



Immunization Updates

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Background



- Several new vaccine products have been introduced in the past couple of years.
- Every year, vaccine recommendations are updated.
- Several big changes were made to the ACIP/CDC childhood vaccination schedule in 2025 and 2026.
- Professional societies released their own vaccination schedules in 2025 and 2026.
- Public attitudes towards vaccines have shifted.

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Objectives

- Be familiar with current US vaccine schedules.
- Be familiar with the new vaccines available and their use.
- Be familiar with common vaccine myths.
- Develop strategies for approaching vaccine hesitancy.

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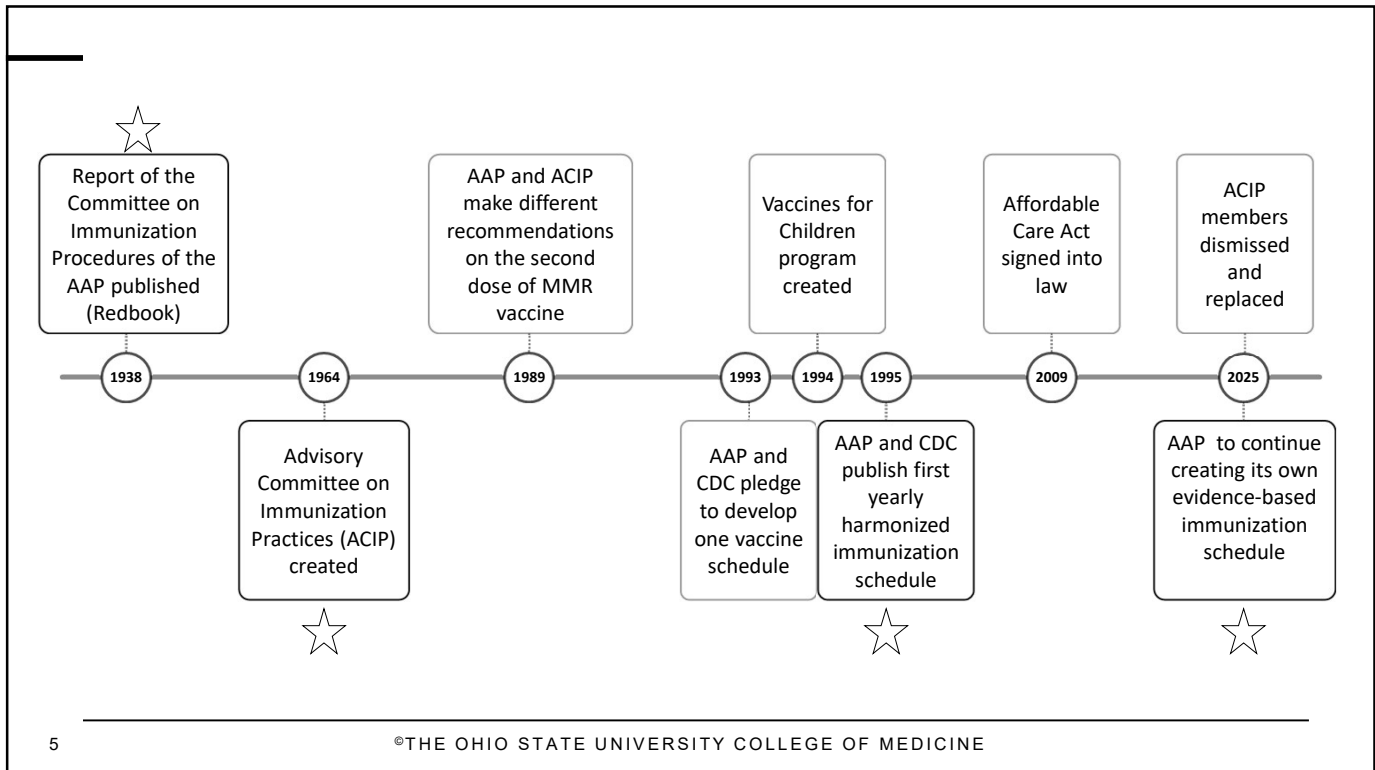
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Not Covered Today

- Dengue vaccine
- Mpox Vaccine
- Travel vaccines
- Vaccines not available in the United States

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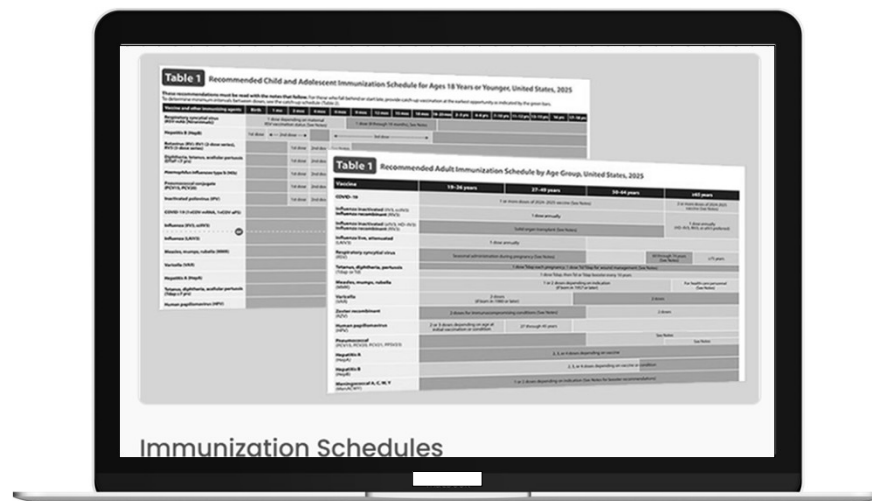
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CDC/ACIP vaccine schedule

<https://www.cdc.gov/vaccines/hcp/>



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CDC/ACIP Immunization Schedule

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Hepatitis B vaccination
(minimum age: birth)

Not

Routine vaccination

Catch-up vaccination

Special situations

Contraindications and Precautions

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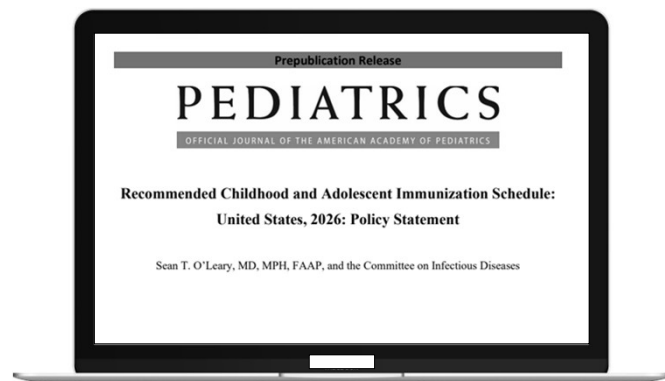
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AAP Immunization Schedule

Policy Statement released Jan 26, 2026

Endorsed by:

- **American Academy of Family Physicians (AAFP)**
- American College of Nurse Midwives (ACNM)
- American College of Obstetrics and Gynecology (ACOG)
- American Medical Association (AMA)
- American Pharmacists Association (APhA)
- Council of Medical Specialty Societies (CMSS)
- **Infectious Diseases Society of America (IDSA)**
- National Association of Pediatric Nurse Practitioners (NAPNAP)
- National Medical Association (NMA)
- Pediatric Infectious Diseases Society (PIDS)
- Pediatric Pharmacy Association (PPA)
- Society for Adolescent Health and Medicine (SAHM)



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AAP/Red Book Vaccination Schedule

Table 1 Recommended Child and Adolescent Immunization Schedule for Ages 18 Years or Younger, United States, 2025

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN®

These recommendations must be read with the Notes that follow. For those who fall behind or start late, provide catch-up vaccination at the earliest opportunity as indicated by the outlined purple bars. To determine minimum intervals between doses, see the catch-up schedule (Table 2).

