SAUDI THORACIC SOCIETY
الجمعية السعودية لطب وجراحة الصدر

Saudi Thoracic Society guidelines for vaccinations in adult patients with chronic respiratory diseases

Educational slides

Last updated Dec 2024

Al Ghobain M, Farahat F, Zeitouni M, Alsowayan W, Al-Awfi S, AlBarrak A, et al. The Saudi thoracic society guidelines for vaccinations in adult patients with chronic respiratory diseases. Ann Thorac Med Oct 2024

Disclaimer

These guidelines, developed by the Saudi Thoracic Society (STS) task force, provide recommendations of using the vaccines for patients with chronic respiratory diseases. These guidelines aimed to be used as tools to assist practicing physicians in making vaccine recommendations for their patients based on the best current evidence, they are not aimed to replace clinical judgment.

Conflict of interest

These guidelines are fully sponsored by the Saudi Thoracic Society (STS) with no financial support from any vaccine manufacturer. The members of the expert panel declare no conflict of interest or financial compensation from any manufacturer for contributing to these guidelines.

The Saudi thoracic society guidelines for vaccinations in adult patients with chronic respiratory diseases

Task Force

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Guidelines Panel

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Objectives

They are intended to serve as a reference for healthcare practitioners managing CRD patients

The guidelines aimed to review current knowledge related to vaccination indications and efficacy in adult patients with CRD based on recent evidence and recommendations and expert opinions

they can guide policymakers in establishing vaccination programs for adult population

Sections of the guidelines

- *Introduction and methodology*
- *Influenza vaccine*
- *Pneumococcal vaccine*
- *COVID-19 Vaccine*
- *Respiratory Syncytial Virus (RSV) vaccine*
- *Herpes Zoster vaccine (HZV)*
- *Co-administration of multiple vaccines*
- *Hajj recommendations for vaccinations*

Chronic respiratory diseases (CRD)

• Chronic Obstructive Pulmonary Disease (COPD)
• Asthma
• Interstitial lung diseases (ILD)
• Bronchiectasis
• Hypoxic and hypercapnic respiratory failure
• Obstructive Sleep Apnea (OSA)
• Patients requiring long-term home oxygen or non-invasive ventilatory support
• Chronically ventilated patients

Burden of CRD

- *CRD is the 3rd leading cause for mortality in the world*
- *4 million people died prematurely from CRD*
- *CRD: 4% of total mortality of all causes*
- *2.9% of disability-adjusted life years (DALYs)*
- *The 6th cause of mortality in MENA region*
- *in Saudi Arabia, CRD was the 11th cause of DALYs in 2017 compared to the 15th position in 1990*

References 2 - 5 in the document

Burden of CRD

Adult patients with CRDs are high risk group who are more likely to experience worse clinical outcomes if they acquire viral or bacterial infections

7.7 times higher risk of pneumococcal pneumonia in patients 65 years and older with CRD

COPD exacerbations result in 14% increase in mortality for hospitalized patients (30% in ICU)

References 6,10 & 14 in the document

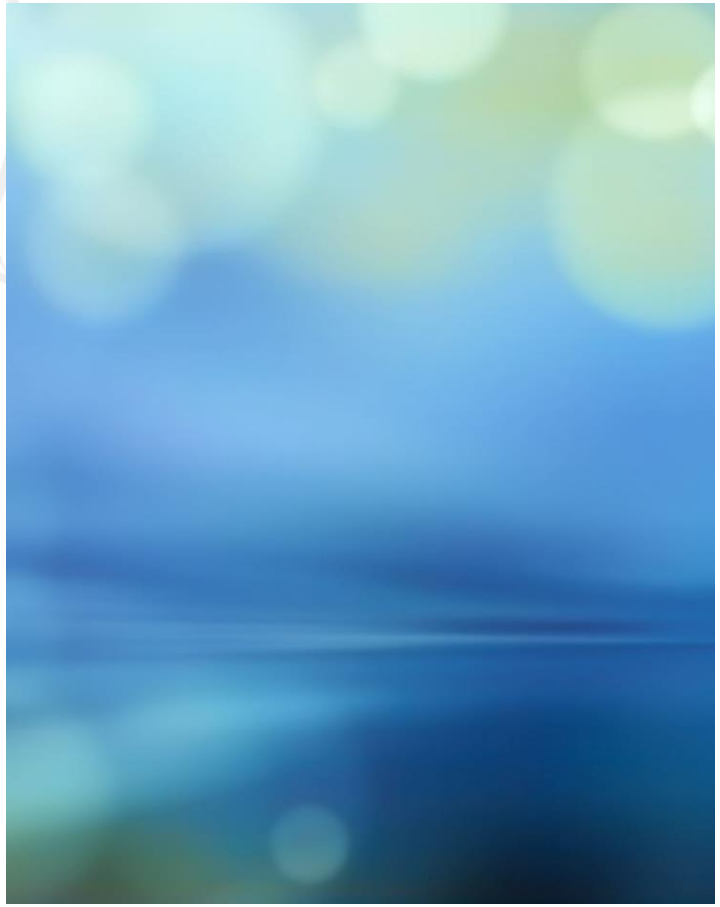
Burden of CRD

Patients with ILD reported five times higher rate of pneumonia than the general population,

