
IMPORTANT IMMUNIZATION UPDATES: NEW PRODUCTS & NEW RECOMMENDATIONS

OCTOBER 2024

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DISCLOSURES

- Focus group participant for Alexion Pharmaceuticals on a complement-inhibiting immunobiologic drug and vaccination recommendations.

AGENDA

- Review key difference between polysaccharide and conjugate vaccines.
- Understand how the new pneumococcal vaccine impacts current recommendations for adults.
- Understand the current immunization options for Respiratory Syncytial Virus.
- Understand the current influenza and COVID-19 vaccine recommendations.





POLYSACCHARIDE VACCINES VS CONJUGATE VACCINES

VERY BASIC COMPARISON



BATMAN AND ROBIN

B cell



Helper T cell

B CELLS AND ANTIBODIES

- The B cell is responsible for making circulating antibodies/immunoglobulins
 - IgM – made early but not long-living. Usually testing for IgM indicates recent exposure/infection
 - IgA – secreted from mucosal surfaces (nasal, gut), also found in breastmilk
 - IgG – long lasting and demonstrates B cell immune MEMORY
- Isotype switching – when B cells mature and adjust the type of antibody/immunoglobulin they are making
 - Most isotype switching involves Helper T cell assisting the B cell response (T cell-dependent B cell activation)

B CELL ACTIVATION

T cell-dependent

- Requires T Helper cell
- **Responds to protein/peptides**
- Strong immune response elicited
- Isotype Switching occurs (make IgG and some IgA)
- Memory B cells are made



T cell-independent

- **Responds to polysaccharides & lipids**
- Little-to-no isotype switching
 - IgM >> IgG
- Only some antigens (polysaccharides) make memory B cell response
- Poor response in children < 2YO



T CELL-INDEPENDENT B CELL ACTIVATION



- Bacteria with polysaccharide (encapsulated) or fat/lipid on the surface will not be recognized by T cells
- Need a way to fight invaders that can avoid T cells
 - *Haemophilus influenza type B*
 - *Streptococcus pneumoniae*
 - *Neisseria meningitis*
 - *Streptococcus agalactiae* (Group B Strep)
 - *Salmonella typhi*
- Polysaccharide vaccines also use this mechanism of action

T CELL-INDEPENDENT B CELL ACTIVATION



- Patients who are vulnerable to infections from encapsulated organisms:
 - Children < 2YO (immature immune system)
 - Asplenic (congenital or acquired)
 - Complement deficiency or on complement-inhibiting medication

CONJUGATED VACCINES – A LOOPHOLE TO ACTIVATE B CELLS

- Conjugating protein to a polysaccharide
 - Protein gets recognized by T cell, & the polysaccharide is the “plus one” that can then be recognized by the immune system
 - The protein conjugate is usually tetanus toxoid or diphtheria protein
 - The purpose of conjugating is NOT to provide an immune response to the protein, but to elicit the response to the conjugated polysaccharide
- This is why we can vaccinate children <2YO against encapsulated organisms, but you cannot give polysaccharide vaccine to child <2YO
- In adults, a conjugate vaccine stimulates a stronger immune response than a polysaccharide vaccine
 - This is why Pneumococcal conjugate vaccines (PCV) are now preferred over the polysaccharide vaccine (PPSV23)

PNEUMOCOCCAL VACCINES



TWO TYPES OF PNEUMOCOCCAL VACCINES (AND CURRENTLY AVAILABLE PRODUCTS)

Pneumococcal conjugate vaccines (PCVs)

- PCV15
- PCV20
- PCV21

Pneumococcal polysaccharide vaccine

- PPSV23

PNEUMOCOCCAL VACCINE UPDATE

- Pneumococcal 21-valent conjugate vaccine (PCV21) is a vaccine that helps prevent pneumonia and invasive disease in adults 18 and older.
- It is NOT PCV20 plus one more serotype
- PCV 21 has greater coverage of the serotypes that cause invasive pneumococcal disease in adults as compared to PCV 20

Adult Pneumococcal Vaccines

[illegible]

PNEUMOCOCCAL VACCINE UPDATES

- PCV21 does NOT change routine childhood PCV15 or PCV20 series – PCV21 is only for adults.
- PCV21 contains eight new pneumococcal serotypes not included in PCV15, PCV20, or PPSV23. However, PCV21 doesn't contain certain pneumococcal serotypes (e.g., serotype 4) included in other pneumococcal vaccines.
- ACIP recommends PCV21 as an **option** for adults aged ≥ 19 years who currently have a recommendation to receive a dose of PCV.
- Based on shared clinical decision-making, adults 65 years or older have the option to get PCV20 or PCV21
- If PCV15 is used, administer a dose of PPSV23 one year later, if needed. Their pneumococcal vaccinations are complete. If PPSV23 is not available, one dose of PCV20 or PCV21 may be given.