Vaccine and other immunizing agents	Birth	1 mo	2 mo	4 mo	6 mo	9 mo	12 mo	15 mo	18 mo	19-23 mo	2-3 yrs	4-6 yrs	7-10 yrs	11-12 yrs	13-15 yrs	16 yrs	17-18 yrs
Respiratory syncytial virus (RSV) (nirsevimab, clesrovimab)	1 dose during RSV season depending on individual RSV vaccination status (See Notes)									1 dose nirsevimab during RSV season (See Notes)							
Hepatitis B (HepB)	1 st dose		2 nd dose														
Rotavirus (RV) (2-dose series), RV5 (1-dose series)			1 st dose	2 nd dose	See Notes												
Diphtheria, tetanus, and acellular pertussis (DTaP <7 yrs)			1 st dose	2 nd dose	3 rd dose					4 th dose							5 th dose
Haemophilus influenzae type b (Hib)			1 st dose	2 nd dose	See Notes					3 rd or 4 th dose (See Notes)							
Pneumococcal conjugate (PCV15, PCV20)			1 st dose	2 nd dose	3 rd dose					4 th dose							
Inactivated poliovirus (IPV)			1 st dose	2 nd dose													
COVID-19 (1vCOV-mRNA, 1vCOV-aPS)																	
Influenza																	
Measles, mumps, and rubella (MMR)																	
Varicella (VAR)																	
Hepatitis A (HepA)																	
Tetanus, diphtheria, and acellular pertussis (Tdap ≥7 yrs)																	
Human papillomavirus (HPV)																	
Meningococcal (MenACWY-CRM ≥2 mos, MenACWY-TT ≥2 years)																	
Meningococcal B (MenB-4C, MenB-FHbg)																	
Respiratory syncytial virus vaccine (RSV [Abrysvo])																	
Dengue (DENACYD 9-16 yrs)																	
Mpox																	

For the most up-to-date version, visit AAP.org/ImmunizationSchedule



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Table 1 Recommended Child and Adolescent Immunization Schedule for Ages 18 Years or Younger, United States, 2025

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Vaccine and other immunizing agents	Birth	1 mo	2 mo	4 mo	6 mo	9 mo	12 mo	15 mo	18 mo	19-23 mo	2-3 yrs	4-6 yrs	7-10 yrs	11-12 yrs	13-15 yrs	16 yrs	17-18 yrs
Respiratory syncytial virus (RSV) (nirsevimab or clesrovimab)	1 dose during RSV season depending on individual RSV vaccination status. See Notes									1 dose (9-18 months). See Notes							
Hepatitis B (HepB)	1 st dose		2 nd dose														
Rotavirus (RV) (2-dose series), RV5 (1-dose series)			1 st dose	2 nd dose	See Notes												
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Haemophilus influenzae type b (Hib)			1 st dose	2 nd dose	See Notes					3 rd or 4 th dose (See Notes)							
Pneumococcal conjugate (PCV15, PCV20)			1 st dose	2 nd dose	3 rd dose					4 th dose							
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Respiratory syncytial virus vaccine (RSV [Abrysvo])																	
Dengue (DENACYD 9-16 yrs)																	
Mpox																	

Range of recommended ages for all children Range of recommended ages for catch-up vaccination Range of recommended ages for certain high-risk groups Recommended vaccination on shared clinical decision-making Recommended vaccination based on shared clinical decision-making No recommendation Not applicable

Child (birth to 18 years old) Immunization Schedules

Table 1 Recommended Adult Immunization Schedule by Age Group, United States, 2025

Vaccine	19-26 years	27-49 years	50-64 years	≥65 years
COVID-19	1 or more doses of updated 2023-2024 vaccine. See Notes	See Notes	See Notes	2 or more doses of 2023-2024 vaccine. See Notes
Influenza (inactivated [IIV], cell/cell [CIV], influenza recombinant [RIV])	1 dose annually	1 dose annually	1 dose annually	1 dose annually (IIV or CIV preferred)
Influenza (live attenuated [LAIV])	1 dose annually (if not previously vaccinated)	1 dose annually (if not previously vaccinated)	1 dose annually (if not previously vaccinated)	1 dose annually (if not previously vaccinated)
Respiratory syncytial virus (RSV)	Seasonal administration during pregnancy. See Notes	1 dose Tdap each pregnancy; 1 dose Tdap for wound management (See Notes)	50 through 74 (See Notes)	>75 years
Tetanus, diphtheria, pertussis (Tdap or Td)	1 dose Tdap, then Td or Tdap booster every 10 years (if born in 1980 or later)	1 dose Tdap each pregnancy; 1 dose Tdap for wound management (See Notes)	1 dose Tdap each pregnancy; 1 dose Tdap for wound management (See Notes)	1 dose Tdap each pregnancy; 1 dose Tdap for wound management (See Notes)
Measles, mumps, rubella (MMR)	2 doses (if born in 1980 or later)	2 doses (if born in 1980 or later)	2 doses (if born in 1980 or later)	2 doses (if born in 1980 or later)
Zoster recombinant (RZV)	2 doses for immunocompromising conditions (See Notes)	2 doses for immunocompromising conditions (See Notes)	2 doses for immunocompromising conditions (See Notes)	2 doses for immunocompromising conditions (See Notes)
Human papillomavirus (HPV)	2 or 3 doses depending on age at initial vaccination or condition	27 through 45 years	See Notes	See Notes
Pneumococcal (PCV15, PCV20, PPSV23)	See Notes	See Notes	See Notes	See Notes
Hepatitis A (HepA)	2, 3, or 4 doses depending on vaccine or condition (19 through 50)	2, 3, or 4 doses depending on vaccine or condition (19 through 50)	2, 3, or 4 doses depending on vaccine or condition (19 through 50)	2, 3, or 4 doses depending on vaccine or condition (19 through 50)
Hepatitis B (HepB)	See Notes	See Notes	See Notes	See Notes
Meningococcal A, C, W, Y (MenACWY)	1 or 2 doses depending on indication. See Notes for booster recommendations.	1 or 2 doses depending on indication. See Notes for booster recommendations.	1 or 2 doses depending on indication. See Notes for booster recommendations.	1 or 2 doses depending on indication. See Notes for booster recommendations.
Meningococcal B (MenB)	2 or 3 doses depending on vaccine and indication. See Notes for booster recommendations.	2 or 3 doses depending on vaccine and indication. See Notes for booster recommendations.	2 or 3 doses depending on vaccine and indication. See Notes for booster recommendations.	2 or 3 doses depending on vaccine and indication. See Notes for booster recommendations.
Haemophilus influenzae type b (Hib)	19 through 23 years	19 through 23 years	19 through 23 years	19 through 23 years
Mpox	Complete 3-dose series if incompletely vaccinated. Self-report of previous doses acceptable. See Notes	Complete 3-dose series if incompletely vaccinated. Self-report of previous doses acceptable. See Notes	Complete 3-dose series if incompletely vaccinated. Self-report of previous doses acceptable. See Notes	Complete 3-dose series if incompletely vaccinated. Self-report of previous doses acceptable. See Notes
Inactivated poliovirus (IPV)	Complete 3-dose series if incompletely vaccinated. Self-report of previous doses acceptable. See Notes	Complete 3-dose series if incompletely vaccinated. Self-report of previous doses acceptable. See Notes	Complete 3-dose series if incompletely vaccinated. Self-report of previous doses acceptable. See Notes	Complete 3-dose series if incompletely vaccinated. Self-report of previous doses acceptable. See Notes

Recommended vaccination for adults who meet age requirement, lack documentation of vaccination or lack evidence of past infection Recommended vaccination for adults with an additional risk factor or another indication Recommended vaccination based on shared clinical decision-making No recommendation Not applicable

Adults Ages 19 and Older Immunization Schedules

This version of the immunization schedules has been adopted by the American Academy of Family Physicians. The CDC's 2025 immunization schedules, which are not endorsed by the AAFP, can be found [here](https://www.cdc.gov/vaccines/imz/downloads/).



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AAFP Adult Vaccine Schedule

How does the AAFP adult vaccine schedule differ from the CDC recommendations?