Severe outcome of COVID-19 infection is significantly more in the old ages as well as in individuals with CRD

RSV accounts for 10% of admissions due to pneumonia, 11% for COPD, and 7% for asthma

In a Saudi retrospective study, most patients with RSV-related community-acquired pneumonia were elderly with comorbidities, one in four patients admitted to ICU, with death rate of 32%



References 18,19,21,29,30 & 32 in the document

Prevention better than treatment

The best method to prevent and reduce infection-related complications, as well as promoting patient health is the administration of the recommended vaccines

Vaccine effectiveness in COPD patients

	Influenza vaccine alone	Pneumococcal vaccine alone	Combination of both
Exacerbation reduction	70%	54%	72%
Pneumonia reduction	59%	53%	73%
Admission reduction	58%	46%	69%

References 38 in the document

WHO international target rate for influenza vaccine coverage at 75%
CDC set pneumococcal vaccination coverage rate at 60%

	Influenza vaccination	Pneumococcal vaccination
UK	23%	10%
Italy	30%	13%
Turkey	36%	14%
Germany	46%	14%

References 40, 50-52 in the document

The most important factors that determine the vaccination uptake :

- Vaccine accessibility
- Healthcare provider awareness
- Patient acceptance
- Media promotion

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- Vaccine accessibility
- Healthcare provider awareness
- Patient acceptance
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Barriers and how to improve implementation

Vaccination rates depend on several factors, including vaccine accessibility and availability, healthcare provider awareness, and patient acceptance.

Healthcare professionals	Health system	Patients

The recommended vaccines should be available and accessible in every healthcare facility and offered to every patient with CRD as part of their routine management.

Methodology

Recommendations, Assessment, Development, and Evaluation (GRADE) for grading the evidence and evidence-based recommendations	***Evidence A*** Systematic reviews or meta-analysis or RCT
	Evidence B Limited RCT
	Evidence C Non-interventional studies
	Evidence D Panel personal opinion and agreement

