Elevating ID Through a Revitalized IDSA

January 2025

IDSA Infectious Diseases Society of America

IDSA Key Priorities: 2020-2024

ID Workforce

Fair Compensation

Progress on AMR

Practice Guidelines

IDSA Infectious Diseases Society of America

IDSA Key Priorities: 2021-2024

ID Workforce

Fair Compensation

Progress on AMR

Practice Guidelines

Pandemic Preparedness

IDSA Infectious Diseases Society of America

"The infectious diseases workforce is a **robust, diverse and innovative community** that advances scientific discovery and protects and heals the world."

IDSA Workforce Development Vision
August 2023

IDSA
Infectious Diseases Society of America

Physician Compensation

Negotiation Tools and Resources

Regional In-Person Sessions

Compensation that Reflects ID Value

idsociety.org/compensation

IDSA Infectious Diseases Society of America

Secure Our Seat at the Table

Adequately Valuing ID Physician Services

- HCPCS add-on code
- Outpatient complexity code

Bio-Preparedness Workforce Pilot Program

PASTEUR Act

IDSA Infectious Diseases Society of America

Guidelines

Current Priorities

- Increase production of high-quality guidelines and guideline updates
- Expand portfolio with additional guidance products
- Improve guideline dissemination and implementation

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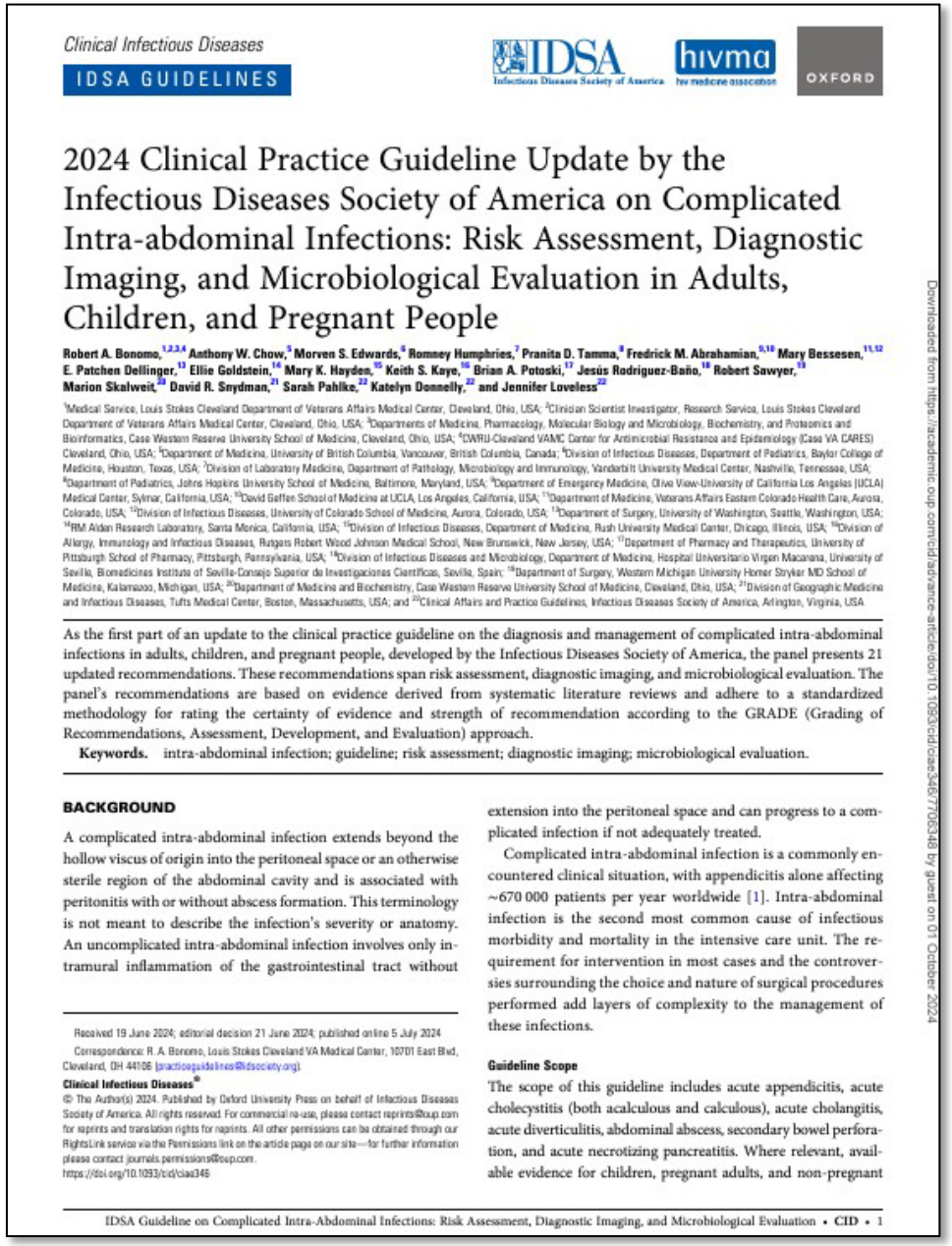

Clinical Infectious Diseases

IDSA GUIDELINES

2024 Clinical Practice Guideline Update by the Infectious Diseases Society of America on Complicated Intra-abdominal Infections: Risk Assessment, Diagnostic Imaging, and Microbiological Evaluation in Adults, Children, and Pregnant People

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As the first part of an update to the clinical practice guideline on the diagnosis and management of complicated intra-abdominal infections in adults, children, and pregnant people, developed by the Infectious Diseases Society of America, the panel presents 21 updated recommendations. These recommendations span risk assessment, diagnostic imaging, and microbiological evaluation. The panel's recommendations are based on evidence derived from systematic literature reviews and adhere to a standardized methodology for rating the certainty of evidence and strength of recommendation according to the GRADE (Grading of Recommendations, Assessment, Development, and Evaluation) approach.

Keywords. intra-abdominal infection; guideline; risk assessment; diagnostic imaging; microbiological evaluation.

BACKGROUND

A complicated intra-abdominal infection extends beyond the hollow viscus of origin into the peritoneal space or an otherwise sterile region of the abdominal cavity and is associated with peritonitis with or without abscess formation. This terminology is not meant to describe the infection's severity or anatomy. An uncomplicated intra-abdominal infection involves only intramural inflammation of the gastrointestinal tract without extension into the peritoneal space and can progress to a complicated infection if not adequately treated.

Complicated intra-abdominal infection is a commonly encountered clinical situation, with appendicitis alone affecting ~670 000 patients per year worldwide [1]. Intra-abdominal infection is the second most common cause of infectious morbidity and mortality in the intensive care unit. The requirement for intervention in most cases and the controversies surrounding the choice and nature of surgical procedures performed add layers of complexity to the management of these infections.

