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Children's Hospital Colorado

CONTAGIOUS COMMENTS
Department of Epidemiology

Update from the Centers for Disease Control and Prevention (CDC) Advisory Committee on Immunization Practices (ACIP)

Measles, Mumps, and Rubella (MMR) Vaccine During a Mumps Outbreak

1. **New ACIP recommendation for MMR vaccine during a mumps outbreaks**
   a. **New off-label recommendation:** Persons previously vaccinated with 2 doses of a mumps virus–containing vaccine identified by public health authorities as part of a group at increased risk for acquiring mumps because of an outbreak should receive a third dose of MMR vaccine to improve protection against mumps disease and related complications
      i. Measles, mumps, rubella, and varicella (MMRV) vaccine also may be used for the third dose in children aged <13 years

2. **Public health authorities will define groups at increased risk of mumps during an outbreak**
   a. Increased risk for acquiring mumps is determined based on evidence that transmission occurred and the likelihood of intense or frequent transmission in settings with groups who have close contact with a mumps patient
   b. Public health authorities communicate the groups identified at increased risk and recommendations for vaccination to health care providers and affected institutions
   c. Persons in the groups at increased risk for mumps should:
      i. Receive a third dose of MMR if previously vaccinated with 2 doses of mumps-containing vaccine
      ii. Receive an additional dose of MMR if they have <2 doses of mumps virus–containing vaccine, evidence of presumptive immunity other than documented MMR vaccine, or unknown vaccination status
   d. An additional dose is not recommended for people who received ≥3 doses of MMR before the outbreak

3. **Mumps vaccine references**
   a. Marin M, et al. Recommendation of the ACIP for use of a third dose of mumps virus–containing vaccine in persons at increased risk for mumps during an outbreak. MMWR 2018;67:33–8.
   b. CDC guidance for public health authorities on use of a 3rd dose of MMR vaccine during mumps outbreaks. Available at: https://www.cdc.gov/mumps/health-departments/MMR3.html
   c. McLean HQ, et al. Prevention of measles, rubella, congenital rubella syndrome, and mumps, 2013: Summary recommendations of the ACIP. MMWR Recomm Rep 2013;62(4):1–34.
   d. Cardemil CV, et al. Effectiveness of a third dose of MMR vaccine for mumps outbreak control. N Engl J Med 2017;377:947–56.
   e. Plotkin SA. Mumps: A pain in the neck. J Pediatr Infect Dis Soc 2018;7:91–2.

Hepatitis A Vaccines

1. **Hepatitis A vaccine recommendations for pre-exposure prophylaxis**
   a. All children at age 12–23 months
   b. Persons at increased risk of exposure or severe disease (i.e., injection and non-injection drug users, men who have sex with men, persons with chronic liver disease, persons with clotting factor disorders, persons who anticipate close personal contact with an international adoptee, international travelers, persons who work with nonhuman primates).
   c. In October 2018, ACIP approved the recommendation for use of hepatitis A vaccine in persons experiencing homelessness.

2. **New ACIP recommendations for hepatitis A vaccine for infants traveling outside the U.S.**
   a. **Off-label recommendation:** One dose of hepatitis A vaccine should be administered to infants age 6–11 months traveling outside the United States
   b. Infants should then start the full 2 dose series of hepatitis A vaccine at ≥12 months of age

3. **New ACIP recommendations for hepatitis A post-exposure prophylaxis (PEP)**
   a. Hepatitis A vaccine should be administered for PEP for all persons aged ≥12 months
   b. In addition to hepatitis A vaccine, immunoglobulin may be administered to persons aged >40 years depending on the provider's risk assessment (e.g., patient age, immune status and underlying medical conditions, risk of transmission, and IG availability)

4. **Hepatitis A vaccine and immune globulin (Ig) for international travel and PEP**

Age/condition	International travel	Postexposure prophylaxis (PEP)
Vaccine contraindication	Ig	Ig
<6 mos	Ig	Ig
6–11 mos	Vaccine*	Ig
12 mos–40 yrs	Vaccine	Vaccine
>40 yrs	Vaccine (and Ig)†	Vaccine (and Ig)†
Immunocompromised or chronic liver disease	Vaccine (and Ig)†	Vaccine and Ig

Source: Nelson NP. MMWR 2018.
*Off-label use; this dose should not be counted toward the routine 2-dose series, which should be initiated at age 12 months.
†Based on provider risk assessment and availability of vaccine or Ig.