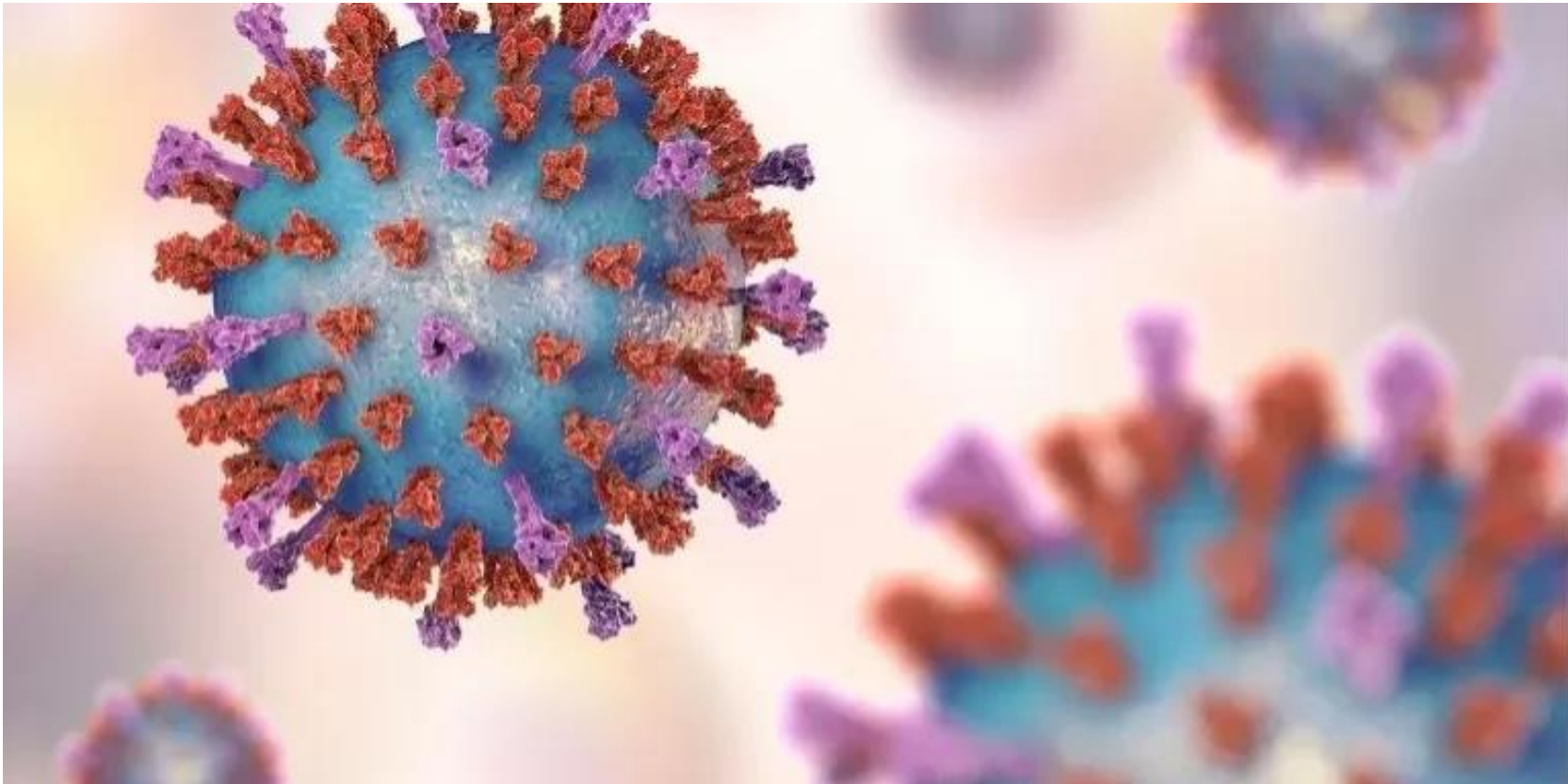
PNEUMOCOCCAL VACCINATION & SEROTYPE 4

- In Alaska, Colorado, New Mexico, Navajo Nation, and Oregon), serotype 4 has caused high percentages (i.e., $\geq 30\%$) of invasive pneumococcal disease (IPD).
- Typically, individuals living within these geographic areas who develop serotype 4 IPD are adults aged <65 years with specific underlying conditions or risk factors such as:
 - Alcoholism
 - Chronic lung disease
 - Cigarette smoking
 - Homelessness
 - Injection drug use

IMPORTANCE OF REVIEWING ADULT VACCINE RECORDS

- PPSV23
 - PCV7 (licensed in 2000)
 - PCV13 (licensed in 2010)
 - In 2015, ACIP recommended PCV13 followed by PPSV23 for adults 65YO and older
 - PCV15
 - PCV20
 - PCV21
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- The babies who were fully vaccinated with routine PCV shots are becoming adults who may be eligible for additional pneumococcal vaccination.
 - Adult pneumococcal recommendations have changed 4 times in <10 years
 - Four different products currently available – careful documentation of correct product is very important.

RESPIRATORY SYNCYTIAL VIRUS



RSV VACCINE OPTIONS

Protein Subunit Vaccines (2 options)

- One with adjuvant and one without adjuvant
- Both approved for adults 60YO and older
- Only the Pfizer (no adjuvant) vaccine is also approved for maternal vaccination
- Vaccine Efficacy is 75-82%
- Safety concerns:
 - Guillain-Barré syndrome
 - Immune thrombocytopenia (ITP)
- Results from this initial analysis did not provide clear, conclusive evidence of an elevated risk for GBS associated with RSV vaccination in older adults

mRNA Vaccine

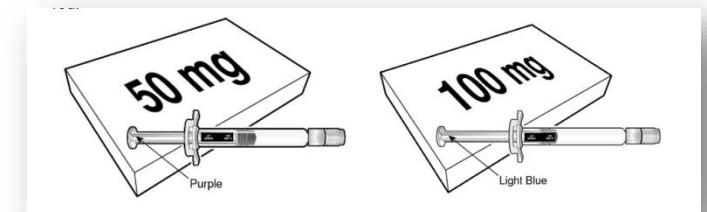
- Approved for adults 60YO and older
