



# *Infection Management and Antibiotic Stewardship*

## Hot Topic Session #4

# Vaccination updates

**December 13, 2023**



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# Today's Team

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# Session Objectives

1. Principles of vaccination
2. Some vaccination updates
  - Influenza
  - Covid
  - Pneumococcal
  - RSV



Image by [Wilfried Pohnke](#) from [Pixabay](#)

# Principles of vaccination: Goals



**Reduction of risk of colonization:** pneumococcal, meningococcal vaccines

**Infection prevention:** live attenuated polio, inhaled influenza vaccines

**Disease prevention:**

pre-exposure – tetanus, hepatitis, MMR, covid, RSV vaccines

Post-exposure - varicella, smallpox, hepatitis, rabies, tetanus

**Reduction of severity:** influenza, pneumococcal, varicella, covid

**Reactivation prevention:** zoster

**Herd immunity:** MMR, varicella, small pox, pneumococcal and meningococcal vaccines

**Maternal immunization (infant protection):** pertussis, covid, RSV, hep B vaccines.

**Disease elimination (regional):** Measles (US), polio (Americas)

**Disease eradication (worldwide):** smallpox, polio type 2 (1999), polio type 3 (2012)

**Reduction of incidence of infection:** influenza, pneumococcal, varicella

**Cancer prevention:** Hepatitis B (liver), HPV (cervical, vaginal and vulvar)

# Principles of vaccination: Benefits in older adults

Individual Factors	General Factors
Stimulate the immune systems	Combat antibiotic resistance
Reduce likelihood of infection	Reduce antibiotic overuse
Reduce the sequelae of infection	Decrease vaccine-preventable infections
Improve quality of life	Contribute to herd immunity

Ciarambino T, et al. *Vaccines* 2023;11:1414

# Principles of vaccinations - Administration

## Vaccine co-administration

- Live virus vaccines: same day or delay by one month
- Administration of immune globulins should not occur with vaccines from live virus.
  - does not apply to inactivated vaccines, yellow fever, or oral polio vaccines