- A) COVID-19 vaccine recommendations
- B) Influenza vaccine recommendations
- C) Hepatitis B vaccine recommendations
- D) Trick question – no difference

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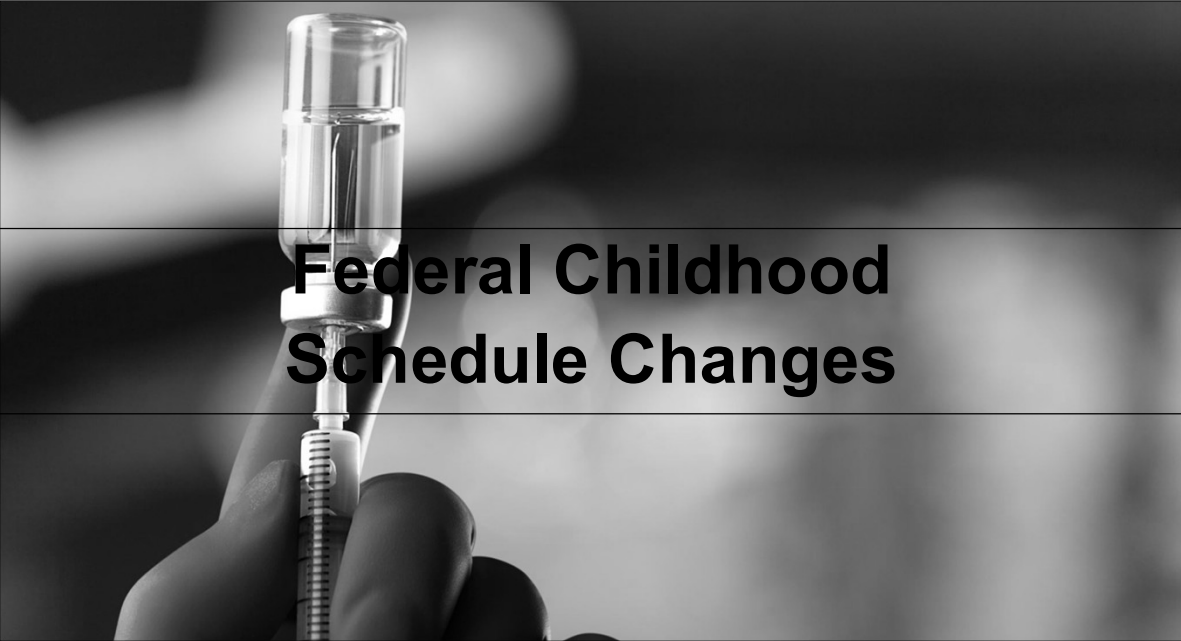
AAFP Adult Vaccine Schedule

How does the AAFP adult vaccine schedule differ from the CDC recommendations?

- A) COVID-19 vaccine recommendations**
- B) Influenza vaccine recommendations
- C) Hepatitis B vaccine recommendations
- D) Trick question – no difference

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Federal Childhood Schedule Changes

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Federal Childhood Vaccine Changes

Dec 2025 – President Trump issued a memo asking for HHS to complete an assessment & make recommendations on the childhood immunization schedule

Aug 2026 – President Trump signed Executive Order to confirm Jan overhaul, split combo vaccines, and promote state-level exemptions

Jan 2026 – CDC released a memo overhauling the childhood vaccine schedule

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Federal Vaccine Changes

- 3 New classifications
- Decreased routine diseases covered from 18 to 11

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Federal Childhood Vaccine Changes New ACIP Vaccine Classifications

Recommended for All Children	Shared Clinical Decision-making	Certain High-Risk Groups or Populations
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Federal Childhood Vaccine Schedule Changes Recommended for All (No Change)

Vaccine	Prior CDC Status	New Classification
DTaP & Tdap	Universal	Recommended for all children
Hib	Universal	Recommended for all children
Pneumococcal (PCV)	Universal	Recommended for all children
Polio (IPV)	Universal	Recommended for all children
MMR	Universal	Recommended for all children
Varicella	Universal	Recommended for all children

<https://www.hhs.gov/childhood-immunization-schedule/index.html>

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Federal Childhood Vaccine Schedule Changes Changed from prior schedule

Vaccine	Prior CDC Status	New Classification	Clinical Implication
HPV	Universal (2–3 doses)	Recommended for all children	Reduced to 1 dose at 11-12
Rotavirus	Universal	Shared decision-making	
Hepatitis B	Universal	Risk-based / shared decision	Only recommended for infants of mother with Hep B. 1 st dose for shared decision moved to 2 months or later.
Hepatitis A	Universal	Risk-based / shared decision	1 dose recommended for travelers, 2-dose series at 12 months is shared decision
MenACWY	Universal	Risk-based / shared decision	Asplenia or college students living in residential housing.
MenB	At risk groups	Risk-based / shared decision	Asplenia or outbreak, doesn't mention residential housing.

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Federal Childhood Vaccine Schedule Changes

Seasonal Vaccines and Immunoprophylaxis

Vaccine	Prior CDC Status	New Classification	Clinical Implication
Influenza	Universal	Shared decision-making	Counseling and individual risk assessment
COVID-19	Universal	Shared decision-making	Counseling and individual risk assessment
RSV	Seasonally if mother did not receive vaccine	Certain High-Risk Groups or Populations	No Change – still recommended for all infants who's mother did not receive vaccination in 1 st season and 2 nd season for high-risk

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Federal Vaccine Changes

Response

AAP reaffirms its 2026 vaccination schedule.

“Vaccine recommendations from the American Academy of Pediatrics are tailored to the health of children living in the United States and are based on decades of research and systematic tracking of real-world experiences. Pediatricians recommend children receive certain vaccines at specific ages based on when children's immune systems will respond best and when they are most vulnerable to certain diseases. Sometimes this means children will receive a single shot that protects against multiple diseases, or they may receive multiple vaccines at one visit.”

>200 organizations opposed and denounced the executive order.

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Federal Vaccine Changes

"All vaccines currently recommended by CDC will remain covered by insurance without cost sharing,"

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New Vaccines

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Immunizations to Protect Against Severe RSV

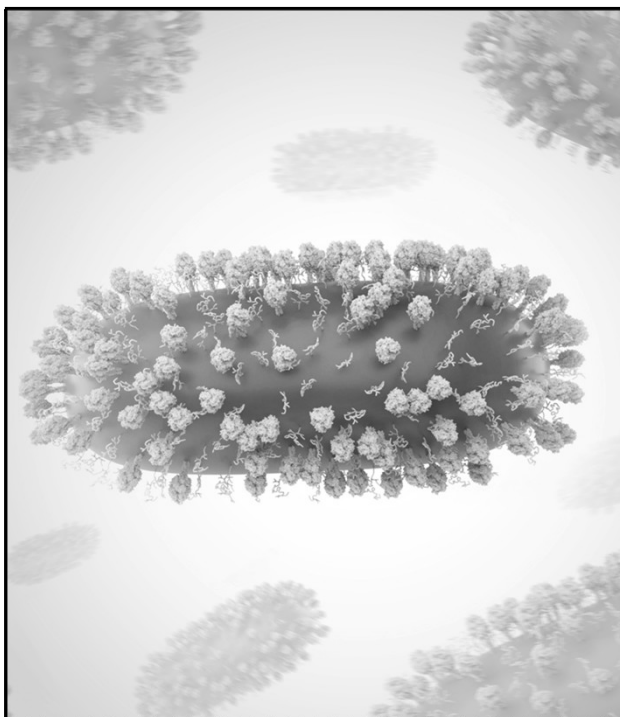
Who Does It Protect?	Type of Product	Who Is It Recommended For?	When Is It Available?
 Adults 50 and over	RSV vaccine	Adults ages 50-74 who are at increased risk of severe RSV AND Everyone ages 75 and older	Available any time, but best time to get vaccinated is late summer and early fall
 Babies	RSV antibody given to baby	All infants whose mother did not receive RSV vaccine during pregnancy, and some children ages 8-19 months who are at increased risk for severe RSV	October through March*
 Babies	OR RSV vaccine (Pfizer's ABRYSVO) given to mother during pregnancy	All pregnant women during weeks 32-36 of their pregnancy	September through January

www.cdc.gov/rsv

*Recommended timing of administration in most of the continental United States. Recommended timing of administration may differ in some areas, based on state, local, or territorial guidance.