Guideline Scope

The scope of this guideline includes acute appendicitis, acute cholecystitis (both acalculous and calculous), acute cholangitis, acute diverticulitis, abdominal abscess, secondary bowel perforation, and acute necrotizing pancreatitis. Where relevant, available evidence for children, pregnant adults, and non-pregnant

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Clinical Infectious Diseases®

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At the Forefront of Pandemic and Outbreak Response

Advising CDC, Federal Agencies, White House

Developing Rapid Guidelines

Broader Media Outreach

IDSA Infectious Diseases Society of America

Reflecting the Faces of ID

Inclusion, Diversity, Access & Equity Roadmap and Strategies

IDA&E Committee

Diverse Slate of Board Members

IDSA Infectious Diseases Society of America

idsociety.org/volunteer

2025:

Refreshed strategic plan

IDSA's New Strategic Priorities

1

Build and sustain a broad, diverse and valued ID workforce to improve patient care, advance science and promote public health

2

Promote IDSA as the leader and trusted source for timely, evidence-based infectious diseases content and expertise

3

Expand IDSA's leadership in preventing, preparing for and responding to infectious diseases threats to protect our communities

IDSA Infectious Diseases Society of America

2025-2030 IDSA Strategic Priorities

Strategic Priority 1: Build and sustain a broad, diverse and valued ID workforce to improve patient care, advance science and promote public health

- Goal 1: Foster thriving careers for ID professionals
- Goal 2: Attract and inspire medical students, residents and fellows to pursue a rewarding career in ID
- Goal 3: Ensure the ID workforce is accessible to, and reflects the diversity of, the communities it serves

2025-2030 IDSA Strategic Priorities

Strategic Priority 2: Promote IDSA as the leader and trusted source for timely, evidence-based infectious diseases content and expertise

- Goal 1: Increase recognition of IDSA and the IDSA brand
- Goal 2: Expand the reach and impact of IDSA's products and services

2025-2030 IDSA Strategic Priorities

Strategic Priority 3: Expand IDSA's leadership in preventing, preparing for and responding to infectious diseases threats to protect our communities

- Goal 1: Reduce the impact of antimicrobial resistance
- Goal 2: Position the ID workforce for effective outbreak and pandemic preparedness and response

Rebrand

Revitalizing Our Brand, Reshaping Our Identity and Reinforcing Our Value

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Thank you

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IDSA Infectious Diseases Society of America

Vaccine Update: Utilizing One of the Greatest Public Health Developments

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NORTHWESTERN UNIVERSITY FEINBERG SCHOOL OF MEDICINE

Disclosures

- I have a Research Grant relationship with GSK, and Sanofi Pasteur
- I have a Data Monitoring Safety Board relationship with Pfizer
- I am a member of the Vaccine Advisory Board for Sanofi Pasteur, Pfizer, Merck, GSK, Moderna, and Novavax
- I do not intend to discuss an unapproved or investigative use of commercial products or devices

Objectives

- Discuss the current epidemiology of various vaccine preventable diseases
- Discuss recently licensed vaccines
- Discuss new vaccines in development

Vacccines Work !!!

- Vaccines are one of the greatest public health achievements of all time.
- Vaccines save milliions of lives: each year vaccines save the lives of 2 to 3 million children and global immunization efforts have saved at least 154 million lives over the past 50 years.
  - This is equivalent to 6 lives saved per minute every year (the vast majority being infants)
- Vaccines save money at all levels – e.g. 96 million productive adults lives saved from vaccine preventable diseases.
- Vaccines provide protection for those who are at high risk and vulnerable to vaccine preventable diseases but who are unable themselves to receive a vaccine.