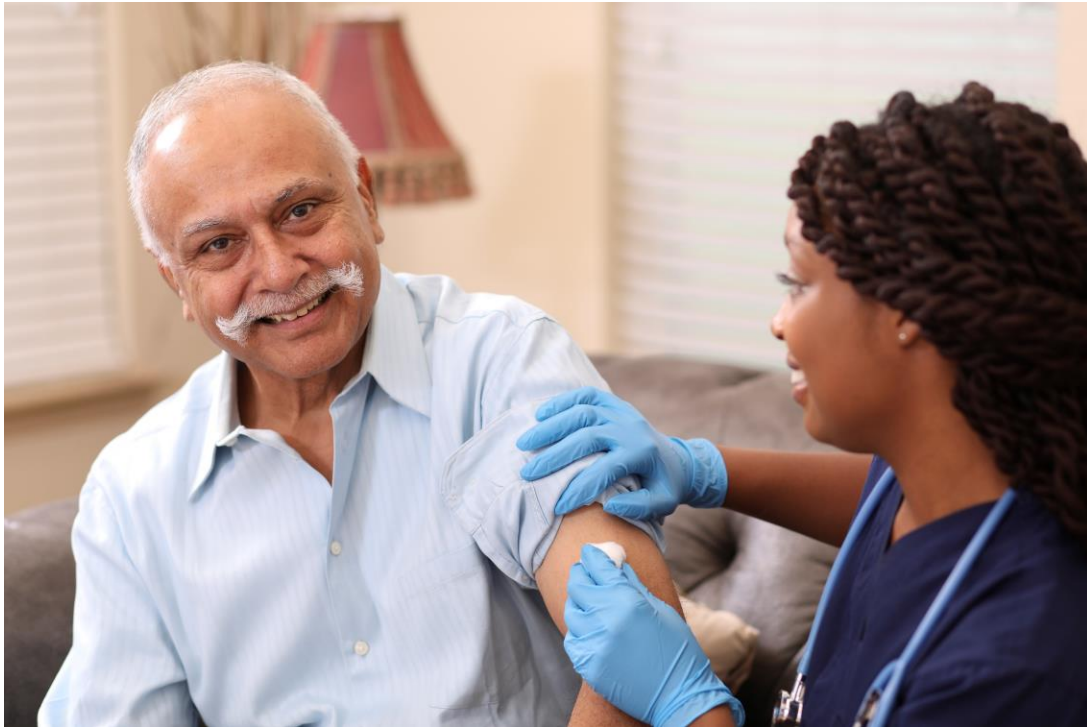
# Principles of vaccinations - Safety

**Contraindications: Which of these is a true contraindication?**

- A. Egg allergy
- B. Family history of adverse reaction to vaccines
- C. Previous moderate local pain, redness, swelling or  $<104$  F after a vaccine
- D. Immunocompromised state
- E. Anaphylaxis
- F. Recent or current antibiotic use
- G. On anticoagulation
- H. Neuro complications
- I. Recent or current illness with or without low grade fever



# Update – Influenza vaccine



## Overview

Individuals with influenza are most contagious within the first 4 days of illness

Transmission of infection can occur before symptoms develop and up to one week after onset of symptoms

Complications include otitis media, sinusitis, pneumonia and aggravation or worsening of chronic conditions

Adults ages 65 or older and those with conditions such as cardiovascular disease, diabetes have a higher risk of serious complications from influenza.

# Update – Influenza vaccine

## Overview



### **Getting the flu vaccine is the most important step in preventing the flu or complications from the flu**

- Recommended for everyone 6 months or older
- Vaccine should be offered starting in September – October; continue as long as influenza virus remains in circulation and vaccine available.
- Higher dose or adjuvanted vaccines recommended for adults  $\geq 65$
- *Standard safety measures recommended for a history of egg allergies*

[https://www.cdc.gov/mmwr/volumes/72/rr/rr7202a1.htm?s\\_cid=rr7202a1\\_w](https://www.cdc.gov/mmwr/volumes/72/rr/rr7202a1.htm?s_cid=rr7202a1_w)

# Update – Covid vaccine

Three vaccines available:

Pfizer -mRNA

Moderna -mRNA

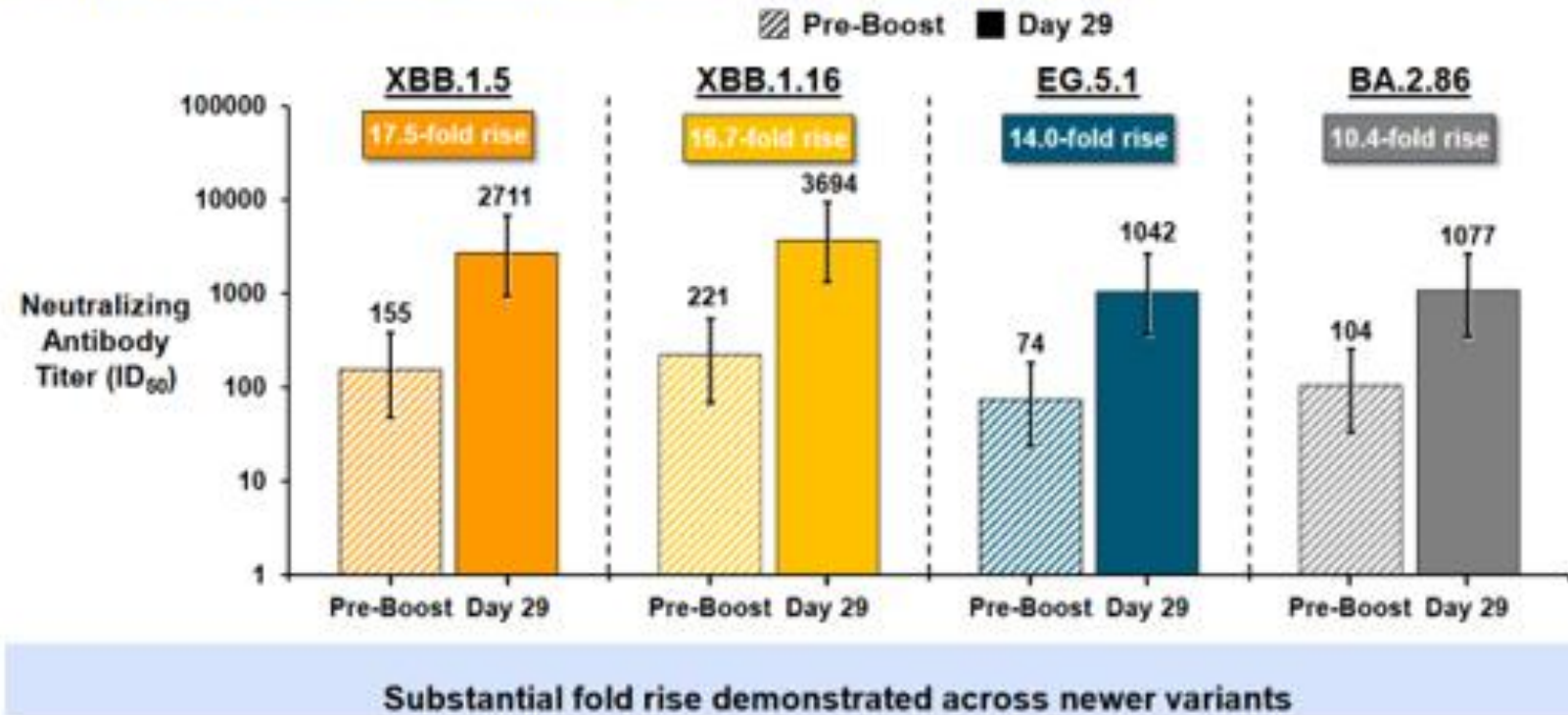
Novavax – protein subunit vaccine



# Safety and Immunogenicity of Moderna COVID-19 Vaccine (2023-24 Formula)

## Cross Neutralization Results (Day 29) After XBB.1.5 Vaccine in Adults – *Duke Assay*

Study 205J, Per-Protocol Immunogenicity Set - All Participants



Priddy F. ACIP,  
9/12/2023 via  
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# Safety and Immunogenicity of Moderna COVID-19 Vaccine (2023-24 Formula)

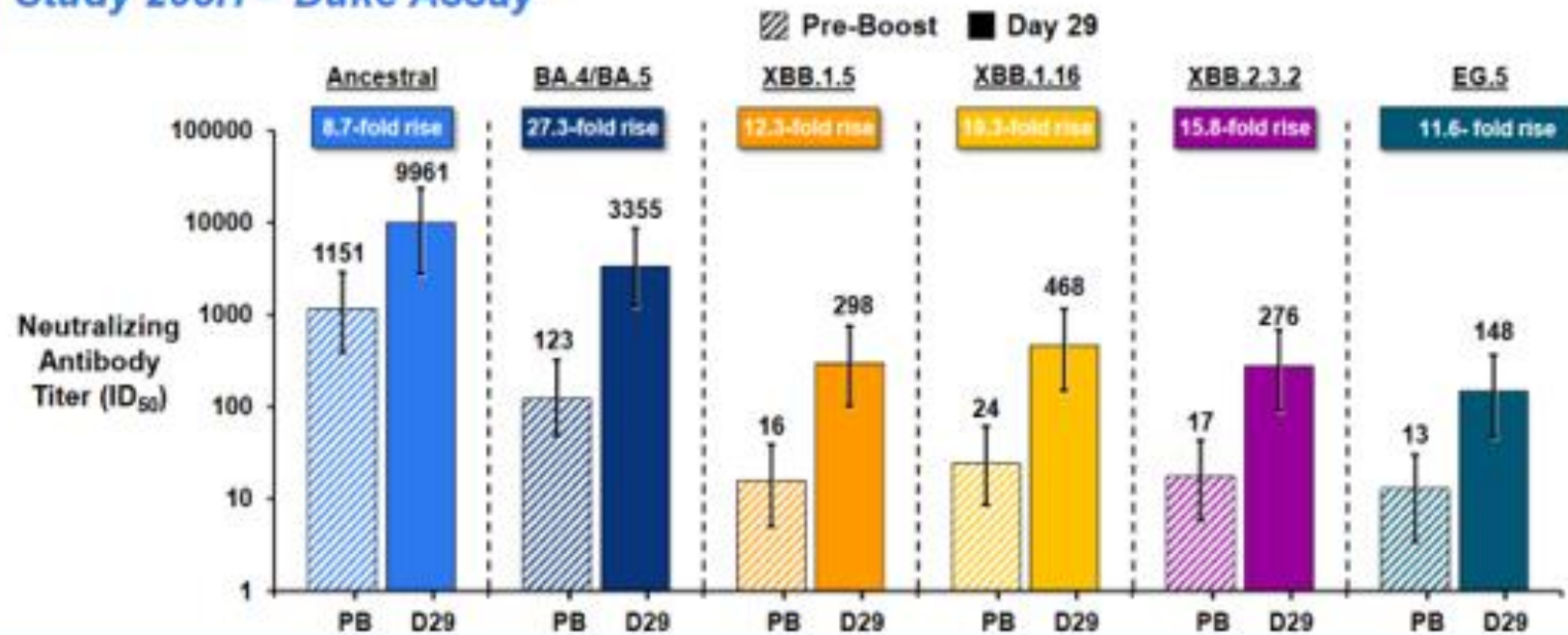
**Cross Neutralization Results (Day 29) After XBB.1.5 Vaccine in Adults by Baseline SARS-CoV-2 Serostatus - Duke Assay**  
*Study 205J, Per-Protocol Immunogenicity Set*