- NOT approved for maternal vaccination
- Vaccine Efficacy is 78-80%
- Safety concerns:
 - No cases of Guillain-Barré syndrome (GBS), other inflammatory neurologic events, myocarditis, or pericarditis were recorded within 42 days after

RSV VACCINATION FOR OLDER ADULTS

- ACIP recommends adults 75 years of age and older receive a single dose of RSV vaccine.
 - RSV vaccination is recommended as a single lifetime dose only. Persons who have already received RSV vaccination are NOT recommended to receive another dose.
 - These recommendations replace the previous recommendation that adults 60 years of age and older may receive RSV vaccination using shared clinical decision-making.
- ACIP recommends adults 60–74 years of age and older who are at increased risk of severe RSV disease receive a single dose of RSV vaccine.
 - Adults 60–74 years of age who are not at increased risk of severe RSV disease are NOT recommended to receive RSV vaccination.

CURRENT ACIP/CDC GUIDELINES FOR NIRSEVIMAB

- Infants <8 months old:
 - Mother did not receive RSV vaccine **during current pregnancy**, or maternal vaccination is unknown or <14 days prior to delivery
 - Repeating RSV vaccination during subsequent pregnancies is currently NOT recommended, but is being investigated
 - Can be considered even if maternal vaccination was given if potential benefit is administration warranted:
 - Pregnant person may not mount adequate immune response to vaccine (maternal immune compromising condition) or has impaired transplacental transfer (HIV infection)
 - Infant had cardiopulmonary bypass or exchange transfusion (loss of RSV antibodies)
 - Infant w/substantially increased risk for severe RSV disease
- Dosing is 50mg (<5kg) or 100mg (≥5 kg)