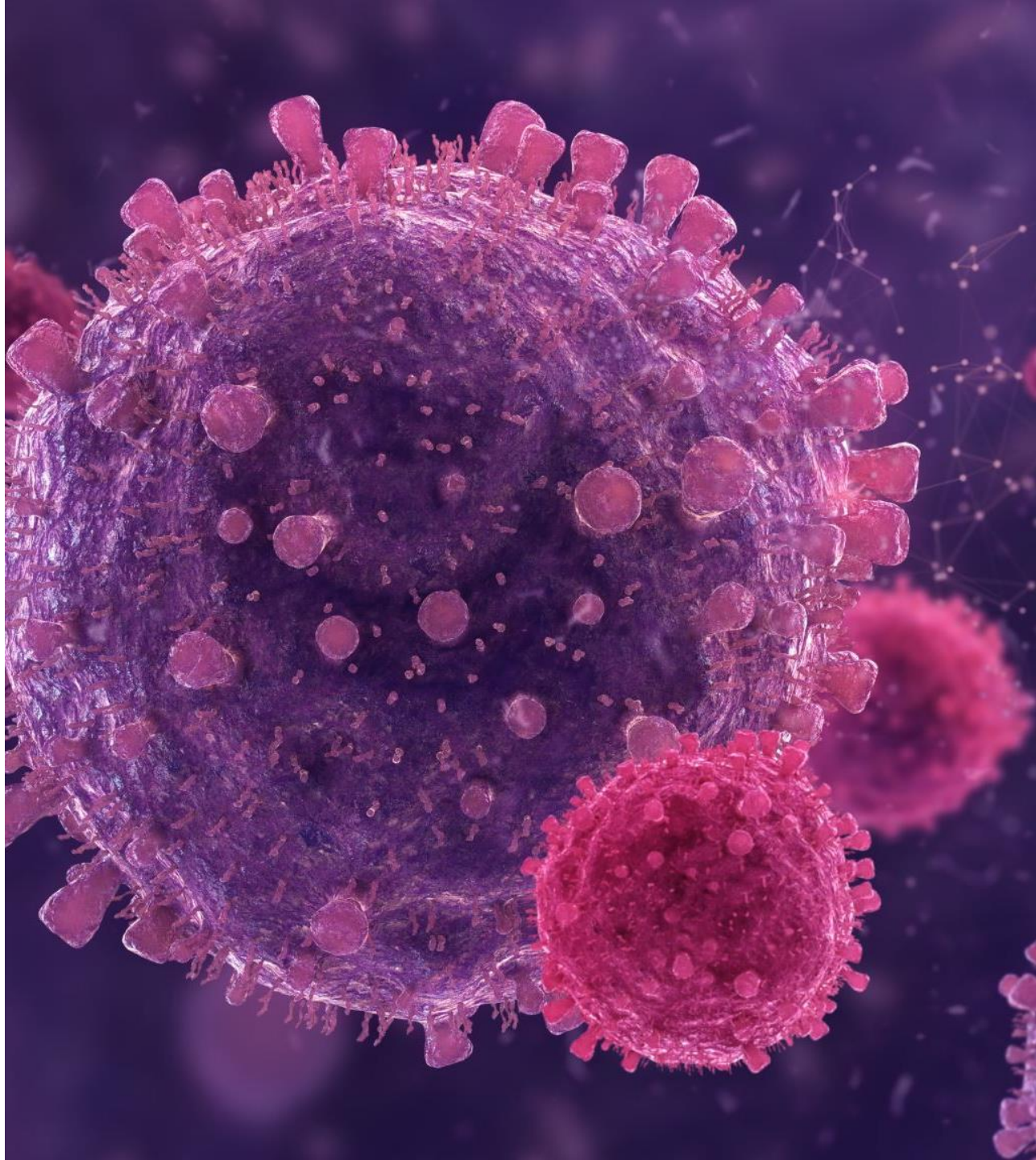
Influenza vaccination

Influenza virus

- **Influenza A** HA (H1, H2, H3), NA (N1, N2)
- **Influenza B** B Yamagata, B Victoria

Note: While many genetically distinct subtypes for HA and for NA have been found in circulating influenza A viruses, only three HA and two NA subtypes have caused human epidemics.

- ***Trivalent influenza vaccine (TIV)*** : A (H1N1) and A (H3N2) antigens and Victoria B antigen
- ***Quadrivalent influenza vaccine (QIV)*** : A (H1N1) and A (H3N2) antigens and both Victoria B and Yamagata B antigens



Types of influenza vaccines

- ***Inactivated influenza vaccine (IIV) :*** Egg-based vaccine contains inactivated (killed) influenza viruses.
- ***High dose IIV (HD-IIV):*** Egg-based vaccine contains higher antigens (four times) than the standard IIV dose
- ***Live attenuated influenza vaccine (LAIV)*** *(not yet available in Saudi Arabia)*
- ***Recombinant influenza vaccine (RIV)*** *(not available in Saudi Arabia)*
- ***Cell Culture-based Vaccine (CCIV)*** *(not available in Saudi Arabia)*

Inactivated influenza vaccine (IIV)	High dose IIV (HD-IIV)
Adult patients 19 years and older with CRD	Adult patients 65 years and older with CRD
0.5 ml IM	0.7 m IM

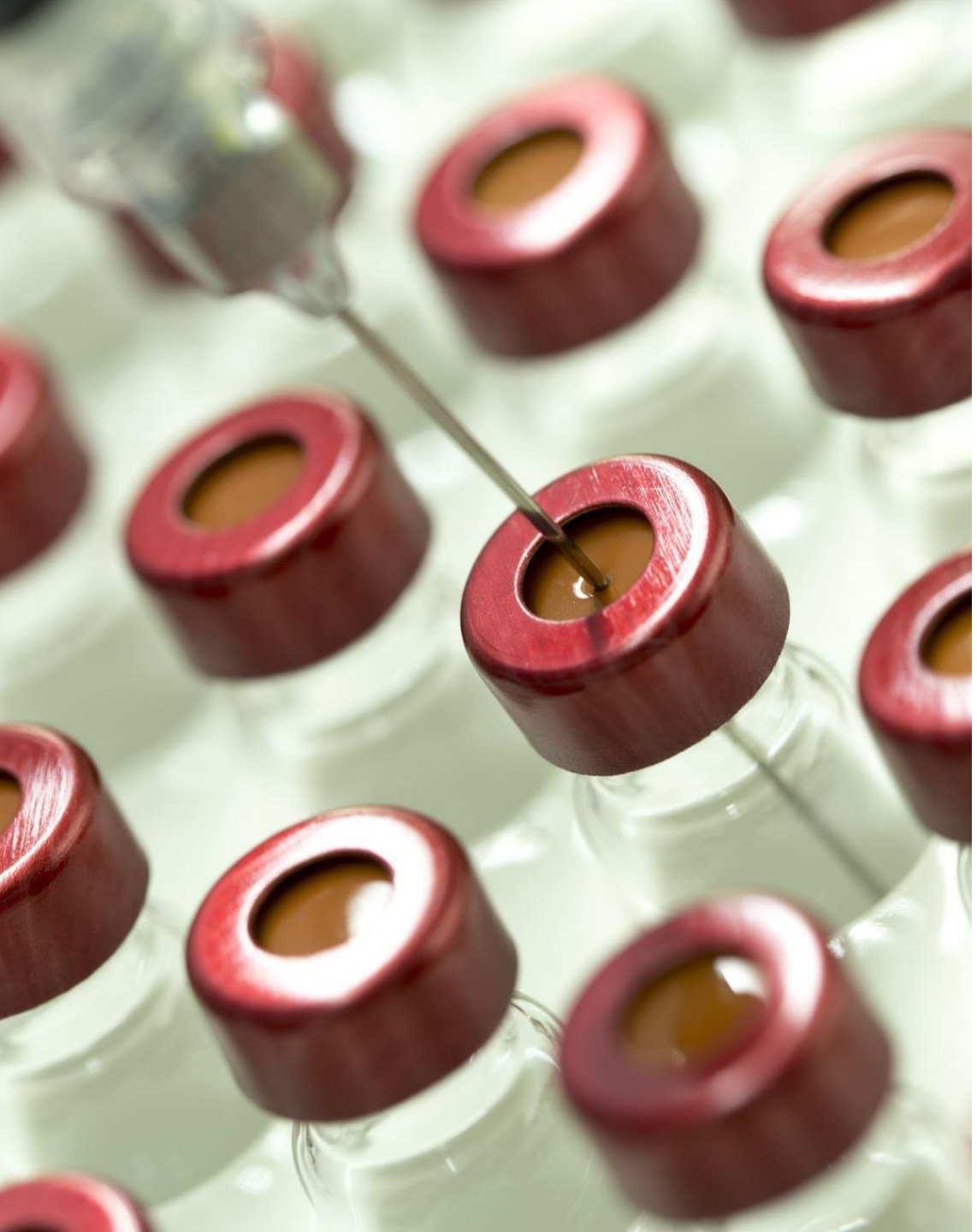
Any time during the season (October – March) preferably September before season starts