Priddy F. ACIP,  
 9/12/2023 via  
 David J. Weber

# Safety and Immunogenicity of Moderna COVID-19 Vaccine (2023-24 Formula)

## Cross Neutralization Results (Day 29) in Adults after Bivalent BA.4/BA.5 Vaccine *Study 205H – Duke Assay*



Limited cross neutralization to newer variants after previously authorized BA.4/BA.5 bivalent vaccine

Priddy F. ACIP,  
9/12/2023 via  
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# Update – Covid vaccine

## Recommendations for covid mRNA vaccines – non immunocompromised persons

- People age 5 or older: to receive one dose of updated vaccine



**Wait 3 months after recent covid -19 for vaccine or booster**

<https://www.cdc.gov/vaccines/covid-19/clinical-considerations/interim-considerations-us.html>

# Update – Covid vaccine

## Recommendations for covid mRNA vaccines – immunocompromised persons

Vaccine status	Updated formula	# of doses
Unvaccinated	Moderna	3
	Pfizer	3
	Novavax	2
One dose previously	Moderna	2
	Pfizer	2
	Novavax	1
Two or more doses	Moderna	1
	Pfizer	1

<https://www.cdc.gov/vaccines/covid-19/clinical-considerations/interim-considerations-us.html>



# Pneumococcal Vaccines - Overview

Vaccine Comparison				
Generic Name	PCV13	PCV15	PCV20	PPSV23
Manufacturer	Pfizer	Merck	Pfizer	Merck
Indication	<ul style="list-style-type: none"> <li>Active immunization to prevent invasive disease caused by <i>S. pneumoniae</i> in patients 6 weeks-5 years, 6-17 years, and <math>\geq 18</math> years</li> <li>Active immunization to prevent otitis media cause by <i>S. pneumoniae</i> in patients 6 weeks- 5 years</li> </ul>	<ul style="list-style-type: none"> <li>Active immunization to prevent invasive disease caused by <i>S. pneumoniae</i> in patients <math>\geq 6</math> weeks</li> </ul>	<ul style="list-style-type: none"> <li>Active immunization to prevent invasive disease caused by <i>S. pneumoniae</i> in patients <math>\geq 6</math> weeks and <math>\geq 18</math> years</li> <li>Active immunization to prevent otitis media cause by <i>S. pneumoniae</i> in patients 6 weeks- 5 years</li> </ul>	<ul style="list-style-type: none"> <li>Active immunization to prevent invasive disease caused by <i>S. pneumoniae</i> in patients <math>\geq 2</math> years and <math>\geq 50</math> years</li> </ul>
Type	Conjugate			Polyvalent

# Pneumococcal Vaccines – Summary and Recommendations

Vaccine Comparison		
Generic Name	PCV15	PCV20
<b>Advantages</b>	<ul style="list-style-type: none"> <li>Additional serotype coverage compared to PCV13</li> </ul>	<ul style="list-style-type: none"> <li>Additional serotype coverage compared to PCV13/15</li> <li>Can be administered by itself</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>Used in series with PPSV23</li> <li>Cost when combined with PPSV23 may exceed PCV20</li> </ul>	<ul style="list-style-type: none"> <li>Some serotypes did not meet non-inferiority per predefined IgG concentrations</li> </ul>
<b>Place in Therapy</b>	<p><b>PCV13:</b> Should only be given when neither PCV15 nor PCV20 is available.</p> <p><b>PCV15:</b> An option for patients &lt;19 years according to currently recommended PCV13 dosing/schedules. Used in series with PPSV23 for all adults <math>\geq 65</math> years and for adults 19-64 years with underlying medical conditions.</p> <p><b>PCV20:</b> An option for routine vaccination in patients 2-23 months, catch-up vaccination in patients 24-59 months, patients 24-71 months with underlying medical conditions, and patients 2-18 years with risk conditions. An option for adults <math>\geq 65</math> years and adults 19-64 years with underlying medical conditions.</p> <p><b>PPSV23:</b> An option for patients 2-18 years with risk conditions. Used in series with PCV15 for all adults <math>\geq 65</math> years and for adults 19-64 years with underlying medical conditions.</p>	