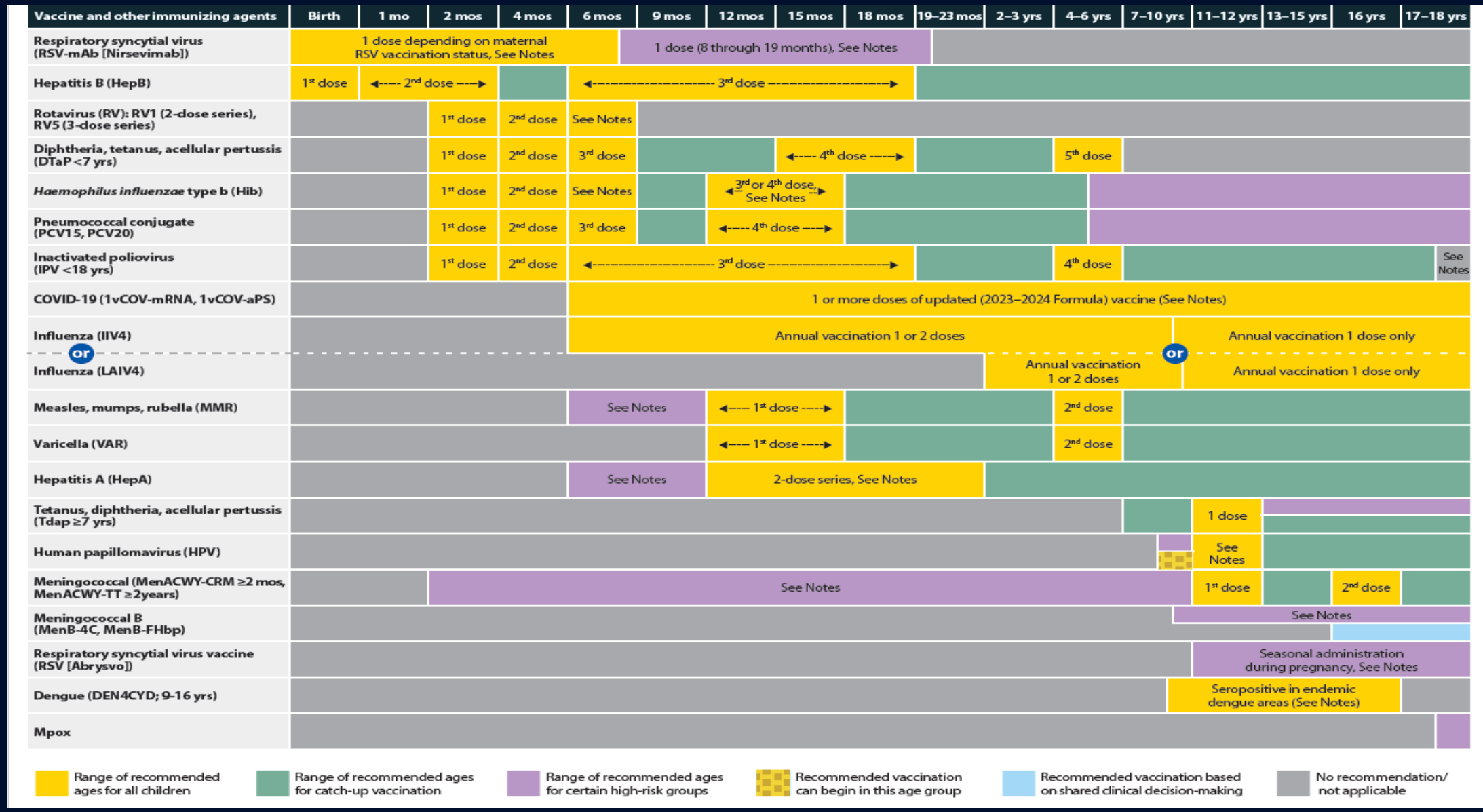
www.cdc.gov, www.who.int

Impact of Vaccines in the 20th & 21st Centuries

Comparison of 20th Century Annual Morbidty & Current Morbidity in US

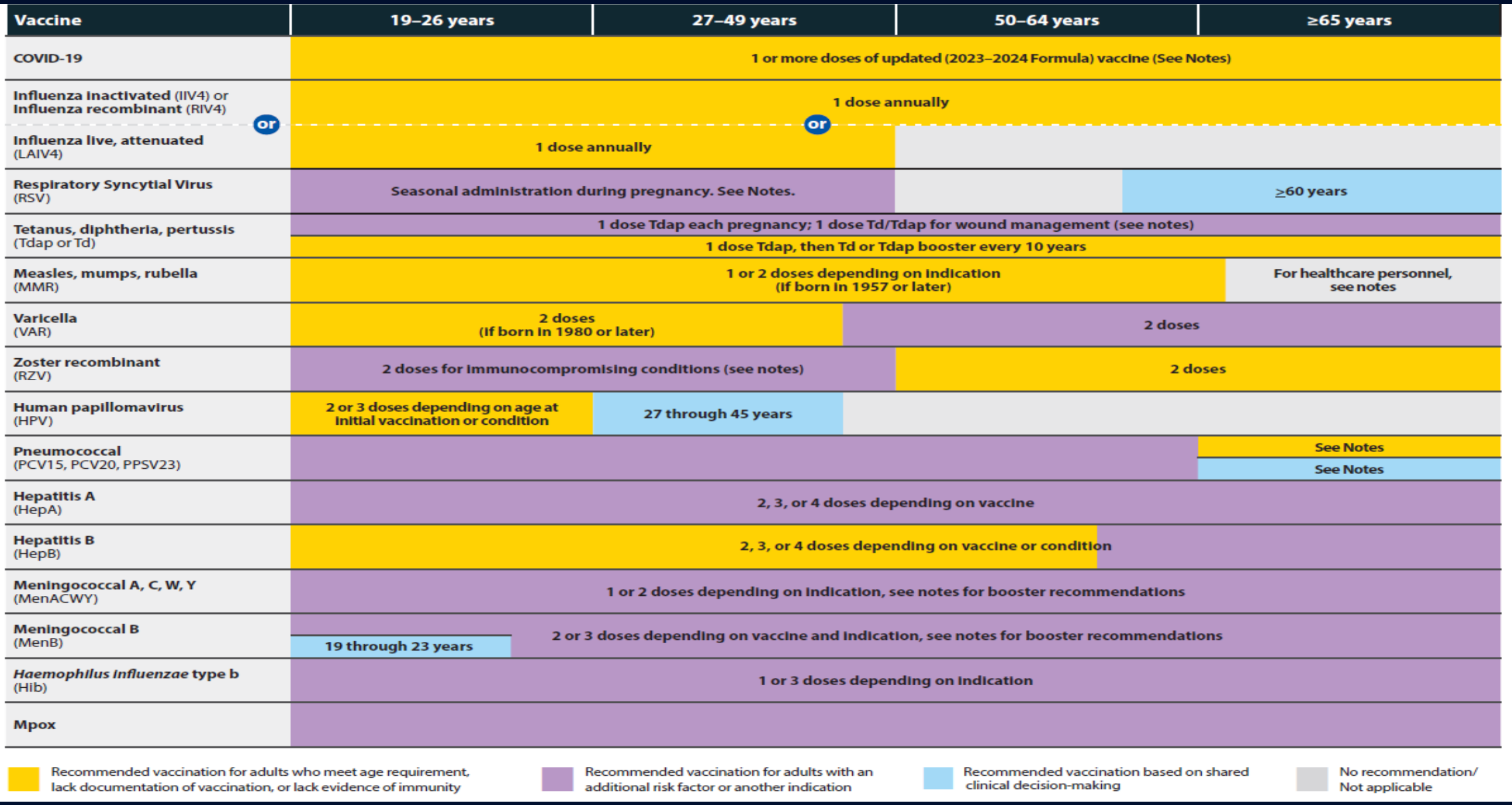
Disease	20th Century Annual Morbidity	2022 Reported Number of Cases	% Decrease
Smallpox	29,005	0	100%
Diphtheria	21,053	0	100%
Pertussis	200,752	2,388	98.5%
Tetanus	580	28	96%
Polio (paralytic)	16,316	0	100%
Measles	530,217	121	>99%
Mumps	162,344	191	>99%
Rubella	47,745	7	>99%
Congenital Rubella Syndrome	152	0	100%
Haemophilus influenzae type b	20,000 (est)	211	99%