5. **Hepatitis A vaccine references**

   a. Nelson NP, et al. Update: Recommendations of the Advisory Committee on Immunization Practices for use of hepatitis A vaccine for postexposure prophylaxis and for preexposure prophylaxis for international travel. MMWR 2018;67:1216–20.
   b. CDC. Update: Prevention of hepatitis A after exposure to hepatitis A virus and in international travelers. Updated recommendations of the ACIP. MMWR 2007;56:1080–4.
   c. Fiore AE, et al. Prevention of hepatitis A through active or passive immunization: Recommendations of the ACIP. MMWR Recomm Rep 2006;55(RR-7):1–23.
   d. Doshani M, et al. Recommendations of the Advisory Committee on Immunization Practices for use of hepatitis A vaccine for persons experiencing homelessness. MMWR 2019;68(6):153–156.

Hepatitis B Vaccines

1. **New ACIP recommendations for hepatitis B vaccine for infants**
   a. Hepatitis B vaccination within 24 hours of birth for all medically stable infants ≥2,000 gms
   b. Removed permissive language for delaying the birth dose until after hospital discharge
   c. Postvaccination serologic testing for infants whose mother's HBsAg status will remain unknown
   d. Option of single-dose revaccination and retesting for infants born to HBsAg-positive or HBsAg-unknown women and who did not respond to the initial vaccine series

2. **Post vaccination testing for infants born to HBsAg-positive or HBsAg-unknown mothers**
   a. Perform testing at age 9–12 months after completion of vaccination
   b. If anti-HBs ≥10 mIU/mL, the infant is protected
   c. **New recommendation:** If anti-HBs <10 mIU/mL, revaccinate with 1 dose and retest in 1–2 mos
      i. If anti-HBs remains <10 mIU/mL following 1st extra dose, give 2 additional doses and retest 1–2 months after the final dose
   d. Infants with anti-HBs <10 mIU/mL also may be revaccinated with 3 doses and retested 1–2 months after the final dose
   e. No additional vaccine recommended for infants with anti-HBs <10 mIU/mL following two complete series of hepatitis B vaccine
   f. HBsAg-positive infants should be referred for follow-up care

3. **Hepatitis B vaccine and immune globulin products available in the United States**

Product	Manufacturer	Antigen/antibody	Age
Recombivax HB	Merck	HBsAg	Birth and up
Engerix-B	GSK	HBsAg	Birth and up
Pediarix	GSK	HBsAg, DTaP, IPV	6 wks–6 yrs
Twinrix	GSK	HBsAg, HAV	≥18 yrs
Heplisav-B	Dynavax	HBsAg	≥18 yrs
HepaGam B	Cangene	Anti-HBsAg	Birth and up
Nabi-HB	Biotest	Anti-HBsAg	Birth and up

Source: Schillie S. MMWR Recomm Rep 2018; Schillie S. MMWR 2018.
Abbreviations: HBsAg = hepatitis B surface antigen; DTaP = diphtheria and tetanus toxoids and acellular pertussis vaccine; IPV = inactivated poliovirus vaccine; HAV = inactivated hepatitis A virus vaccine.

4. Hepatitis B vaccine schedules for infants

Birthweight	Maternal HBsAg	First dose	Subsequent doses*
≥2,000 gms	Positive	Birth (≤12 hrs) with HBIG	1–2 mos, 6 mos
	Unknown	Birth (≤12 hrs)	1–2 mos, 6 mos
	Negative	Birth (≤24 hrs)	1–2 mos, 6–18 mos
<2,000 gms	Positive	Birth (≤12 hrs) with HBIG	1 mo, 2–3 mos, 6 mos
	Unknown	Birth (≤12 hrs) with HBIG	1 mo, 2–3 mos, 6 mos
	Negative	Discharge or age 1 month	2 mos, 6–18 mos

Source: Schillie S. MMWR Recomm Rep 2018.
*Administer additional dose if use Pediarix after the birth dose

5. Other new ACIP recommendations for hepatitis B vaccine

a. Test HBsAg-positive pregnant women for hepatitis B virus DNA
   i. American Association for the Study of Liver Diseases (AASLD) recommends maternal antiviral therapy if hepatitis B viral DNA >200,000 IU/mL to prevent perinatal transmission
b. Routine hepatitis B vaccination for persons with chronic liver disease (e.g., cirrhosis, fatty liver disease, alcoholic liver disease, autoimmune hepatitis, and ALT or AST >2 times normal, hepatitis C virus infection)
c. Heplisav-B may be used in adults aged ≥18 years recommended for hepatitis B vaccination

6. Hepatitis B vaccine references

a. Schillie S, et al. Prevention of hepatitis B virus infection in the United States: Recommendations of the ACIP. MMWR Recomm Rep 2018;67(1):1–31.
b. Schillie S, et al. Recommendations of the ACIP for use of a hepatitis B vaccine with a novel adjuvant. MMWR 2018;67:455–8.