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RSV Vaccines

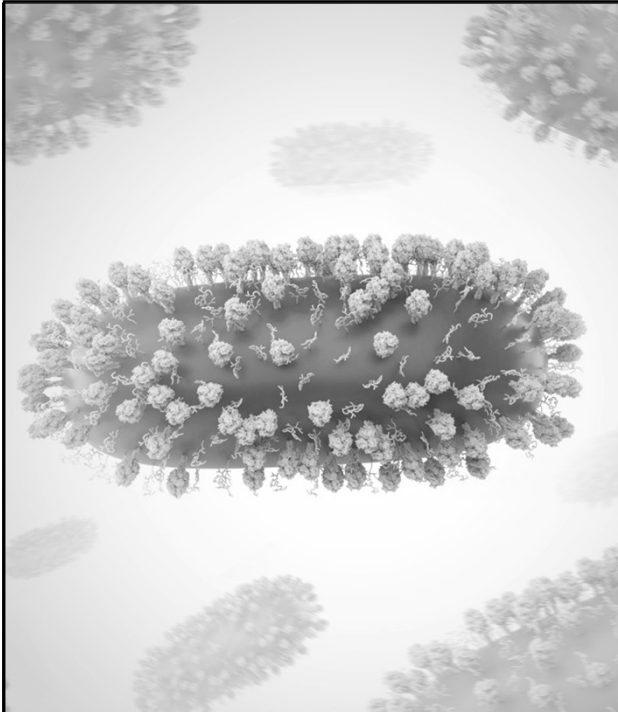
Adult products

- Arexvy (GSK) – adult
- Mresvia (Moderna) – adult
- Abrysvo (Pfizer) – adults, including pregnant

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RSV Vaccines

Adult Recommendations

- Everyone 75 yo+
- 50-74yo at increased risk of severe RSV
 - Chronic medical conditions such as lung, heart disease
 - Live in nursing homes
- 1 time dose, ideally given late summer/early fall
- Available at the pharmacy under Medicare part D

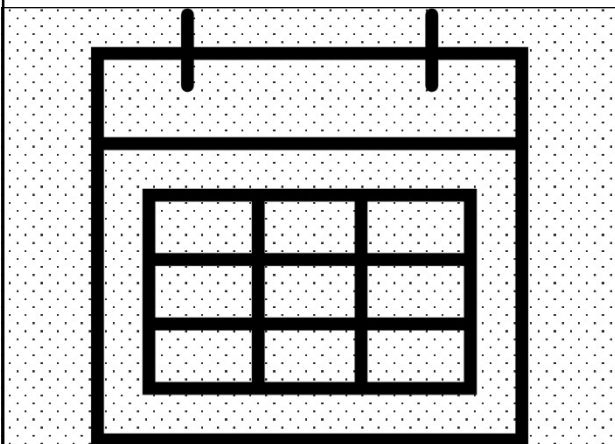
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RSV Vaccines

Adult Products



When should maternal RSV vaccine be given?

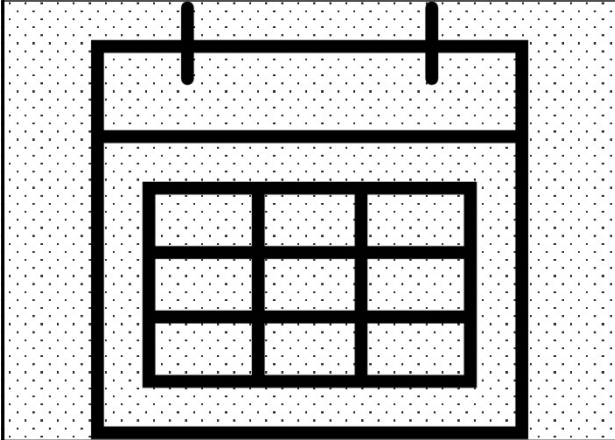
- A) All year round
- B) September through January
- C) October through March
- D) It changes every year

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RSV Vaccines Adult Products



When should maternal RSV vaccine be given?

- A) All year round
- B) September through January**
- C) October through March
- D) It changes every year

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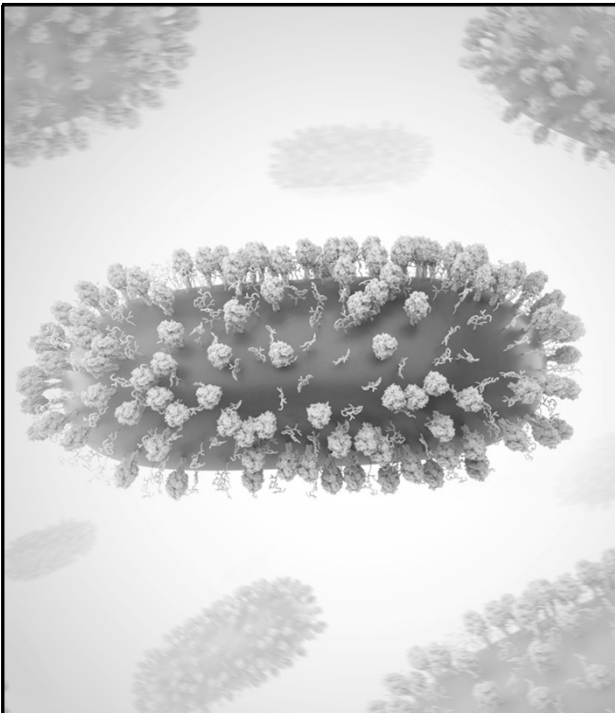
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RSV Vaccines Adult Recommendations

- Pregnancy
 - September through January
 - Between 32 and 36 wks gestation
 - At least 14d before delivery
 - Only recommended ONCE (do not repeat for future pregnancies)
 - Reduces risk of RSV hospitalization for babies by 57% in the first 6 months

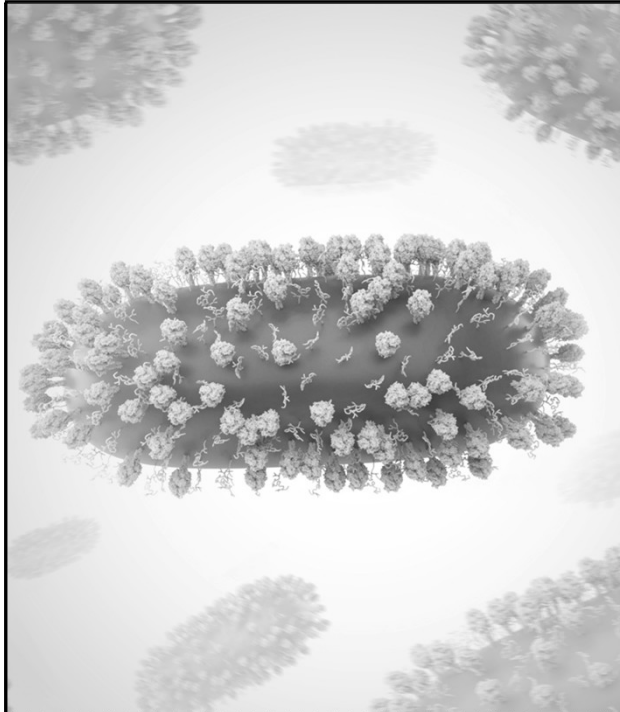
ONLY Abrysvo vaccine



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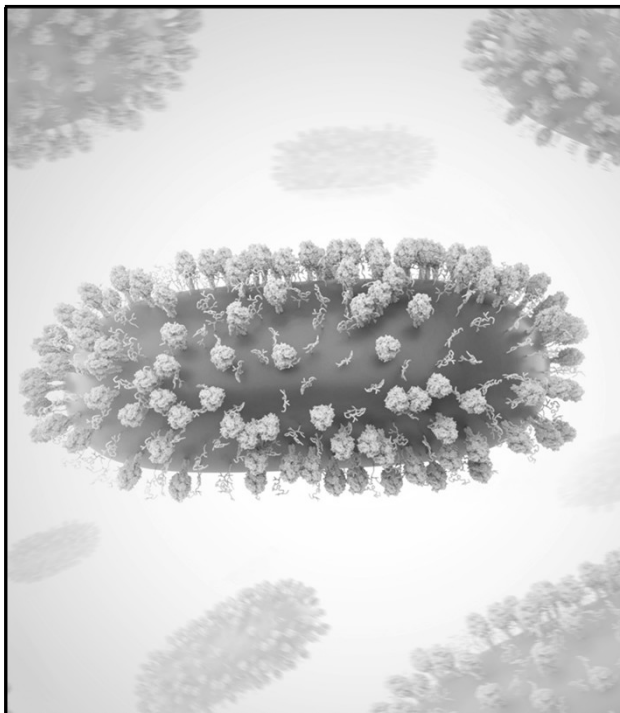
RSV Immunizations Pediatrics