Pediatric Recommended Immunization Schedule - 2024



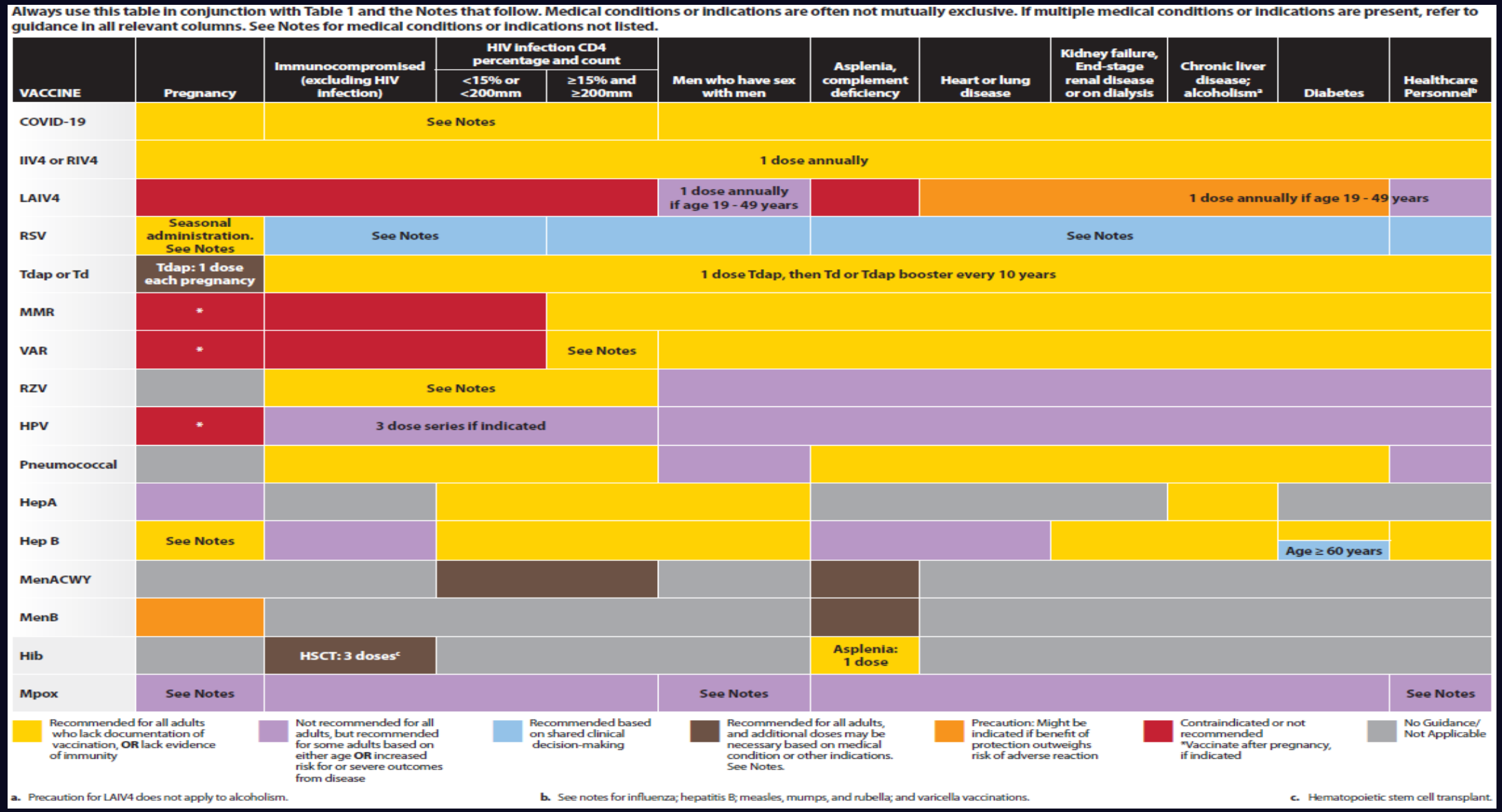
www.cdc.gov

Adult Recommended Immunization Schedule - 2024

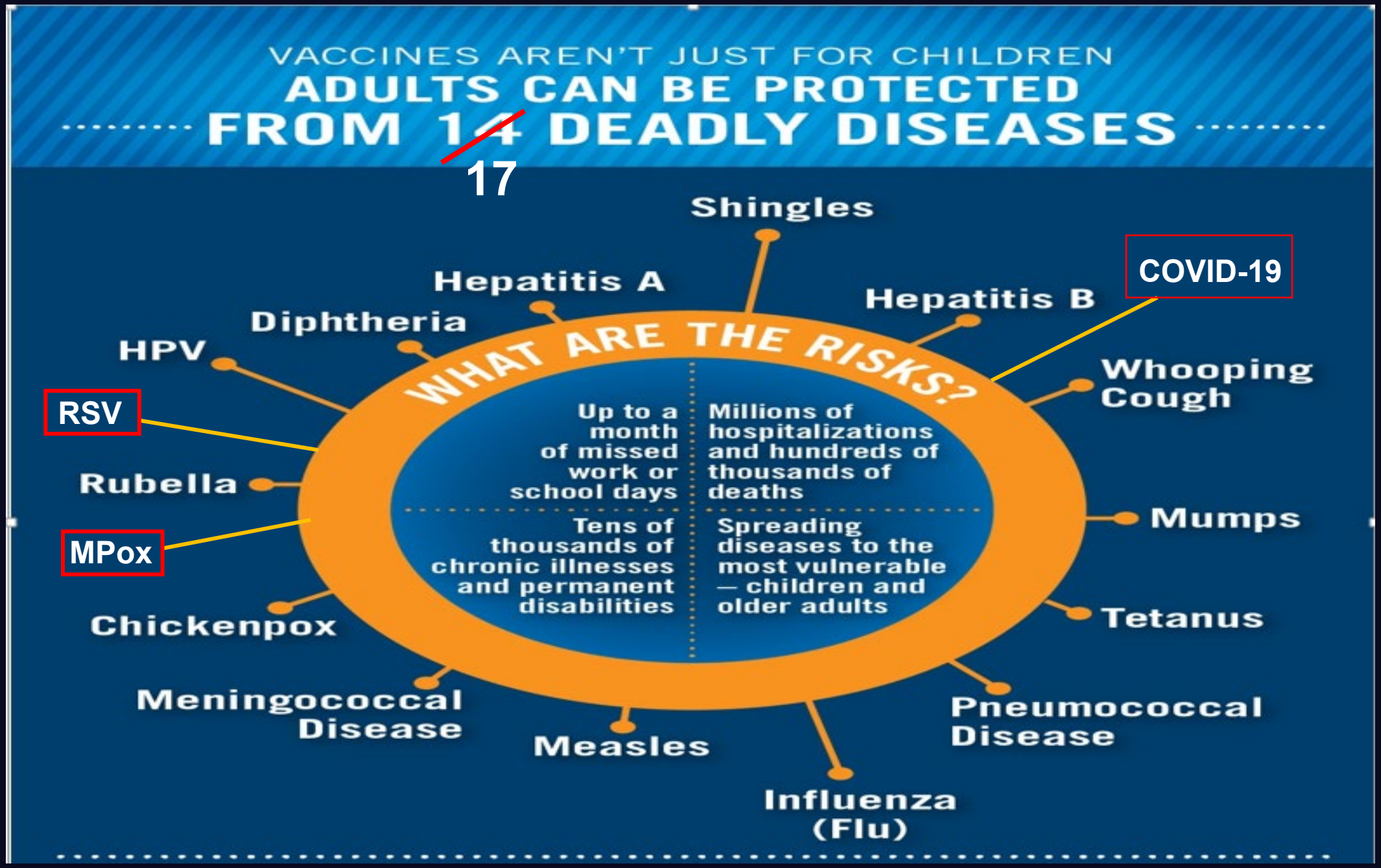


www.cdc.gov

US Recommended Adult Immunization Schedule by Medical Condition or other Indication, 2024



cdc.gov



National Foundation for Infectious Diseases

Impact of Vaccines

HEALTH

- Reduces infectious diseases morbidity and mortality
- Eradicates infectious diseases
- Prevents cancer
- Induces herd immunity
- Reduces diseases that complicate vaccine preventable diseases
- Provides protection across all ages, genders and racial/ethnic groups

ECONOMIC

- Cost savings at all levels
- Cost-effective preparedness for outbreaks
- Minimizes financial impact on family, healthcare systems, and national goverments
- Establishes programs for vaccine development

SOCIETAL

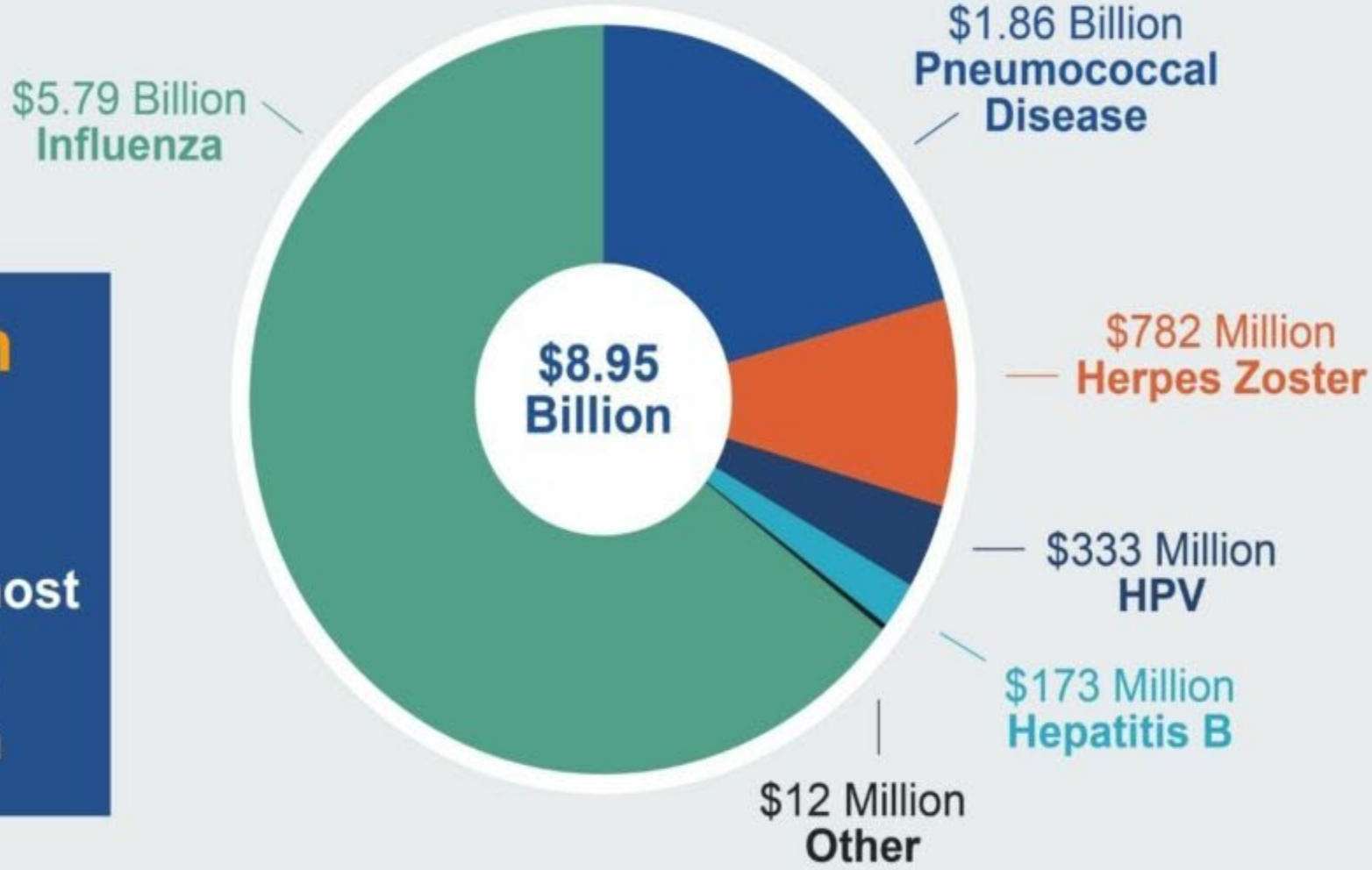
- Equity of healthcare
- Strengthens healthcare infrastructure
- Empowers people to protect themselves and their families
- Provides opportunity to protect communities by collaborating with stakeholders