Influenza vaccine effectiveness

Many factors determine the vaccine effectiveness including age, coexisting chronic medical diseases, circulating strains and history of previous influenza vaccinations

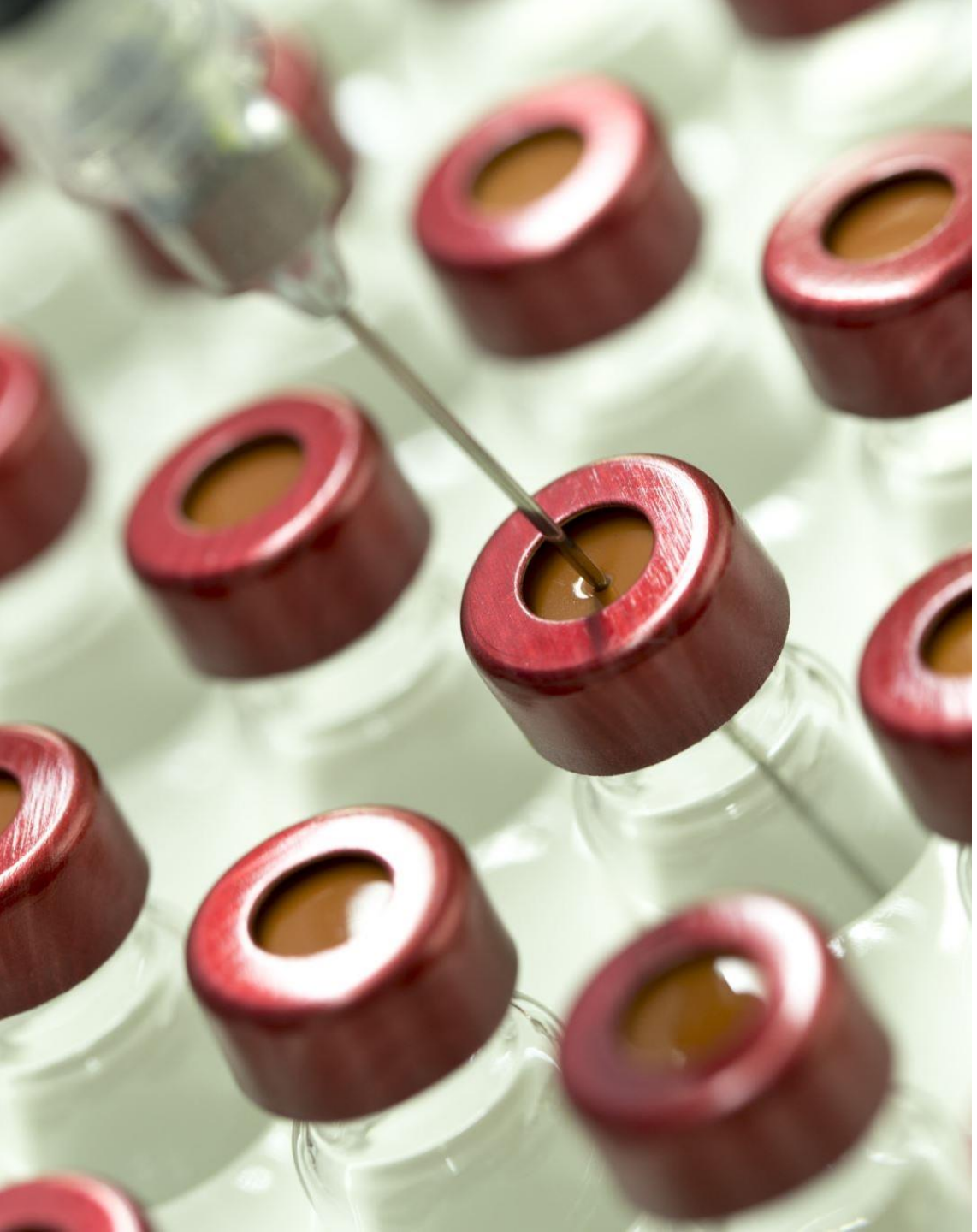
Proven in preventing the influenza infection, reducing complications, morbidity and mortality among CRD patients