- Nirsevimab (Beyfortus)
- Clesrovimab (Enflonsia)
- Palivizumab (Synagis) approved for use and removed from market Dec 2025

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RSV Immunizations Pediatrics

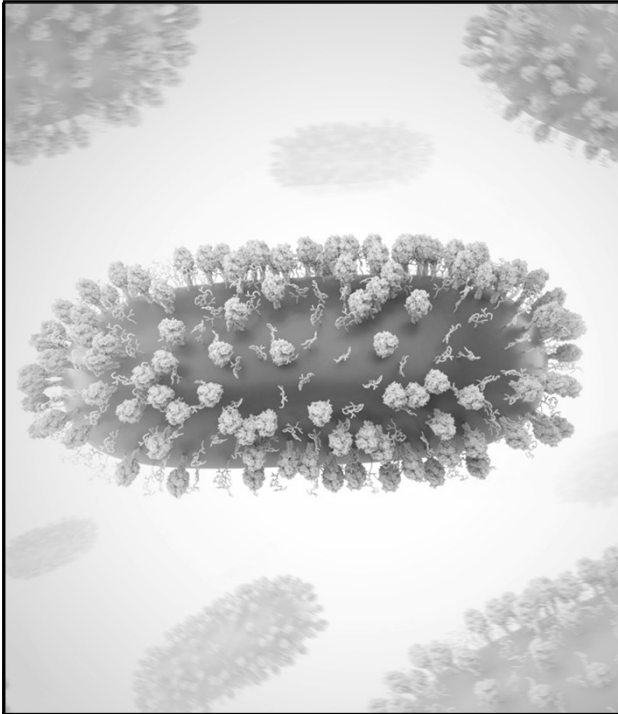
Which of the following babies should receive RSV mAb?

- Newborn in Jan, mom received Abrysvo at 37 weeks, baby born full term at 38 weeks
- 9-month old at WCC who's mother did not receive Abrysvo
- Newborn seen in June with cleft palate.
- 4mo at WCC in Oct, mom did not receive Abrysvo

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RSV Immunizations

Pediatrics

Which of the following babies should receive RSV mAb?

- A) **Newborn in Jan, mom received Abrysvo at 37 weeks, baby born full term at 38 weeks**
- B) 9-month old at WCC who's mother did not receive Abrysvo
- C) Newborn seen in June with cleft palate.
- D) **4mo at WCC in Oct, mom did not receive Abrysvo**

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RSV Immunizations

Pediatrics

- **All babies in 1st RSV season** (usually Oct 1-Mar) **<8 months** old if birth parent did not receive Abrysvo at 32-36 weeks + at least 14d before delivery.

AAP issued expanded indications for babies to receive MAB in 2nd RSV season on Sept 2, 2026.

Nirsevimab 200mg is recommended for patients 8-19 months of age at high risk for severe RSV disease entering their second RSV season. The 4 new high risk indications are:

- All children born preterm, at <32 weeks, 0 days gestation
- Children with hemodynamically significant congenital heart disease
- Children with anatomic pulmonary abnormalities or neuromuscular disorders putting them at risk for severe RSV disease
- Children with Down syndrome or other chromosomal differences placing them at higher risk of severe RSV disease

This is in addition to the original 4 indications which still apply:

- Children with chronic lung disease attributable to prematurity or other significant neonatal conditions (eg meconium aspiration, congenital diaphragmatic hernia) who require medical support (ie, chronic corticosteroids, diuretics, or oxygen) at any time during the 6-month period before the start of the second RSV season
- Children with severe immunocompromise
- Children with cystic fibrosis who have either:
 - Manifestations of severe lung disease or
 - Weight-for-length that is less than 10th percentile
- American Indian or Alaska Native children

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RSV			
	Positive	Total	Percent Positive
4/11/2026	26	217	12%
4/4/2026	39	241	16%
3/28/2026	26	238	11%
3/21/2026	42	234	18%
3/14/2026	54	314	17%
3/7/2026	48	295	16%
2/28/2026	49	276	18%
2/21/2026	62	308	20%
2/14/2026	42	230	18%
2/7/2026	40	223	18%
1/31/2026	44	220	20%
1/24/2026	66	271	24%
1/17/2026	39	243	16%
1/10/2026	39	282	14%
1/3/2026	63	314	20%
12/27/2025	31	255	12%
12/20/2025	22	294	7%
12/13/2025	17	248	7%
12/6/2025	13	230	6%
11/29/2025	15	211	7%
11/22/2025	16	268	6%
11/15/2025	11	258	4%
11/8/2025	11	259	4%
11/1/2025	4	213	2%

RSV Immunizations

Pediatrics

Abrysvo for pregnancy – Sept 1 through **Mar 1**
 ACOG updated season end date on Sept 2, 2026

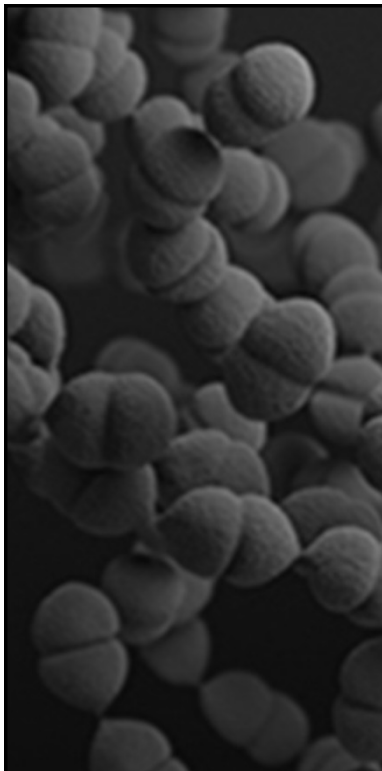
Nirsevimab & Clesrovimab – Oct through Mar**

Can vary due to local RSV activity

The CDC reported continued RSV activity so VFC has extended RSV season to end of April 2026

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Pneumococcal Vaccines

Pneumococcal Conjugate Vaccines

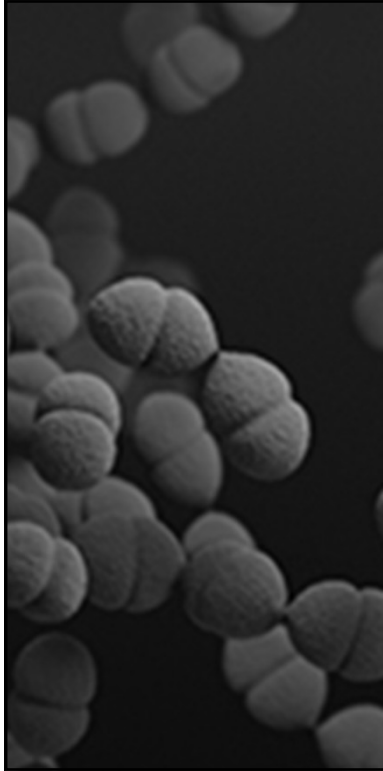
- PCV15 (Vaxneuvance) – 6 weeks+
 - Approved for pediatric patients in 2022
- PCV20 (Prennar 20) – 6 weeks+
 - Approved for pediatric patients in 2023
- PCV21 (Capvaxive) – adults 18+

Pneumococcal Polysaccharide Vaccines

- PPSV23 (Pneumovax)

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Pneumococcal Vaccines

Pediatrics

Routine vaccination: 4-dose series

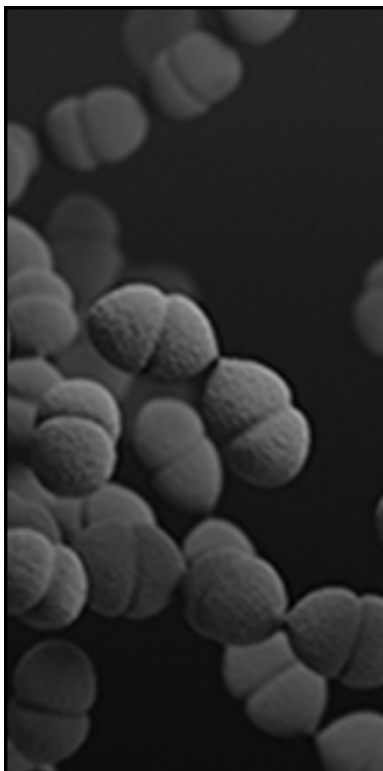
- 2 month
- 4 month
- 6 month
- 12-15 months