Diphtheria, Tetanus, and Pertussis Vaccines

1. ACIP recommendations for prevention and control of diphtheria, tetanus, and pertussis

a. In April 2018, ACIP published a compilation of all previous recommendations for diphtheria, tetanus, and pertussis vaccines

b. Publication contains no new recommendations and replaces all previous reports

2. ACIP recommendations for diphtheria, tetanus, and pertussis vaccines

Vaccine	Age/indication	Schedule
DTaP	2 mos–6 yrs	Primary series at 2, 4, and 6 mos
		Booster doses at 15–18 mos and 4–6 yrs
Tdap	7–10 yrs	Not routinely recommended
	11–12 yrs	One dose
	≥13 yrs	One dose if no previous Tdap
	Pregnant woman*	One dose each pregnancy at 27–36 wks gestation
Td	Adults	One dose every 10 years

Source: Liang JL. MMWR Recomm Rep 2018.

Abbreviations: DTaP = diphtheria and tetanus toxoids and acellular pertussis vaccine; Tdap = tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis vaccine; Td = tetanus and diphtheria toxoids vaccine.

*Off-label use

3. Diphtheria, tetanus, and pertussis vaccines approved for use in children aged <7 years

Type	Trade name	Manufacturer
DTaP	Infanrix	GSK
DTaP	Daptacel	Sanofi
DTaP-IPV	Kinrix	GSK
DTaP-IPV	Quadracel	Sanofi
DTaP-IPV-HepB*	Pediarix	GSK
DTaP-IPV-Hib†	Pentacel	Sanofi
DT	No trade name	Sanofi

Source: Liang JL. MMWR Recomm Rep 2018.

* Approved through age 6 years

† Approved through age 4 years.

4. Diphtheria, tetanus, and pertussis vaccines approved for use in persons aged ≥7 years

Type	Trade name	Manufacturer
Tdap*	Boostrix	GSK
Tdap*	Adacel	Sanofi
Td	No trade name	MassBiologics
Td	Tenivac	Sanofi

Source: Liang JL. MMWR Recomm Rep 2018.
* Approved for persons ages ≥10 years

5. Tetanus prophylaxis for routine wound management

	Clean and minor wound		All other wounds	
Previous doses tetanus containing vaccines	**DTaP,Tdap, or Td***	**TIG**	**DTaP,Tdap, or Td***	**TIG†**
<3	Yes	No	Yes	Yes
≥3	No§	No	No¶	No

Source: Liang JL. MMWR Recomm Rep 2018.
Abbreviations: DTaP = diphtheria and tetanus toxoids and acellular pertussis vaccine; Tdap = tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis vaccine; Td = tetanus and diphtheria toxoids vaccine; TIG = tetanus immune globulin.
* DTaP is recommended for children aged <7 years. Tdap is preferred to Td for persons aged ≥11 years who have not previously received Tdap. Persons aged ≥7 years who are not fully immunized against pertussis, tetanus or diphtheria should receive one dose of Tdap for wound management and as part of the catch-up series.
† All persons with HIV or immunodeficiency receive TIG regardless of previous tetanus doses.
§ Yes, if >10 years since last tetanus vaccination.
¶ Yes, if >5 years since last tetanus vaccine.

6. Diphtheria, tetanus, and pertussis vaccine references

a. Liang JL, et al. Prevention of pertussis, tetanus, and diphtheria with vaccines in the United States: Recommendations of the ACIP. MMWR Recomm Rep 2018;67(2):1–44.

Herpes Zoster Vaccines

1. Newly licensed herpes zoster vaccine

a. Recombinant Zoster Vaccine (RZV) [Shingrix, GSK]
   i. Recombinant glycoprotein E with a novel adjuvant (AS01^{B})
   ii. Two 0.5 mL doses administered intramuscularly at 2–6 mos apart
   iii. In October 2017, FDA licensed for use in adults aged ≥50 years

b. Zoster Vaccine Live (ZVL) [Zostavax, Merck]
   i. Live attenuated varicella zoster virus
   ii. One 0.65 mL dose administered subcutaneously
   iii. In 2006, licensed for use in adults aged ≥60 yrs; in 2011, licensed for adults aged ≥50 years
   iv. ACIP recommends for use in immunocompetent adults aged ≥60 yrs