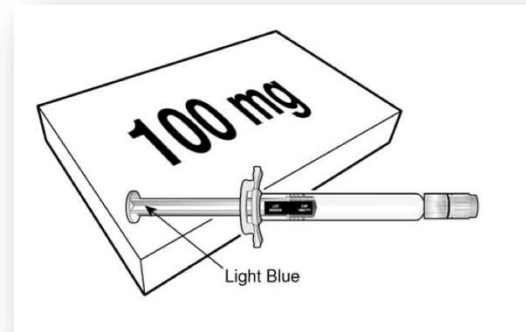
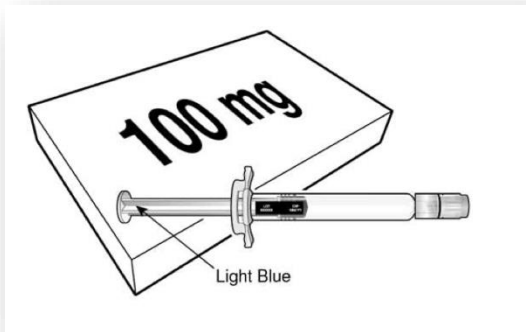


CURRENT ACIP/CDC GUIDELINES FOR NIRSEVIMAB

- Infants <8 months old:
 - Although RSV circulation in Hawaii is year-round, this does NOT mean that all infants receive a 2nd dose 6 months after 1st dose
 - The year-round authorization from CDC to HDOH still only applies to the use of one dose to newborns (or infants <8 months old) can happen year-round
- Example: infant born in January who received Nirsevimab does NOT receive another dose at 6 months or at 8 months if they are otherwise healthy and do not meet criteria for a 2nd dose

CURRENT ACIP/CDC GUIDELINES FOR NIRSEVIMAB 2ND DOSE

- Infants 8-19 months old and >6 months since 1st Nirsevimab dose:
 - Chronic lung disease of prematurity who require medical support any time during 6-month period prior to RSV season
 - Severe immunocompromise
 - Cystic fibrosis with severe clinical disease
 - American Indian and Alaska Native child
 - Dosing is 200mg (administer TWO injections of 100mg on same day)



INFLUENZA VACCINES



INFLUENZA VACCINE TYPES

- All 2024-2025 vaccines are **trivalent**
- **IIV** = Inactivated Influenza Vaccine (flu virus is grown, then inactivated)
 - **aIIV** = adjuvanted IIV (adjuvant creates stronger immune response)
 - **ccIIV** = cell culture based (uses mammalian cells to grow virus instead of hen eggs)
 - **HD-IIV** = high-dose
- **RIV** = Recombinant Influenza Vaccine (synthetically created antigen)
 - Contains 3-times the antigen
- **LAIV** = Live Attenuated Influenza Vaccine
 - Nasal vaccine – replicates in nasal mucosa

WHAT'S THE LATEST TO KNOW ABOUT FLU VACCINES

DOCTORS RECOMMEND GETTING VACCINATED TO LOWER YOUR RISK OF SEVERE ILLNESS AND DEATH AND TO AVOID SPREADING ILLNESS TO OTHERS

VACCINE	WHAT	WHO
QUADRIVALENT FLU VACCINE	USES INACTIVATED VIRUS GROWN IN EGGS; PROTECTS AGAINST FOUR DIFFERENT FLU VIRUSES	RECOMMENDED FOR THOSE AGED 6 MONTHS AND OLDER
CELL-BASED FLU VACCINE	USES INACTIVATED VIRUS GROWN IN CELL CULTURE; PROTECTS AGAINST FOUR DIFFERENT FLU VIRUSES	RECOMMENDED FOR THOSE AGED 6 MONTHS AND OLDER
RECOMBINANT FLU VACCINE	EGG-FREE; CONTAINS THREE TIMES THE AMOUNT OF ANTIGEN TO CREATE A STRONGER IMMUNE RESPONSE	RECOMMENDED FOR THOSE AGED 65 AND OLDER
HIGH-DOSE FLU VACCINE	CONTAINS FOUR TIMES THE AMOUNT OF ANTIGEN TO CREATE A STRONGER IMMUNE RESPONSE	RECOMMENDED FOR THOSE AGED 65 AND OLDER
ADJUVANTED FLU VACCINE	MADE WITH INGREDIENT THAT HELPS CREATE A STRONGER IMMUNE RESPONSE	RECOMMENDED FOR THOSE AGED 65 AND OLDER
NASAL SPRAY FLU VACCINE	MADE WITH WEAKENED LIVE FLU VIRUS	RECOMMENDED FOR THOSE AGED 2 TO 49; NOT FOR THOSE IMMUNOCOMPROMISED OR PREGNANT