References 58-61 in the document



Common adverse reactions

- Mild and transient local pain and redness at the injection site
- Fever and other systemic symptoms such as fatigue
- In sick patients with acute illness, the vaccine should be postpended till the time of complete recovery
- History of previous anaphylactic reaction is the only absolute contraindication for influenza vaccine
- In patient with eggs allergy , the vaccine can be safely administered (not contraindicated)



Rare adverse reactions

- Severe allergic anaphylaxis reaction
- Guillain-Barré syndrome (GBS): 1 case per million vaccinated individuals
- Oculorespiratory syndrome: bilateral red eyes with or without respiratory symptoms

Pneumococcal vaccination

Types of pneumococcal vaccines

Valent pneumococcal conjugate vaccines ***(PCV13,15,20,21)***

23-Pneumococcal polysaccharide vaccine ***(PPSV23)***

■ Included in vaccine □ Not included in vaccine

Vaccine	Serotype																														
	1	3	4	5	6A	6B	7F	9V	14	18C	19A	19F	23F	22F	33F	8	10A	11A	12F	15B	2	9N	17F	20	15A	15C	16F	23A	23B	24F	31	35B
PCV21		■			■		■				■			■	■	■	■	■	■			■	■	■	■	■	■	■	■	■	■	■
PPSV23	■	■	■	■		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■								
PCV20	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■												
PCV15	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■																	

Note: PCV21 is not yet available in Saudi Arabia.

Pneumococcal vaccine

Indicated for adult patients 19 years and older with CRD

0.5 ml IM

Chosen type of pneumococcal vaccine depends on the patient's age, availability of the vaccine, immunocompromised status and previous history of immunization.

Pneumococcal vaccine

Patient category	*Option A*	*Option B*
Naive patient	PCV20	PCV15 followed by a PPSV23 with a one-year interval (8 weeks interval in immunocompromised and revaccinated once after 5 years)
History of PPSV 23 only	PCV20 after 1 year interval since the last PPSV23 dose	PCV15 after 1 year interval since the last PPSV23 dose (8 weeks interval in immunocompromised and revaccinated once after 5 years)
History of PCV13 only	PCV20 after 1 year interval since the last PCV13 dose.	PPSV23 after one year interval since the last PCV13 dose (8 weeks interval in immunocompromised and revaccinated once after 5 years)
History of both PCV13 and PPSV23:		
• Current age ≥65 years or immunocompromised and **PPSV23 received before** the age of 65 years	PCV20 after 5-year interval since the last PPSV23 dose.	PPSV23 after 5-year interval since the last PPSV23 dose.
• **PPSV23 received at age** ≥65 years	PCV20 after 5-year interval since the last PPSV23 dose.	---
• Current age 19-64 years with CRD	No current recommendation.	No current recommendation

Pneumococcal vaccine effectiveness

Proven to be effective and immunogenic

PCVs reduce the clinic visit, admission, severity and mortality associated with pneumonia.