2. Herpes zoster vaccine efficacy at approximately 3 years post vaccination

		Outcome			
Vaccine	**Age group**	**Herpes zoster**		**Postherpetic neuralgia**	
RZV					
	50–59 yrs	97%	(90–99%)	91%	(76–98%)*
	60–69 yrs	97%	(90–100%)	--	
	≥70 yrs	91%	(87–95%)	89%	(69–97%)
ZVL					
	50–59 yrs	70%	(54–81%)	--	
	60–69 yrs	64%	(56–71%)	66%	(20–87%)
	≥70 yrs	38%	(25–48%)	67%	(43–81%)

Source: Dooling KL. MMWR 2018.
* Estimated efficacy for adults aged ≥50 years
Abbreviations: RZV = Recombinant Zoster Vaccine (Shingrix); ZVL = Zoster Vaccine Live (Zostavax)

3. New ACIP recommendations for herpes zoster vaccines

a. Recombinant zoster vaccine (RZV) is recommended for prevention of herpes zoster and related complications for immunocompetent adults aged ≥50 years
b. RZV is recommended for the prevention of herpes zoster and related complications for immunocompetent adults who previously received zoster vaccine live (ZVL)
c. RZV is preferred over ZVL for the prevention of herpes zoster and related complications

4. Herpes zoster vaccine references

a. Dooling KL, et al. Recommendations of the ACIP for use of herpes zoster vaccines. MMWR 2018;67:103–8.
b. Shimabukuro TT, et al. Vaccine administration errors involving recombinant zoster vaccine — United States, 2017–2018;67:585–6.
c. Harpaz R, et al. Prevention of herpes zoster: Recommendations of the ACIP. MMWR Recomm Rep 2008;57(RR-5):1–30.

ACIP recommended immunization schedules for 2019

1. Robinson CL, et al. Advisory Committee on Immunization Practices recommended immunization schedule for children and adolescents aged 18 Years or Younger — United States, 2019. MMWR 2019;68:112–14. Available at: www.cdc.gov/vaccines/schedules/hcp/child-adolescent.html
2. Kim DK, et al. Advisory Committee on Immunization Practices recommended immunization schedule for adults aged 19 Years or Older — United States, 2019. MMWR 2019;68:115–18. Available at: www.cdc.gov/vaccines/schedules/hcp/adult.html

Influenza Vaccine References and Resources

1. Grohskopf LA, et al. Prevention and control of seasonal influenza with vaccines: Recommendations of the Advisory Committee on Immunization Practices — United States, 2018–19 influenza season. MMWR Recomm Rep 2018;67(RR-3):1–20. Available at: https://www.cdc.gov/mmwr/volumes/67/rr/rr6703a1.htm.
2. CDC. Influenza vaccines — United States, 2018–19 influenza season. Available at: https://www.cdc.gov/flu/protect/vaccine/vaccines.htm.
3. Grohskopf LA, et al. Update: ACIP recommendations for the use of quadrivalent live attenuated influenza vaccine (LAIV4) — United States, 2018–19 influenza season. MMWR 2018;67:643–5.
4. Garten R, et al. Update: Influenza activity in the United States during the 2017–18 season and composition of the 2018–19 influenza vaccine. MMWR 2018;67:634–42.

Additional ACIP References and Resources

1. CDC ACIP website: https://www.cdc.gov/vaccines/acip/index.html
2. FDA vaccines website: www.fda.gov/BiologicsBloodVaccines/Vaccines/default.htm
3. O'Leary ST, Kimberlin DW. Update from ACIP. J Pediatr Infect Dis Soc 2018; https://doi.org/10.1093/jpids/piy050
4. O'Leary ST, Kimberlin DW, Maldonado YA. Update from ACIP. J Pediatr Infect Dis Soc 2018;7:93–9.
5. O'Leary ST, Kimberlin DW. Update from ACIP. J Pediatr Infect Dis Soc 2017;6:311–6.
6. Hinman AR, et al. Celebrating the ACIP at 50. Vaccine 2015;33:403–4.
7. Walton LR, et al. The history of the United States ACIP. Vaccine 2015;33:405–14.
8. Smith JC, et al. History and evolution of the ACIP — US, 1964–2014. MMWR 2014;63:955–8.
9. Ahmed F. Methods for developing evidence-based recommendations by the ACIP of the U.S. CDC. Vaccine 2011;29:9171–6.
10. Smith JC. The structure, role, and procedures of the U.S. ACIP. Vaccine 2010;28S:A68–75.

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