Rodrigues CMC and Plotkin SA. Front Microbiol July 13 2020;11-2020.

Figure 2: Economic Costs of Vaccine-Preventable Diseases

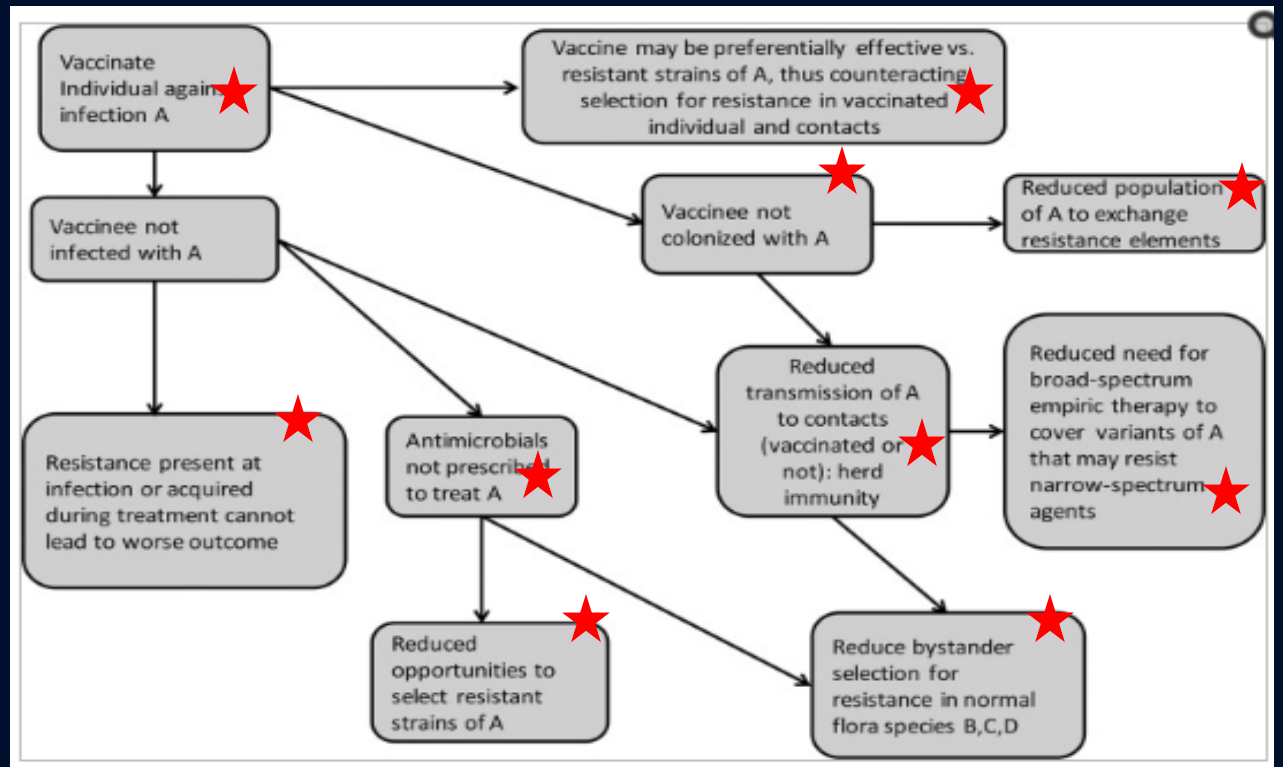
~$7.1 Billion

Unvaccinated individuals are responsible for almost 80% of the total financial burden



Vaccines Contribute to Solving Antimicrobial Resistance Problem

- **Vaccines can help to reduce the burden of antimicrobial resistance through a number of mechanisms:**



Mechanisms by which vaccines can contribute to reducing the prevalence and impact of antimicrobial resistance.

Lipsitch M, Siber GR. mBio 2016;7(3):300428-16

Facts about Common Vaccine Preventable Diseases

- **Influenza**: Each year there are an estimated 10-45 million infections, resulting in over 700,000 hospitalizations and between 30,000 to 50,000 deaths.

  - 90% of the hospitalizations and deaths occur in persons 65 years of age and older.

- **Pneumococcal pneumonia**: Annually there are an estimated 320,000 cases resulting in 150,000 hospitalizations and 5,000 deaths. Blood stream infection and meningitis account for an additional 3,500 deaths a year. Almost 93% of the infections are occurring in the adult population.

- **Hepatitis B**: There are an estimated 46,000 new cases each year in the US (only about 10% of the cases are reported). Majority of the cases are occurring in persons 39 to 59 years of age. There are between 2,000 to 4,000 deaths each year due to this infection. Currently there are an estimated 880,000 people living with chronic Hepatitis B which can cause major health issues.

