – see CDC guidelines

If large volume required (e.g., > 2 mL for small children, > 5 mL for adolescents or adults), may be given in divided doses.

See CDC guidelines.

Pregnancy: Use if clearly needed.

Breastfeeding: Use if clearly needed.

Adverse Events:

Injection Site	Systemic	Uncommon
Pain, nodule	Headache, fever, muscle pain, joint pain, abdominal pain, dizziness, bruising, fatigue, vomiting, diarrhea, flatulence, nasal congestion, oropharyngeal pain	Anaphylaxis, thrombotic events

Safety Issues: Check dosing calculations, RIG concentrations vary between products.

Drug Interactions:

Interacting Agent	Mechanism	Clinical Management
Injectable live-virus vaccines	Interference with immune response to vaccination	Separate IgG and vaccination according to type and dose of IgG or blood product

D 5. BY AGE: CHILDREN AGE 6 MONTHS

Case: Anna, age 6 mo **Date:** September 1

Vaccine History: On schedule so far

Series	Dose 1	Dose 2	Dose 3	Dose 4	Dose 5	More
Hepatitis B	03/01/xx	05/01/xx	? ? ?			
RSV-nirsevimab	03/01/xx					
Rotavirus	05/01/xx	07/01/xx	? ? ?			
DTaP	05/01/xx	07/01/xx	? ? ?			
Haemophilus	05/01/xx	07/01/xx	? ? ?			
Pneumococcal	05/01/xx	07/01/xx	? ? ?			
Poliovirus	05/01/xx	07/01/xx	? ? ?			

Medical History: Fussy last night, temperature 99.5°F (37.5°C)

Step A: What do we know about the patient?

Sick today? **Fussy, 99.5°F** | Medical history? Unremarkable | Recent blood products? No
Allergies? None | Family immune problem? No | Recent vaccinations? None
Prior serious reaction? No | Recent medications? None | Pregnant? No

Answers from parents: **Unremarkable, other than current temperature of 99.5°F (37.5°C)**

Step B: What vaccines are routinely recommended for children at this age?

Step C: Is the patient overdue for any recommended vaccines?

Step D: Should any vaccines be deferred due to contraindications, precautions, or special situations?

Step E: Should any vaccines or antibodies be added to today's plan?

Step F: What vaccines should be given during today's visit?

Discuss VIS content. What is the primary language spoken at home?

After-visit Care: What to do?
Counseling: What to say?

ASSIGNMENT: Work up your plan for today's visit, then advance to next FLASH FACT for answers and explanations.

[FLIP when ready]

… ANSWERS — 6 MO

Case: Anna, age 6 mo **Date:** September 1

Vaccine History: On schedule so far

Series	Dose 1	Dose 2	Dose 3	Dose 4	Dose 5	More
Hepatitis B	*03/01/xx*	*05/01/xx*	? ? ?			
RSV-nirsevimab	*03/01/xx*					
Rotavirus	*05/01/xx*	*07/01/xx*	? ? ?			
DTaP	*05/01/xx*	*07/01/xx*	? ? ?			
Haemophilus	*05/01/xx*	*07/01/xx*	? ? ?			
Pneumococcal	*05/01/xx*	*07/01/xx*	? ? ?			
Poliovirus	*05/01/xx*	*07/01/xx*	? ? ?			

Medical History: Fussy last night, temperature of 99.5°F (37.5°C)

Step A: What do we know about the patient?
» Answers from parents: No concerns other than fussiness and slight temperature elevation.

Step B: Vaccines routinely recommended at this age?
Additional doses of HepB, RV, DTaP, Hib, PCV, and IPV
+ COVID-19 Appropriate vaccine: Start initial series: ≥ 6 mo
+ Flu Influenza vaccine (1 or 2 doses per season)

Step C: Is the patient overdue for any recommended vaccines?
» No. Vaccinations so far given on time.

Step D: Vaccines to defer based on patient history?
» None. **Mild temperature elevation is no reason to hold vaccination.** See FLASH FACT F 3: INVALID CONTRAINDICATIONS.

Step E: Vaccines or antibodies to add based on patient history?
» **Yes, based on the calendar!** On September 1, it's early in influenza-vaccine season. Children need

two doses of vaccine in their first season of being vaccinated against influenza, so start today.
For children born Oct—Mar (for 48 contiguous states), give nirsevimab (extended half-life mAb) at birth. For children born Apr—Sep (48 states), give nirsevimab when entering first RSV season if < 8 mo old. In other locations, follow public-health guidelines.

Step F: What vaccines should be given during today's visit?

Birth	Age 2 mo	Age 4 mo	Age 6 mo **Today!**	Follow-Up	
✓ HepB ✓ Nirsevimab	✓ HepB ✓ RV ✓ DTaP ✓ Hib ✓ PCV ✓ IPV	✓ RV ✓ DTaP ✓ Hib ✓ PCV ✓ IPV	3rd HepB + 3rd RV + 3rd DTaP + 3rd Hib + 3rd PCV + 3rd IPV + 1st Covid-19 + 1st Flu	Make an appointment to return for Covid-19 #2 and Flu #2, several wk later	

Note: Consider using DTaP-based combination products to reduce number of injections needed. Combination product options at this age include Pediarix, Vaxelis, and Pentacel.
As shown in CDC's "Recommended Child & Adolescent Immunization Schedule," there are timing options at this age for several vaccines, shown by the width of the cells.
Discuss VIS content. VIS translations in > 45 languages at www.immunize.org/vis/

After-visit Care: Document vaccination. Treat symptoms of post-vaccination events.
Counseling: Tell us about adverse events. Schedule return visit for next doses.

SECTION E. TRAVEL HEALTH

« TRAVEL HEALTH: OVERVIEW »

E 1. TRAVEL HEALTH & TRAVEL MEDICINE

More people travel outside the United States each year. Travel to exotic places is now commonplace. The hazards they encounter are myriad — some of which are infectious diseases. CDC's *Yellow Book: Health Information for International Travel* describes > 80 distinct infectious diseases. Only a few of these are vaccine preventable. Travel Health involves much more than a few shots before departure. The ***FLASH FACTS*** in SECTION E review major diseases and risk factors affecting the health of travelers.

Travel Health: Efforts to promote health and protect travelers from health hazards encountered during their journeys — to help them stay healthy and avoid becoming ill. Main tool: Pre-travel consultation.

Travel Medicine: Clinical discipline of diagnosing and treating illness(es) contracted during travel, typically provided by infectious-disease specialists.

Individuality. The needs of individual travelers vary greatly, even if they travel to the same country. Risk also

varies by season, altitude, lodging, activities, mode of travel, among other factors. Ultimately, these risks are not quantifiable. Good advice can help reduce risk and increase the odds that the traveler will have a great experience.

If 100,000 travelers go to a developing country for a month, roughly …
30,000 to 75,000 will develop some health problem (#1 is traveler's diarrhea),
8,000 will see a physician about a health problem,
5,000 will stay in bed,
300 will be hospitalized,
50 will be air-evacuated back home,
and 1 will die.

Exposure. We will address travel risks arrayed across six categories, based on route of exposure.
Interspersed will be segments about specific types of risks and ways to mitigate them.

Routes of Exposure	Food & Drink	Environment	Insects
	Blood & Body Fluids	Animals	Respiratory Pathogens