Additional notes:

- using PCV15 or PCV20 for routine childhood vaccination & catch-up vaccination
- For **children 2-18 with any risk condition** received PCV13 or PCV15 for routine vaccinations, they should receive a single dose of PCV20 or PPSV23

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Pneumococcal Vaccines

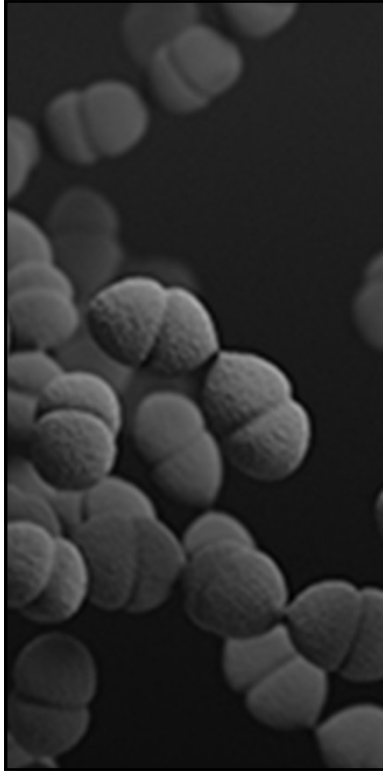
Adults

Routine:

- All adults 50yo+ should get PCV (15, 20, 21)
- If giving PCV15, give PPSV23 1 year later (if not already received)

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Pneumococcal Vaccines

Adults

19-49yo with risk condition:

- 1 dose of PCV (15, 20, 21)
- If giving PCV15, give PPSV23 1 year later
(8 wks if immunocompromised)

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Pneumococcal Vaccines



Confusing! CDC offers:
PneumoRecs VaxAdvisor free app

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Meningococcal Vaccines

Schedule Change

MenB – 2-dose series based on Shared-decision

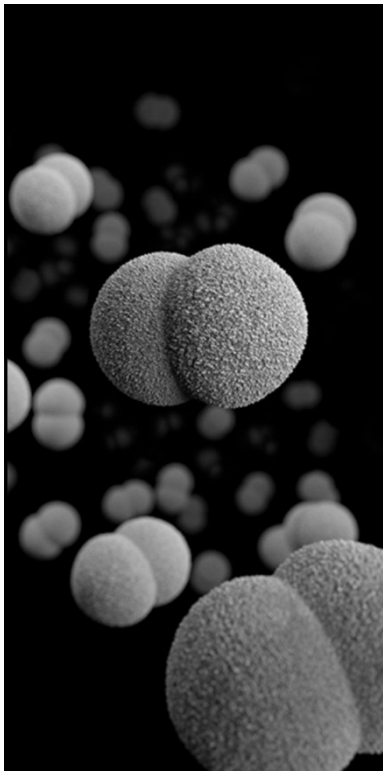
- 16-23 (preferred 16-18) years
- Now 2 doses at 0 and 6 months is standard for both products

Risk Based (3-dose for high risk):

- Complement deficiency (including from meds)
- Asplenia (including functional)
- Some occupations (microbiologist, military)
- College student living in residence hall
- Local outbreak

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Meningococcal Vaccines

Change in products

MenACWY

Menactra removed from market 2022

- Menveo – 2-4 dose series depending on age of initiation (2m-24mo)
- MenQuadfi – 2-dose series starting age 2yr

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Meningococcal Vaccines

Change in products

MenACWY – routine 2-dose series

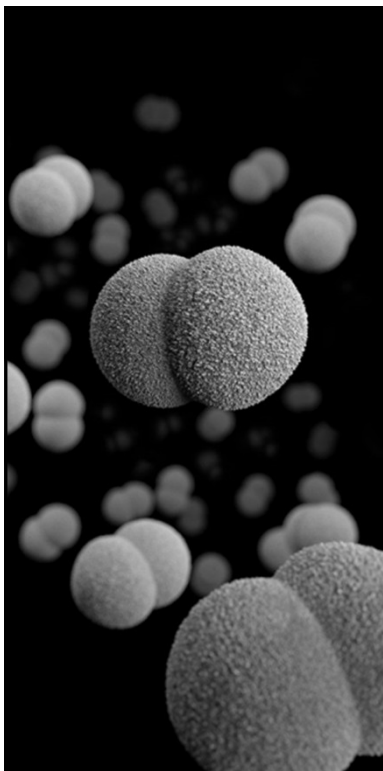
- 11-12 years
- 16 years

Risk Based:

- Complement deficiency (including from meds)
- Asplenia (including functional)
- HIV
- Travel to locations with risk (eg meningitis belt in Sub-Saharan Africa)
- Some occupations (microbiologist, military)
- College student living in residence hall
- Local outbreak

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Meningococcal Vaccines

Combo products

Pentavalent meningitis vaccines– MenABCWY

MenACWY + MenB in a single product

- Penmenvy – Bexsero + Menveo
- Penbraya – Trumenba + Nimenrix
 - 10-25 year olds
 - 2 doses, 6months apart

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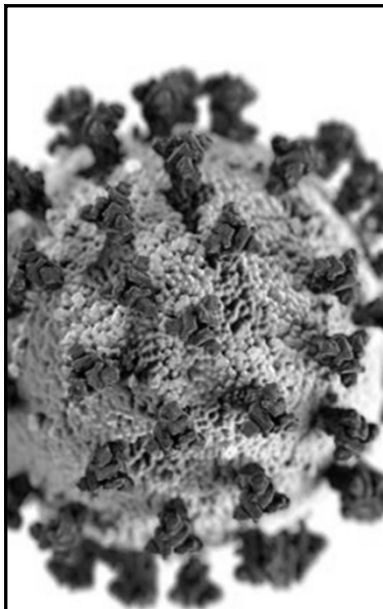


Seasonal Vaccines

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Seasonal Vaccines

COVID-19

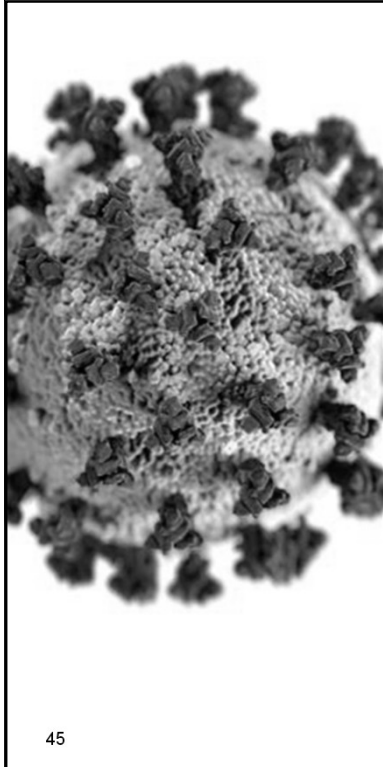
2026-2027 formulation – approved by FDA late Aug 2026

- Spikevax (Moderna) – 6mo+
- Comirnaty (Pfizer-BioNTech) – 5yr+
- mRNAexspike (Moderna) – 12yr+
- Nuvaxovid (Novavax-Sanofi) – 12yr+

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Seasonal Vaccines

COVID-19

2026-2027 formulation

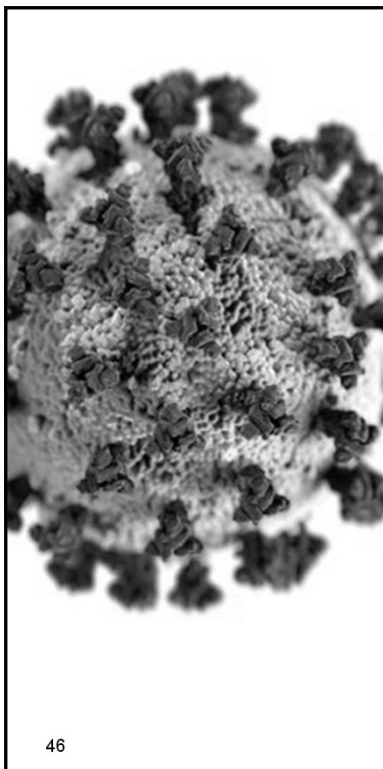
AAP & AAFP recommends:

- everyone 6-23 months: routine vaccination
 - 2 dose series: 0, 4-8 weeks (Spikevax)
- 2-18 at high risk of severe COVID-19, congregate settings, never been vaccinated against COVID-19, household contacts at risk for severe COVID-19, or parent/guardian desire protection.
 - Single dose of age appropriate COVID-19 vaccine

****moderately or severely immunocompromised have different recommendations**

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Seasonal Vaccines

COVID-19

2026-2027 formulation

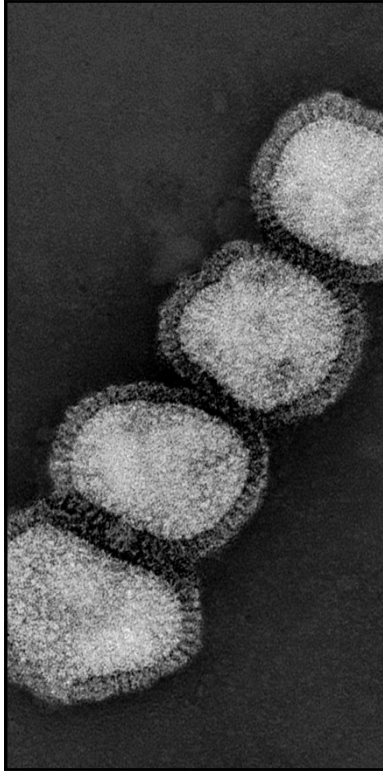
AAFP adult recommendations

- All adults
 - 19-64: Single dose of COVID-19 vaccine
 - 65y+: 2 doses separated by 6mo

****moderately or severely immunocompromised have different recommendations**

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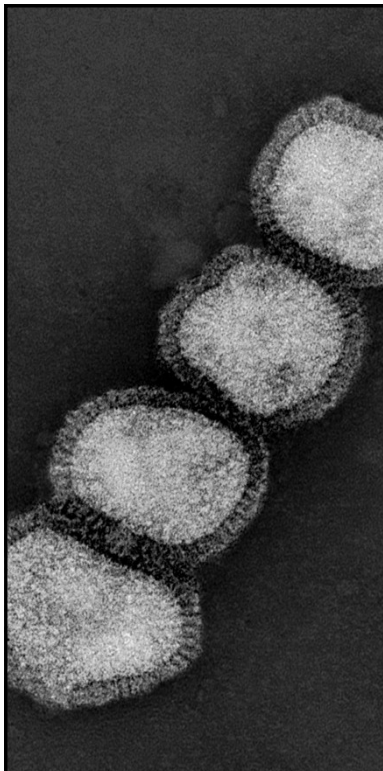
Vaccine Mythbuster

Which vaccines contain Thimerosal?

- A) None since 2001
- B) MMR and Varicella
- C) Multi-dose influenza
- D) Pneumococcal conjugate vaccines

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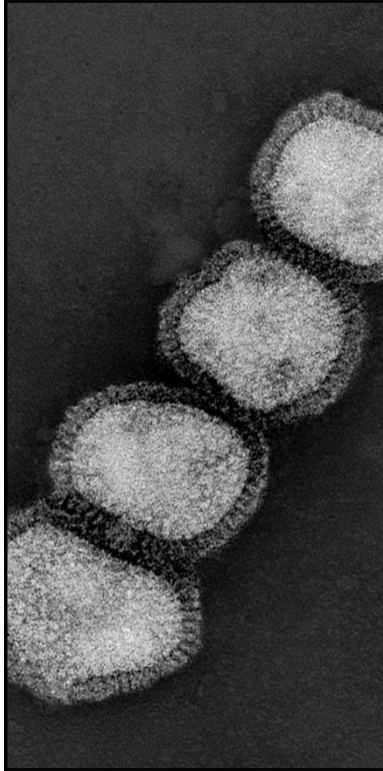
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Seasonal Vaccines

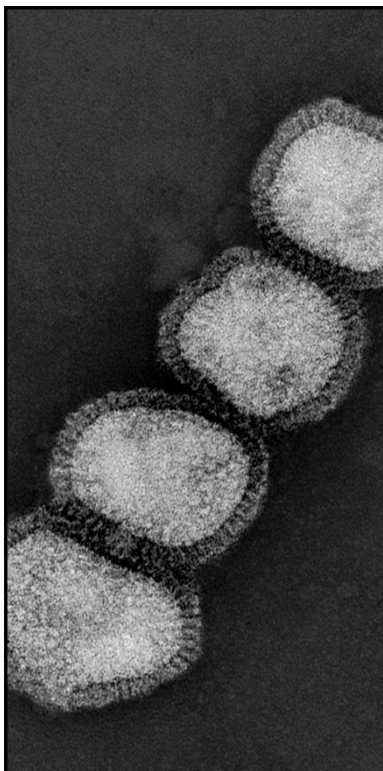
Influenza

2026-2027 formulation – Trivalent only

- an A/Missouri/11/2025 (H1N1)pdm09-like virus;
- an A/Darwin/1454/2025 (H3N2)-like virus; and
- a B/Tokyo /EIS13-175/2025 (B/Victoria lineage)-like virus.

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Seasonal Vaccines

Influenza

mFlusiva is a new mRNA Flu vaccine

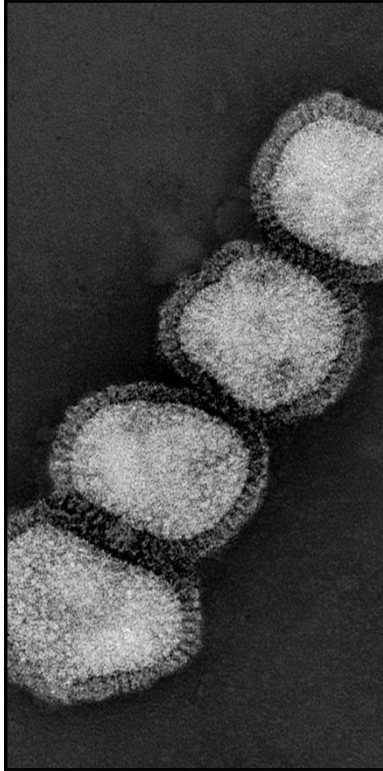
Approved 8/5/2026

- Adults 50y+
- For 65y+, accelerated approval based on immune response, clinical benefit is pending
- Phase 3 trial shows statistical non-inferiority, superiority to standard and high-dose egg-based flu vaccines
- Increased adverse reactions vs traditional

Soens M, Ananworanich J, Hicks B, Lucas KJ, Cardona J, Sher L, Livermore G, Schaefer K, Henry C, Choi A, Avanesov A, Chen R, Du E, Pucci A, Das R, Miller J, Nachbagauer R. A phase 3 randomized safety and immunogenicity trial of mRNA-1010 seasonal influenza vaccine in adults. *Vaccine*. 2025 Mar 19;50:126847. doi: 10.1016/j.vaccine.2025.126847. Epub 2025 Feb 7. PMID: 39919447.

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Seasonal Vaccines

Influenza

2026-2027 formulation

AAP, AAFP, ?CDC

- Recommended for **All** patients 6mo and older

Peds:

- 2 doses for 1st season between 6mo and 8year

Adults:

- High dose preferred 65y+

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Vaccine Hesitancy

“Delay in acceptance or refusal of safe vaccines despite their availability”

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Vaccine Hesitancy

REPORT OF THE SAGE WORKING GROUP ON VACCINE HESITANCY

12 November 2014*

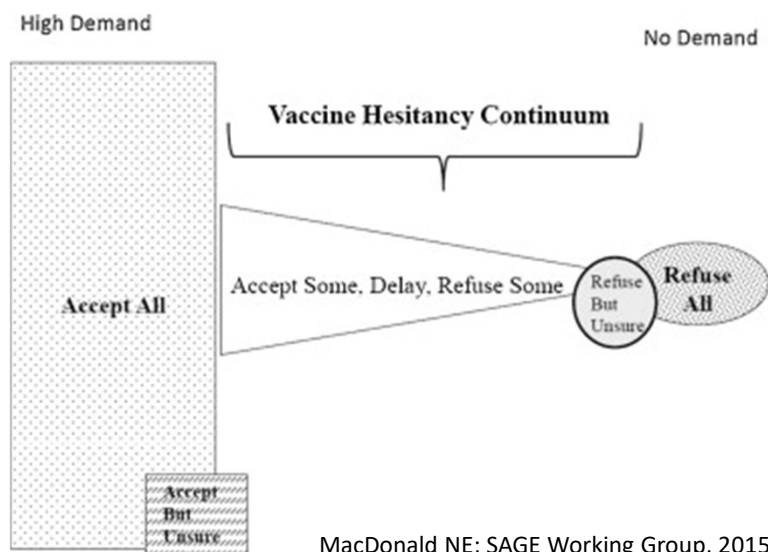
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WHO SAGE Vaccine Hesitancy findings