cdc.gov

Facts about Common Vaccine Preventable Diseases

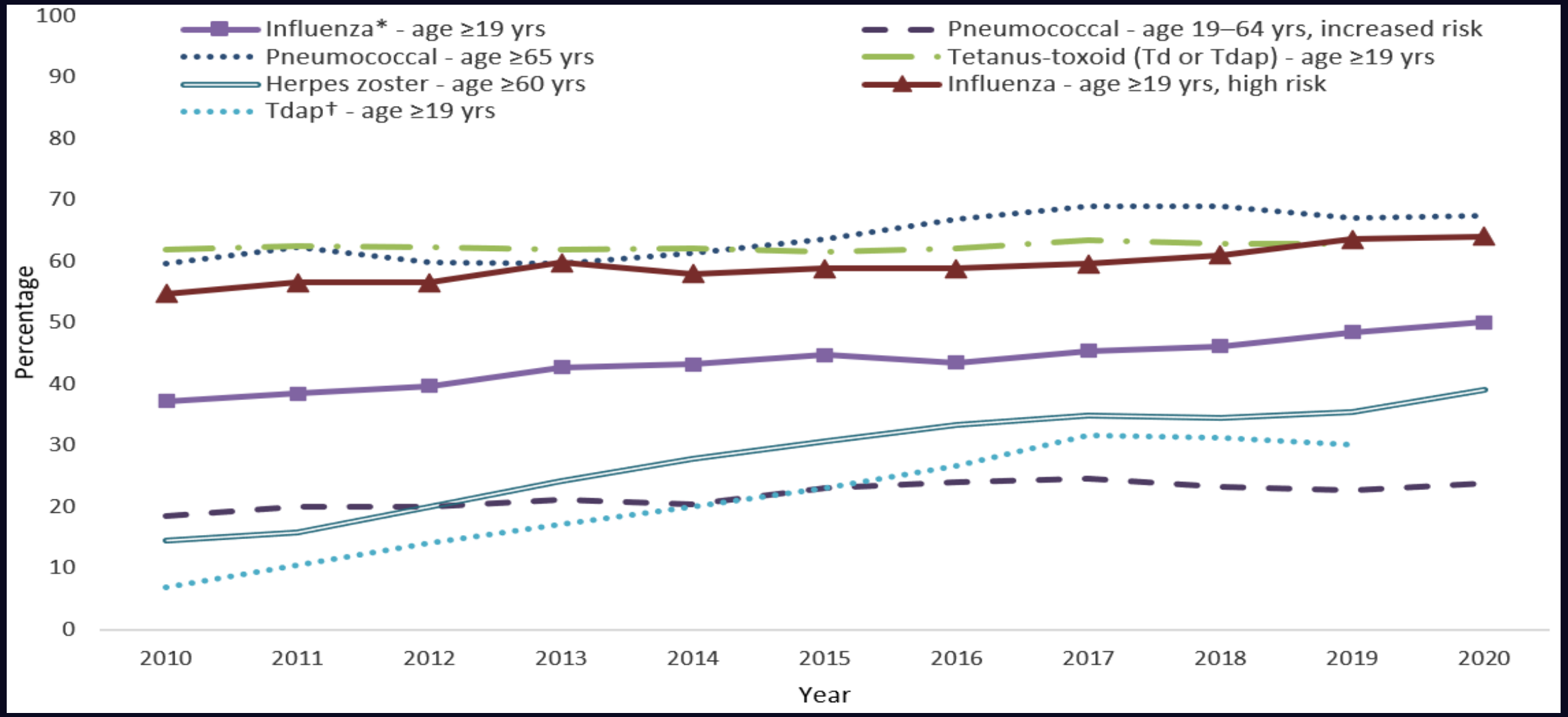
- **Herpes zoster virus (shingles):** There are an estimated 1 million cases of shingles that occur each year
  - 1 out of every 3 adults will develop the disease during their lifetime.
  - Rates of disease are highest among persons 65 years of age and older and those with underlying conditions
  - 10-15% of persons 65 years of age and older will develop complications from shingles with the most common being post-herpetic neuralgia (burning pain lasting long after rash disappears)
- **Pertussis (whooping cough):** Causes a severe, prolonged cough illness with up to 30% of adults developing one or more complications.
  - Complications include: fractured ribs, hearing loss from ruptured eardrums, pneumonia, urinary incontinence, seizures; intracranial hemorrhage (elderly)

Background

- There are 258.3 million adults (≥18 years of age) in the U.S.
- The prevalence of vaccine-preventable diseases (VPDs) is higher among adults than among children
- VPDs cause 50,000 to 90,000 deaths and over 1.5 million hospitalizations in the adult population each year in the United States, despite the availability of safe and effective vaccines against these diseases
- Annually, the U.S. spends an estimated $27 billion treating four VPDs in adults over the age of 50 years: influenza, pertussis, pneumococcal disease and shingles

McLaughlin JM et al. J Prim Prev 2015;36:259-273; Lu PJ et al. Vaccine 2017 May 25;35(23):3104-3115;

Vaccination Coverage Among Adults, US – 2010-2020



www.cdc.gov

Adult vaccination coverage rates - 2022

Vaccine	Coverage rate
Influenza – overall - 2022 - 19 to 49 years - 50 to 64 years - ≥ 65 years - Pregnant women	46.9% 35.2% 50.1% 69.7% 47.0%
Pneumococcal vaccines (PPSV23 and PCV13) in persons at increased risk for disease - 19 to 64 years - ≥ 65 years	22.2% 16.9% to 23.3% 65.8%
Tdap vaccine – overall - 19 to 64 years - ≥ 65 years - Pregnant women	24.5% 31.6% 24.4% 55.4%
Herpes zoster – overall - 60 to 64 years - ≥ 65 years	32.6% 20.1% 41.1%
Hepatitis B (≥3 doses) - overall	34.2%

CDC. www.cdc.gov – adultvaxview 2022

Factors Contributing to Suboptimal Vaccination Rates in Adults

- **Access and equity issues**
- **Economic impacts –** funding mechanisms for vaccines are complex and difficult to navigate
- **Engagement of Healthcare professionals –** a strong vaccine recommendation from a healthcare professional has the biggest impact on patient acceptance, however, in many cases the recommendations are weak or nonexistent.
- **Limited awareness –** adult patients are often unaware of the vaccine recommendations and many healthcare professionals are unaware of the vaccination guidelines for adults.
- **Increasing complexity**
- **Healthcare system challenges –** infrastructure and logistics need to be in place to effectively distribute and administer vaccines.
- **Insufficient public health funding at both state and federal levels**
- **Vaccine hesitancy and misinformation –** in today's world, antivaccine and misinformation online reaches people 6X faster than true factual information and is 70% more likely to be shared. Anti-vaccine narratives continue to rapidly proliferate.

Respiratory Viral Disease, 2024-2025

Based on Southern Hemisphere data, it is anticipated that this year's respiratory virus season (e.g. influenza, COVID-19, RSV) will closely reflect the impact and severity of last season.

cdc.gov
https://www.cdc.gov/surveillance/nrevss/rsv/natl-trend.html

Influenza

- **CDC estimates that influenza annually results in:**

  9 to 41 million illnesses; 140,000 to 710,000 hospitalizations; 12,000 – 52,000 deaths

Following is a list of all the health and age factors that are known to increase a person's risk of getting serious flu complications:

- Adults 65 years and older
- Children younger than 2 years old[1]
- Asthma
- Neurologic and neurodevelopment conditions
- Blood disorders (such as sickle cell disease)
- Chronic lung disease (such as chronic obstructive pulmonary disease [COPD] and cystic fibrosis)
- Endocrine disorders (such as diabetes mellitus)
- Heart disease (such as congenital heart disease, congestive heart failure and coronary artery disease)
- Kidney diseases
- Liver disorders
- Metabolic disorders (such as inherited metabolic disorders and mitochondrial disorders)
- People who are obese with a body mass index [BMI] of 40 or higher
- People younger than 19 years old on long-term aspirin- or salicylate-containing medications.
- People with a weakened immune system due to disease (such as people with HIV or AIDS, or some cancers such as leukemia) or medications (such as those receiving chemotherapy or radiation treatment for cancer, or persons with chronic conditions requiring chronic corticosteroids or other drugs that suppress the immune system)
- People who have had a stroke

Other people at higher risk from flu:

- Pregnant people and people up to 2 weeks after the end of pregnancy
- People who live in nursing homes and other long-term care facilities
- People from certain racial and ethnic minority groups are at increased risk for hospitalization with flu, including non-Hispanic Black persons, Hispanic or Latino persons, and American Indian or Alaska Native persons
- [1] Although all children younger than 5 years old are considered at higher risk of serious flu complications, the highest risk is for those younger than 2 years old, with the highest hospitalization and death rates among infants younger than 6 months old.