SOURCE: CDC

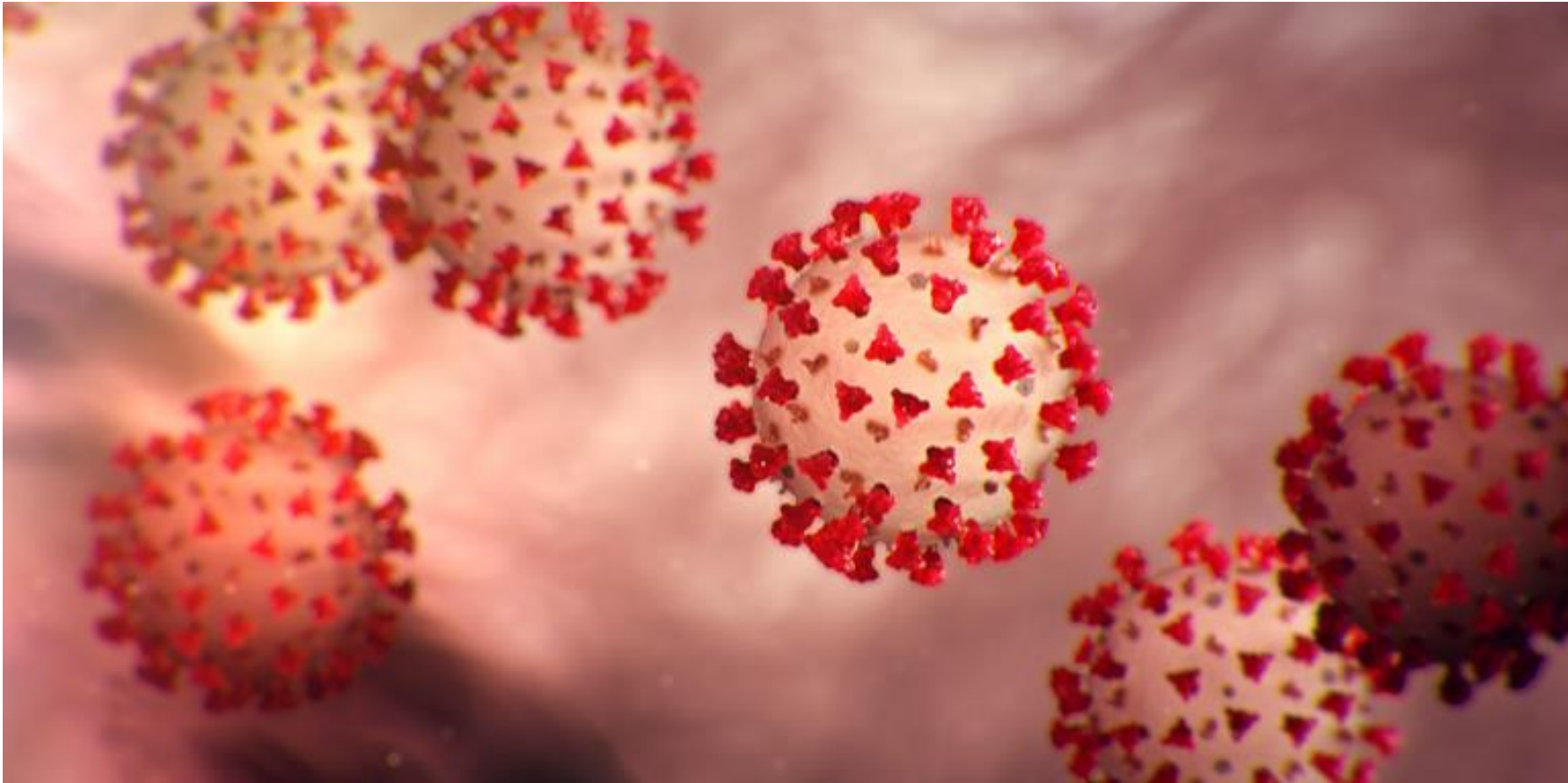
INFLUENZA VACCINES: HIGHER POTENCY RECOMMENDATIONS

- Adults 65YO and older should receive high-dose or adjuvanted vaccine if available
 - HD-IIV
 - aIIV
 - RIV
 - If none of the above are available, can use whatever age-approved influenza vaccine is available
- ACIP recommends HD-IIV3 & adjuvanted inactivated (aIIV3) influenza vaccines as acceptable options for influenza vaccination of solid organ transplant recipients aged 18 through 64 years who are on immunosuppressive medication regimens.
- For other immunocompromised persons, they should receive IIV3 or RIV3, and LAIV3 should not be used.
- Caregivers and close contacts of immunosuppressed persons may receive any age-appropriate IIV3 or RIV3.
- Health care personnel or hospital visitors who receive LAIV3 should avoid caring for/contact with severely immunosuppressed persons who require a protected environment for 7 days after vaccination.

INFLUENZA VACCINES – EGG ALLERGIES

- Old Recommendations:
 - Those with severe egg allergy should receive flu vaccine in a medical setting if egg-based vaccine is used
- New Recommendations:
 - **Any flu vaccine (including egg-based) that is appropriate for patient's age and health status can be used**
 - No recommendation for administration is a specific type of setting
 - All vaccines should be given in a setting with personnel who can recognize acute allergic reactions and activate emergency response (key lesson from COVID-19 vaccines)

COVID-19 VACCINES



COVID-19 VACCINES

- The 2024-2025 COVID-19 vaccines are monovalent and include the mRNA vaccines (Pfizer, Moderna) and the protein-based vaccine (Novavax).
- mRNA vaccines (Moderna & Pfizer) authorized for ages 6 months and older and target the KP.1 lineage
- Novavax is authorized for ages 12 years and older and targets the JN.1 lineage