References 64-73 in the document

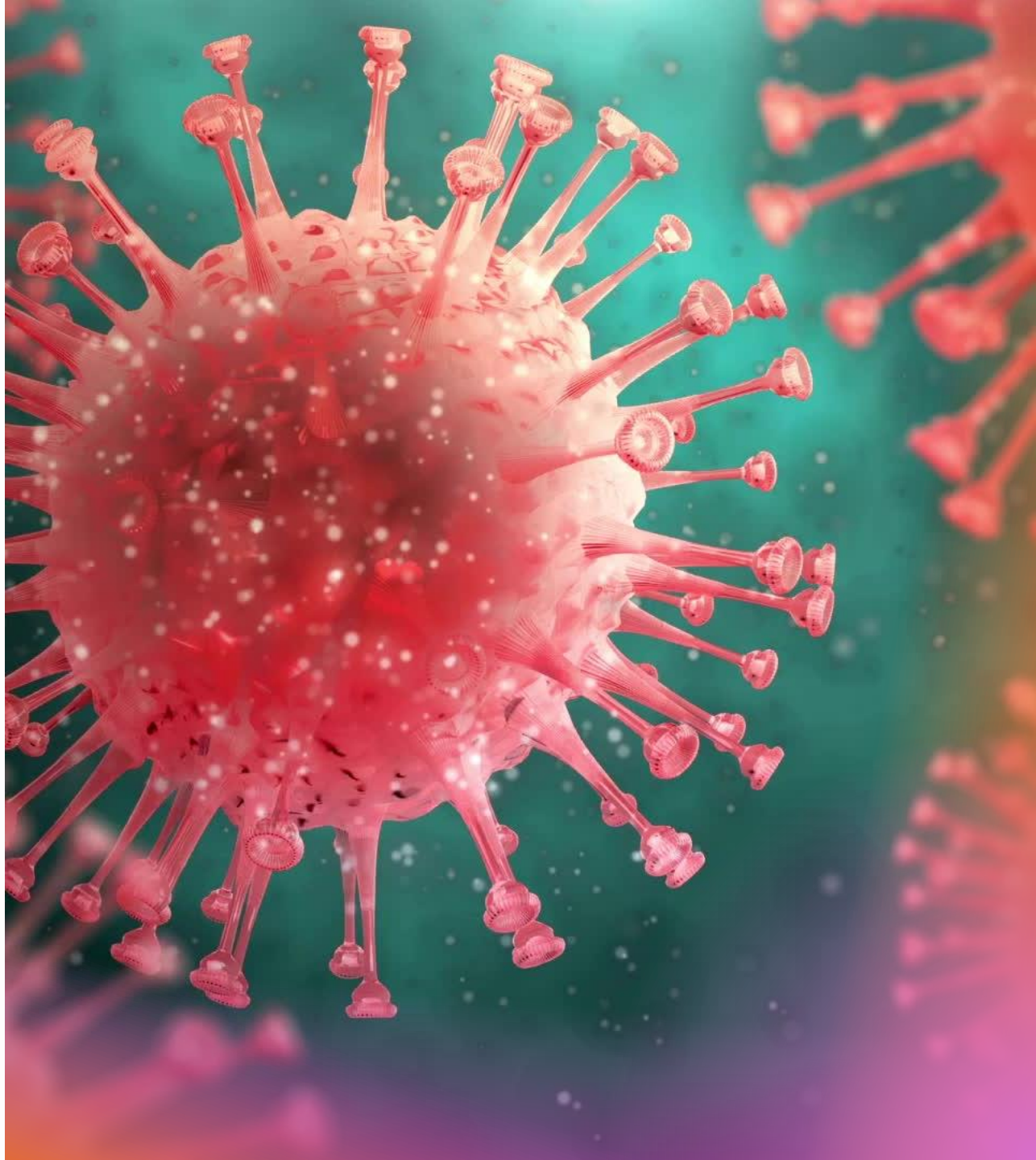
Common adverse reactions

- Mild and transient local pain and redness at the injection site
- Fever and other systemic symptoms such as fatigue
- In sick patient with acute illness, the vaccine should be postpended till the time of complete recovery
- History of previous anaphylactic reaction is absolute contraindication for PCV vaccine
- History of allergic reaction to diphtheria toxoid-containing vaccine is contraindicated

COVID-19 vaccination

COVID-19 virus

- The virus is still spreading and undergoing genetic changes, particularly in the critical regions of its spike protein
- Regular updated vaccine will be required to prevent transmission spikes as immunity wanes over time



The updated vaccine antigen JN.1 variants

Messenger RNA (mRNA) vaccines

- Pfizer-BioNTech COVID-19 vaccine
- Moderna COVID-19 vaccine

Protein subunit vaccine (Novavax COVID-19 Vaccine)

Not available in Saudi Arabia

Pfizer-BioNTech COVID-19 vaccine	Moderna COVID-19 vaccine
0.3 ml IM	0.5 m IM

Adult patients 19 years and older with CRD
single dose and re-vaccinated after 1 year of the previous vaccine