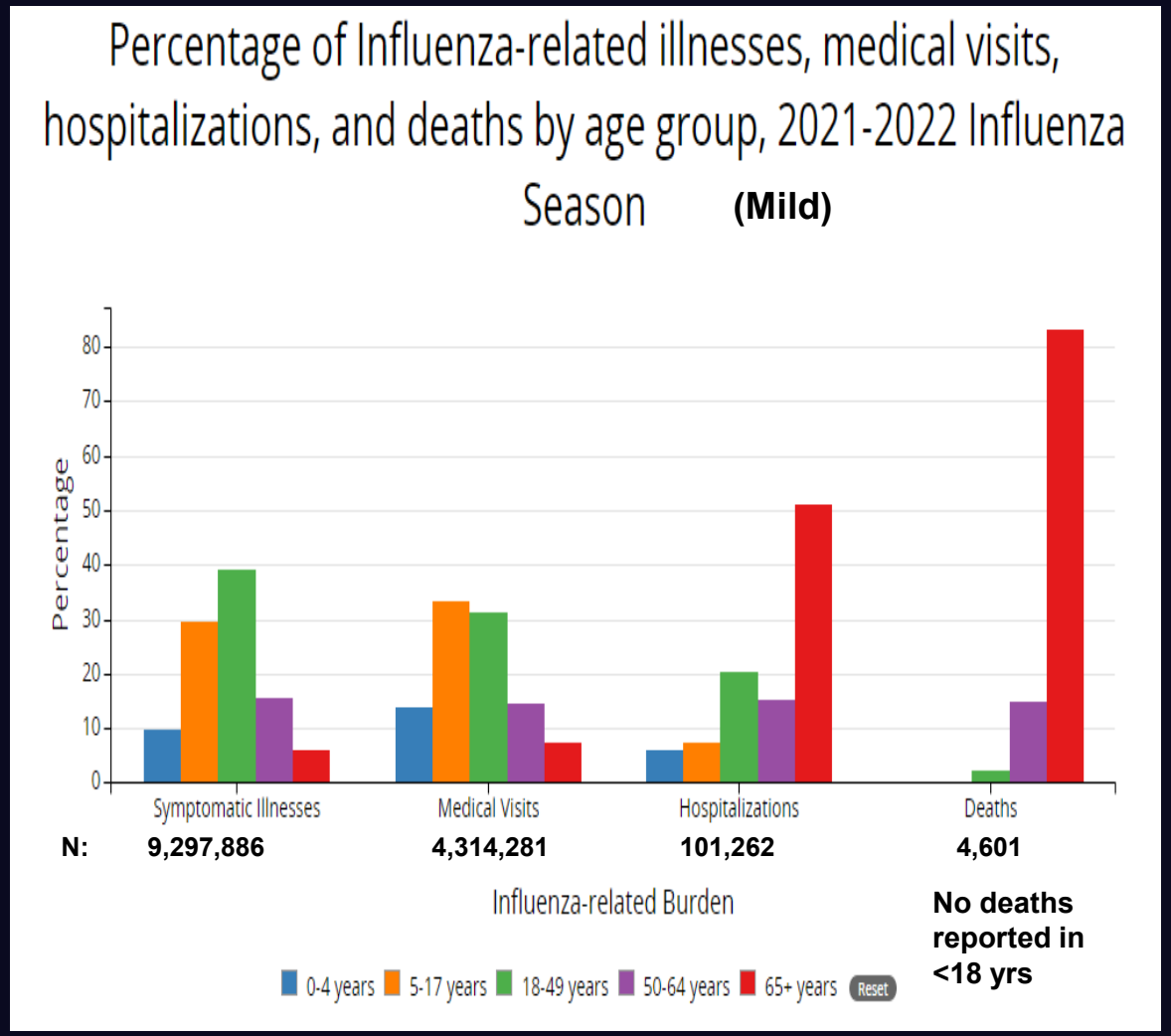
cdc.gov

ACIP of CDC Recommendations For Influenza Vaccination

- It is recommended that everyone 6 months of age and older receive a flu vaccine on an annual basis. The CDC recommends use of any licensed, age-appropriate flu vaccine as an option for vaccination. This includes: quadrivalent inactivated influenza vaccine [IIV3] – egg based or cell culture based, recombinant influenza vaccine [RIV3], or live attenuated influenza vaccine (LAIV3).
- There is a preferential recommendation for the use of higher dose (including high dose and recombinant) or adjuvanted flu vaccines over standard-dose unadjuvanted flu vaccines for adults 65 years and older.
- Co-administration of influenza vaccine with other recommended adult vaccines is encouraged and acceptable.

https://www.cdc.gov/flu/professionals/vaccination/vax-summary.htm

Influenza Seasons 2021- 2024



2022-2023 (Severe season)

- 31 million symptomatic illnesses
- 14 million medical visits
- 360,000 hospitalizations
- 21,000 flu-related deaths
  - 182 pediatric deaths (~80% were not fully vaccinated)

2023-2024 (Severe season)

- 34 million influenza illnesses
- 15 million medical visits
- 380,000 hospitalizations
- 17,000 influenza-related deaths
  - 200 pediatric deaths (>80% unvaccinated or not fully vaccinated)

cdc.gov

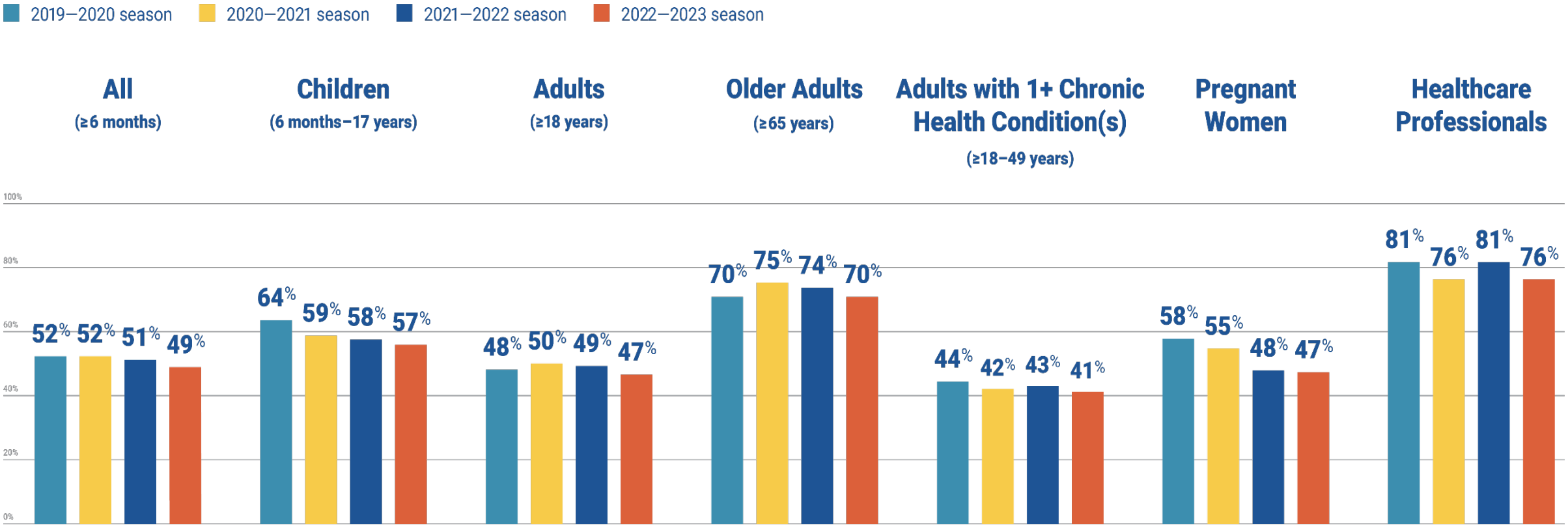
Available Trivalent Seasonal Flu Vaccine Formulations

- **Children and adults:**
  - Egg-produced, inactivated (≥6 months)
  - Cell-culture produced, inactivated (≥6 months)
  - Egg-produced, live, attenuated (2-49 years)