# Update – Pneumococcal vaccines

Two types: pneumococcal conjugate (PCV 15 and 20) and polysaccharide vaccines (PPSV23)

Recommendation for adults 65 or older

Vaccine status	First dose	Subsequent
Unknown history, no previous vaccine	PCV15 PCV 20	PPSV23 a year later Not indicated
History of PPSV23	PCV 15 or PCV 20 at least a year after PPSV23 vaccination	N/A
History of PCV 13	PVC 20 or PPSV23 one year after	N/A
PCV13 with history of immunocompromised condition, cochlear implant or CSF leak	PCV 20 at least a year after or PPSV23 at least 8 week after.	N/A

<https://www.cdc.gov/vaccines/vpd/pneumo/hcp/recommendations.html#vacc-65-plus>

# Update – Pneumococcal vaccines

## Recommendation for adults 65 or older (history of PCV 13 and PPSV23)

Vaccine status	First dose	Subsequent
Received PCV13 at any age plus PPSV23 before 65 (absence of high risk condition)	PCV 20 - 5 years after last pneumococcal vaccine Or PPSV23 – 5 years after last PPSV23 or 1 year after the PCV 13 dose	N/A
Received PCV13 at any age plus PPSV23 before 65 (with a history of a high risk condition)	PCV 20 - 5 years after last pneumococcal vaccine Or PPSV23 – 5 years after last PPSV23 or at least 8 weeks after the PCV 13 dose	N/A
Received PCV13 at any age plus PPSV23 after 65	Shared decision making to determine need for PVC 20. If yes to the vaccine, administer at least 5 years after last pneumococcal vaccine	N/A

<https://www.cdc.gov/vaccines/vpd/pneumo/hcp/recommendations.html#vacc-65-plus>

# Update – RSV vaccine



## Overview:

FDA approval of RSV vaccine in adults 60 or older – May 2023

ACIP recommendation of single dose for adults 60 years or older, using shared decision making – June, 2023

In healthy adults <50 years of age – Low concern, URI symptoms

Older adults  $\geq 50$  or with underlying conditions – common and unrecognized cause of lower respiratory tract infection

Mortality rate of older adults hospitalized with RSV is up to 8%

# Update – RSV vaccine

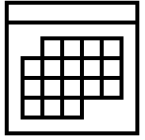
## Chronic conditions associated with increased risk

- Lung diseases e.g. COPD, asthma
- Cardiovascular disease – heart failure, CAD
- Immunocompromised stat
- Diabetes
- Neurological disease
- Kidney disease,
- Liver diseases
- Hematological disorders
- Other underlying condition that may increase risk of severe respiratory illness

## Other factors associated with increased risk

- Advanced age
- Frailty
- Residence in a nursing home or long-term care facility

# Update – RSV vaccine



## Timing:

- Before RSV season; offer as soon as vaccine is available.



## Administration:

- Co-administration with other adult vaccines allowed, although limited data is available
- Non- inferiority criteria met for co-administration with influenza vaccine. Clinical significance is unknown.
- Consider factors such as status with other recommended vaccines, likelihood of acquiring vaccine preventable infections, history of reactions to previous vaccines, preference

# References

1. Up to date – Standard immunizations for non-pregnant adults

Accessed December 4, 2023

2. Melgar M, Britton A, Roper LE, et al. Use of Respiratory Syncytial Virus Vaccines in Older Adults: Recommendations of the Advisory Committee on Immunization Practices — United States, 2023. MMWR Morb Mortal Wkly Rep 2023;72:793–801. DOI: <http://dx.doi.org/10.15585/mmwr.mm7229a4>.



# Questions and Discussion



- ▶ Find session slides at <https://spice.unc.edu> → ncclasp  
→ nursing homes