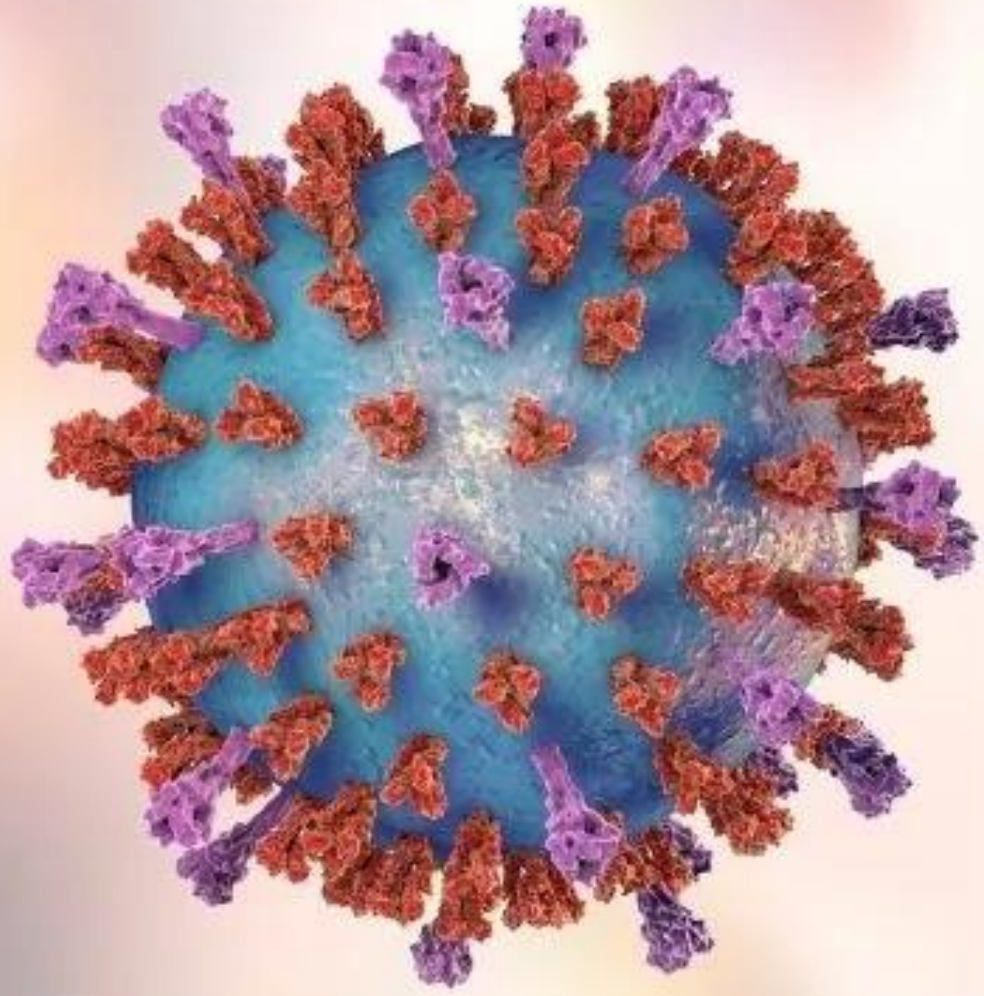
Adverse reactions

- Mild and transient local pain and redness at the injection site
- Fever and other systemic symptoms such as fatigue
- In sick patients with acute illness, the vaccine should be postpended till the time of complete recovery
- History of previous anaphylactic reaction is the only absolute contraindication for COVID-19 vaccine
- In patients who had acute symptomatic COVID-19 infection or asymptomatic positive test, the vaccine should be postpended for at least 3 months

Adverse reactions

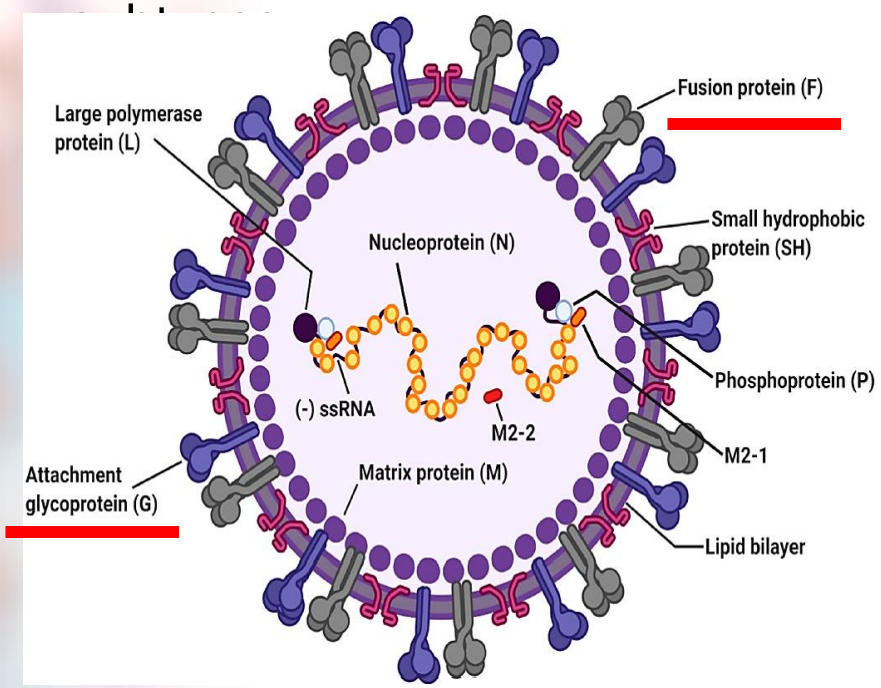
- Axillary lymph nodes enlargement on the same side of the vaccinated arm
- Myocarditis and pericarditis
- Rarely, anaphylactic reactions occur after receiving the COVID-19 vaccination
- Health-care workers are required to document and report any potential side effect or reaction attributed to the vaccine