WHAT'S THE LATEST TO KNOW ABOUT COVID VACCINES

DOCTORS RECOMMEND GETTING VACCINATED TO LOWER YOUR RISK OF SEVERE ILLNESS, INCLUDING HOSPITALIZATION AND DEATH

AGE	UNVACCINATED	PREVIOUSLY VACCINATED
12 YEARS AND OLDER	1 DOSE OF PFIZER OR MODERNA UPDATED VACCINE - OR - 2 DOSES OF NOVAVAX UPDATED VACCINE	1 DOSE OF PFIZER, MODERNA OR NOVAVAX UPDATED VACCINE
5-11 YEARS OLD	1 DOSE OF PFIZER OR MODERNA UPDATED VACCINE	1 DOSE OF PFIZER OR MODERNA UPDATED VACCINE
6 MONTHS - 4 YEARS OLD	2 DOSES OF MODERNA UPDATED VACCINE - OR - 3 DOSES OF PFIZER UPDATED VACCINE	1 OR 2 DOSES MODERNA OR PFIZER UPDATED VACCINE DEPENDING ON PREVIOUS NUMBER OF DOSES

THOSE WHO ARE MODERATELY OR SEVERELY IMMUNOCOMPROMISED
MAY REQUIRE MORE DOSES

SOURCE: CDC

COVID-19 PRE-EXPOSURE PROPHYLAXIS

- The FDA has authorized pemivibart under EUA (Emergency Use Authorization)
- Pemivibart is a monoclonal antibody
- 12YO and older, weight minimum 40kg (88 lbs)
- Moderate-severe immunocompromise and are unlikely to mount an adequate immune response to COVID-19 vaccination.
 - Infused over 60 minutes; Q3 month intervals
- If recently vaccinated against COVID-19, wait 2 weeks prior to infusion

SUMMARY

Pediatrics

- Not much changed
- PCV21 is NOT a pediatric vaccine
- Nirsevimab is amazing at preventing RSV infection in young infants

Pregnancy

- COVID-19, influenza, pertussis vaccines are recommended during each pregnancy
- RSV vaccine currently NOT recommended for repeat administration for subsequent pregnancies

Adults

- PCV21 is now an option and is DIFFERENT from PCV20
- PPSV23 is not enough protection – should only be part of some PCV combination
- RSV vaccine options, age considerations & different recommendations
- Flu vaccine product recommendations vary based on age and underlying condition



QUESTIONS AND DISCUSSION