- Vaccine Hesitancy is complex and context specific
- It is a continuum
- Influences include 3C's: complacency, convenience and confidence.
- There is no single intervention strategy
- Most effective strategies are multi-component vs single-component



MacDonald NE; SAGE Working Group, 2015

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WHO SAGE Vaccine Hesitancy findings

- Regional vaccine coverage rates can be misleading.
- Even those accepting vaccines can have doubts and fears about vaccines.
- Vaccine hesitancy is increasing in developed countries

MacDonald NE; SAGE Working Group, 2015

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CASE STUDY

2018-2019 NYC measles outbreak

- 649 cases
- 85% patients were unvaccinated
- No deaths, 7.6% were hospitalized
- 1 year cost \$8.4 million
 - Missed work, lost income
 - Missed school/educational opportunity
 - Disproportionately affected the poor

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Why should we care?

- Vaccine preventable diseases
- Extra time spent counseling
- Value based care

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Clinician's role in Vaccine Hesitancy

- 2008 study by Gust et al:

The largest proportion of parents who changed their minds about delaying or not getting a vaccination for their child listed “information or assurances from health care provider” as the main reason.

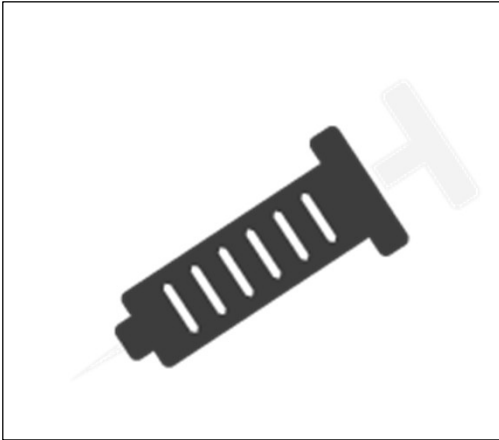
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Addressing Vaccine Hesitancy

AAP 2024 Clinical Report: Strategies for Improving Vaccine Communication and Uptake



- 20% US parents “hesitant” (CDC’s National Immunization Survey 2019-22)
- 1-3% refuse all vaccines
- On-time vaccination decreased in years following COVID-19 pandemic
- Receiving a vaccine strongly correlated with perceived disease risk or susceptibility

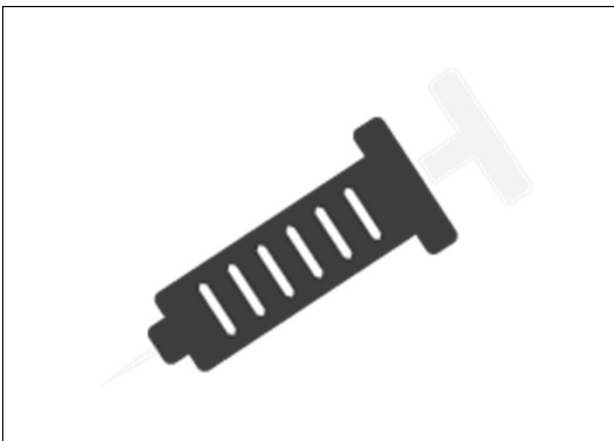
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Addressing Vaccine Hesitancy

AAP 2024 Clinical Report: Strategies for Improving Vaccine Communication and Uptake



*Disparities

- Racial
- Ethnic
- Socioeconomic

<https://www.immunize.org/clinical/vaccine-confidence/topic/vaccine-hesitancy/>

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Addressing Vaccine Hesitancy

AAP 2024 Clinical Report: Strategies for Improving Vaccine Communication and Uptake



Vaccine Safety

- Rigorous approval process
- VAERS for after market surveillance
- Vaccine Safety Datalink (VSD)

<https://www.immunize.org/clinical/vaccine-confidence/topic/vaccine-hesitancy/>

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Vaccine Myths

- Vaccines cause autism.
- Natural immunity is better.
- Too many vaccines overwhelms the system.
- Vaccines contain toxic ingredients like mercury and aluminum.
- Vaccines give you the disease.

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Pain, fear of needles

Techniques to reduce discomfort

- No aspiration
- Injecting least to most painful (if multiple)
- Simultaneous injections for infants (not for 1+)
- Vastus lateralis for infants
- Breastfeeding, pacifier
- Skin-to-skin
- Sucrose solutions
- Kids younger than 3 should be held
- External vibrating device
- 5% topical lidocaine/prilocaine



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To reduce discomfort, oral analgesics can be given before vaccination and is shown to decrease risk of febrile seizures.

FALSE

- Oral analgesics have NOT been shown to decrease risk of febrile seizures

AND

- Oral analgesics (acetaminophen, ibuprofen) can decrease the efficacy of vaccines and are not recommended for pretreatment before vaccines

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Vaccine Hesitancy Strategies - Communication

- Strong Recommendation
- Presumptive Format
- Motivational interviewing

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References

- NCH Weekly Pathogens Report: <https://www.nationwidechildrens.org/specialties/laboratory-services/for-providers/pathogen-surveillance-reports-antibiograms>
- <https://www.cdc.gov/media/releases/2024/s-0626-vaccination-adults.html>
- <https://www.fda.gov/vaccines-blood-biologics/safety-availability-biologics/fda-requires-guillain-barre-syndrome-gbs-warning-prescribing-information-rsv-vaccines-abrysvo-and>
- Moline HL, Tannis A, Goldstein L, et al. Effectiveness and Impact of Maternal RSV Immunization and Nirsevimab on Medically Attended RSV in US Children. *JAMA Pediatr.* 2026;180(3):314–324. doi:10.1001/jamapediatrics.2025.5778
- Dubé E, Gagnon D, MacDonald NE; SAGE Working Group on Vaccine Hesitancy. Strategies intended to address vaccine hesitancy: Review of published reviews. *Vaccine.* 2015 Aug 14;33(34):4191-203. doi: 10.1016/j.vaccine.2015.04.041. Epub 2015 Apr 18. PMID: 25896385.
- Deborah A. Gust, Natalie Darling, Allison Kennedy, Ben Schwartz; Parents With Doubts About Vaccines: Which Vaccines and Reasons Why. *Pediatrics* October 2008; 122 (4): 718–725. 10.1542/peds.2007-0538
- Brendan Nyhan, Jason Reifler, Sean Richey, Gary L. Freed; Effective Messages in Vaccine Promotion: A Randomized Trial. *Pediatrics* April 2014; 133 (4): e835–e842. 10.1542/peds.2013-2365
- İyi Z, İşler A, Özer Z. Effectiveness of ShotBlocker application on reducing the pain of needle-related procedures in children: A systematic review and meta-analysis. *J Pediatr Nurs.* 2024 Sep-Oct;78:e438-e447. doi: 10.1016/j.pedn.2024.08.006. Epub 2024 Aug 10. PMID: 39129083.
- O'Leary ST, Opel DJ, Cataldi JR, Hackell JM; COMMITTEE ON INFECTIOUS DISEASES; COMMITTEE ON PRACTICE AND AMBULATORY MEDICINE; COMMITTEE ON BIOETHICS. Strategies for Improving Vaccine Communication and Uptake. *Pediatrics.* 2024 Mar 1;153(3):e2023065483. doi: 10.1542/peds.2023-065483. PMID: 38404211.
- <https://publications.aap.org/aapnews/news/11163/ID-Snapshot-How-to-reduce-pain-during-vaccination>
- <https://www.cdc.gov/media/releases/2023/p0922-RSV-maternal-vaccine.html>
- <https://www.cdc.gov/vaccines/hcp/by-disease/rsv.html>

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