Respiratory Syncytial Virus (RSV) vaccination



RSV structure

- Surface fusion (F)
- Attachment (G) glycoproteins
- Human RSV exists in A and B antigenic



Recombinant monovalent adjuvanted vaccine	Recombinant bivalent non-adjuvanted vaccine
F protein from the A subtype Adult patients 60 years and older with CRD	F protein from A and from B subtypes Adult patients 60 years and older with CRD Maternal immunization in weeks 32–36 of gestation
0.5 ml IM	0.5 m IM

Vaccination before the peak RSV season is the preferred timing for administering RSV vaccines

RSV vaccine efficacy

Placebo-controlled, phase 3 trial 1:1 ratio, adults 60 years of age or older vaccine vs placebo	**Recombinant monovalent adjuvanted**	**Recombinant bivalent nonadjuvanted**
Duration	Two RSV seasons	One and half seasons
Sample size	24,966	36,862
Mean Follow up	15 months	12 months
The efficacy of the RSV vaccine in preventing lower respiratory tract disease	82.6% for the first year and 56.1% for the 2nd year 94.6% against severe RSV-related lower respiratory tract disease	88.9% for the first year and 78.6% for 2nd year (partial) for a least 2 signs and symptoms 85.7% for at least 3 respiratory symptoms

References 90&91 in the document

Adverse reactions

- Mild and transient local pain and redness at the injection site
- Fever and other systemic symptoms such as fatigue
- In sick patients with acute illness, the vaccine should be postpended till the time of complete recovery
- History of previous anaphylactic reaction is absolute contraindication for RSV vaccine
- Rarely; atrial fibrillation and inflammatory neurologic events

Herpes Zoster vaccination

Recombinant Zoster vaccine (RZV)

Adult patients 50 years and older with CRD
Adult patients with CRD aged 19–49 years with immunodeficiency or immunocompromised due to their disease or due to immunosuppressive drugs

Two doses of 0.5 ml IM, 2–6 months apart in immunocompetent patients or within 1–2 months in immunosuppressed patients

Live attenuated zoster vaccine: not yet available in Saudi Arabia.

Adverse reactions

- Mild and transient local pain and redness at the injection site
- Fever and other systemic symptoms such as fatigue
- In sick patients with acute illness, the vaccine should be postpended till the time of complete recovery
- rarely, severe anaphylactic reaction

Vaccines co-administration

Vaccines co-administration

The co-administration of more than one vaccine in a single visit is safe and effective

Reduces the consultation time and improves compliance with the recommendations

Influenza vaccines can be administered before or after administration of another vaccine during the same clinic visit day

The co-administration of PCVs together with the influenza vaccine is immunogenic and safe in adults

The co-administration of PCV20 with COVID-19 vaccine (Pfizer-BioNTech) was safe

Vaccines co-administration

The immune response of co-administration of more than one vaccine in a single visit is effective and the same as administering single vaccine

Given the shared adjuvant between RSV adjuvant vaccine and RZV vaccine, it is advised to avoid co-administration of these two vaccine in the same clinic visit

The contraindication of co-administration of multiple vaccines at the same time is the same contraindication of each vaccine separately

Hajj recommendations for vaccinations

- Influenza and the updated COVID-19 vaccines are currently among the required vaccinations for performing the Hajj for local pilgrims
- Other vaccines (Pneumococcal, RSV, and HZ vaccines) are not currently required for Hajj
- Patients with CRD are considered a high-risk population and other vaccines (Pneumococcal, RSV, and HZ vaccines) are strongly encouraged and highly recommended before the Hajj season

Summary

Table 2: The recommended available vaccines in Saudi Arabia for patients with chronic respiratory diseases

Type of vaccine	Adult dose and mode of delivery	Age per year: 18–49	50–59	60–64	≥65
IIV	0.5 mL IM Annually	Recommended	Recommended	Recommended	Recommended
HD-IIV	0.7 mL IM Annually	Not recommended	Not recommended	Not recommended	Recommended
Pneumococcal vaccines	0.5 mL IM	Recommended [Table 3]	Recommended [Table 3]	Recommended [Table 3]	Recommended [Table 3]
COVID-19 vaccine (mRNA vaccines)	0.3 mL Pfizer-BioNTech 0.5 mL moderna COVID-19 IM	Recommended (see text)	Recommended (see text)	Recommended (see text)	Recommended (see text)
RSV vaccines	0.5 mL IM	Not recommended (see text)	Not recommended	Recommended	Recommended
RZV	Two-doses (0.5 mL IM), 2–6 months apart	Conditional recommendation (see text)	Recommended	Recommended	Recommended

IIV=Inactivated influenza vaccine, HD-IIV=High-dose IIV, IM=Intramuscular, RSV=Respiratory syncytial virus, RZV=Recombinant zoster vaccine

Note: For patients >=65 years old, IIV is recommended if HD-IIV is not available.


Thank You