- **Adults ≥ 65 years only:**
  - Egg-produced, inactivated, high-dose
  - Egg-produced, inactivated, adjuvanted
  - Recombinant hemagglutinin (HA) only

Centers for Disease Control and Prevention. https://www.cdc.gov/flu/professionals/acip/2024-2025/acip-table.htm

Influenza Vaccination Coverage by Population



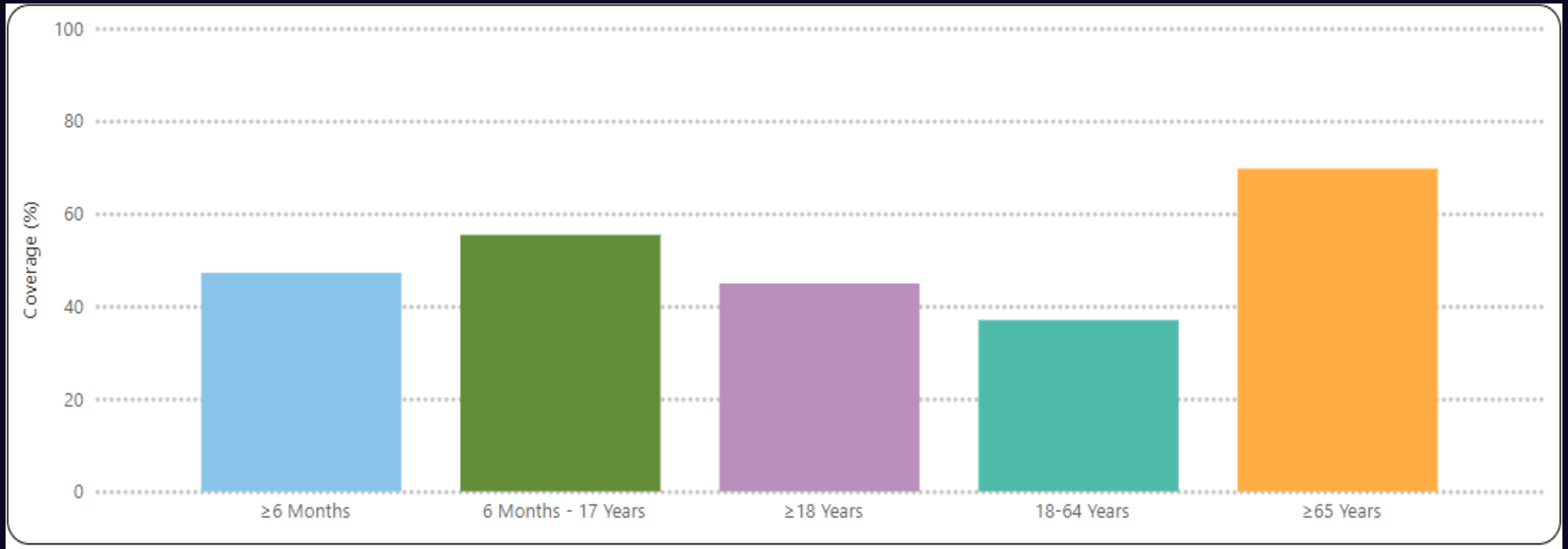
Receipt of ≥1 dose of influenza vaccine during the season

Source: Centers for Disease Control and Prevention (CDC)*

*Percentages have been rounded

cdc.gov

2023-2024 End of Season Influenza Vaccination Coverage



DimensionValue	Coverage	DimensionValueDisplaySequence
≥6 Months	47.20	170
6 Months - 17 Years	55.40	180
≥18 Years	44.90	400
18-64 Years	37.00	420
≥65 Years	69.70	600

Healthcare professionals – 74.4%
Pregnant women – 47.4%

All rates slightly lower than in prior year

RSV Epidemiology

- **RSV is one of the most common causes of acute respiratory tract infection in people of all ages.**
- **RSV typically circulates in Fall, Winter, and Spring – usually October to end of March in US.**
- **Each year in the United States, RSV leads to approximately:**

- 2.1 million outpatient (non-hospitalization) visits among children younger than 5 years of age - vast majority of cases occur in full-term, healthy infants under 6 months of age

- 900,000-1.4 million outpatient visits among adults 65 years and older

- 58,000-80,000 hospitalizations among children younger than 5 years of age (cost of $500 million)

- 60,000-160,000 hospitalizations among adults 65 years and older (cost of $103 million)

- 6,000-10,000 deaths among adults 65 years and older

- 100–300 deaths in children younger than 5 years of age

Hall CB, etl. NEJM 2009;360(6):588-598; Rha B et al. Pediatrics 2020;146(1):e20193611; McLaughlin JM et al. JID 2022;225(6):1100-1111; McLaughlin MJM et al. OFID 2022;9(7):ofac300; Hansen CL et al. JAMA Network Open 2022 Feb 1;5(2):e220527

Risk Factors for Severe RSV Illness

- Premature birth
- Very young infants, especially those ≤6 months of age – most cases occur in healthy, term infants in the first 2-3 months of life
- American Indian and Alaskan Native infants and children
- Crowded living conditions
- Persons with chronic lung disease and chronic heart disease
- Persons with kidney and liver disorders, diabetes mellitus, and hematologic disorders
- Persons of any age with a weakened immune system
- Neuromuscular disorders, including those who have difficulty swallowing or clearing mucus secretions
- Older adults ≥ 65 years of age
- Adults living in nursing home or long-term care facility

CDC. https://www.cdc.gov/rsv/high-risk/infants-young-children.html
CDC. https://www.cdc.gov/rsv/high-risk/older-adults.html#:~:text=Adults%20at%20highest%20risk%20for,Adults%20with%20weakened%20immune%20systems

RSV Vaccines that Are Recommended by CDC

- RSVPreF3 (GSK) – adjuvanted ($ASO1_E$) recombinant prefusion F protein (preF) vaccine
  - given as single dose
  - Recommended only for use in older adults
  - Vaccine efficacy (VE) against RSV-associated lower respiratory tract disease: 82.6% for season 1, 56.1% for season 2
  - Combined Season 1 & 2 efficacy: 74.5%

- RSVpreF (Pfizer) – recombinant prefusion F protein (preF) vaccine
  - given as single dose
  - Recommended for both older adults and pregnant women
  - Vaccine efficacy (VE) against RSV-associated lower respiratory tract disease: 88.9% for season 1, 78.6% for season 2
  - Combined Season 1 & 2 efficacy: 84.4%

- Mresvia (Moderna) – nucleoside modified mRNA encoding the RSV F glycoprotein stabilized in the prefusion conformation (pre-F protein).
  - given as single dose
  - Recommended only for use in older adults
  - Vaccine efficacy (VE) against RSV-associated lower respiratory tract disease: 78.7% for season 1, 62.5% for season 2

https://www.cdc.gov/mmwr/volumes/72/wr/mm722914.html;
Walsh EE et al. N Engl J Med 2023;388 (16):1465-1477

RSV Vaccine Recommendations for Older Adults

- The CDC recommends that everyone 75 and older get an RSV vaccine, and that adults 60–74 who are at increased risk of severe RSV get an RSV vaccine.
- Vaccine dose should be administered prior to the start of RSV season. The best time to get vaccinated is in late summer and early fall.
- Continue to offer vaccination throughout the RSV season to eligible adults who remain unvaccinated
- Coadministration with all other recommended adult vaccines is encouraged and acceptable

www.cdc.gov

Bivalent RSV PreF Vaccine (Pfizer)

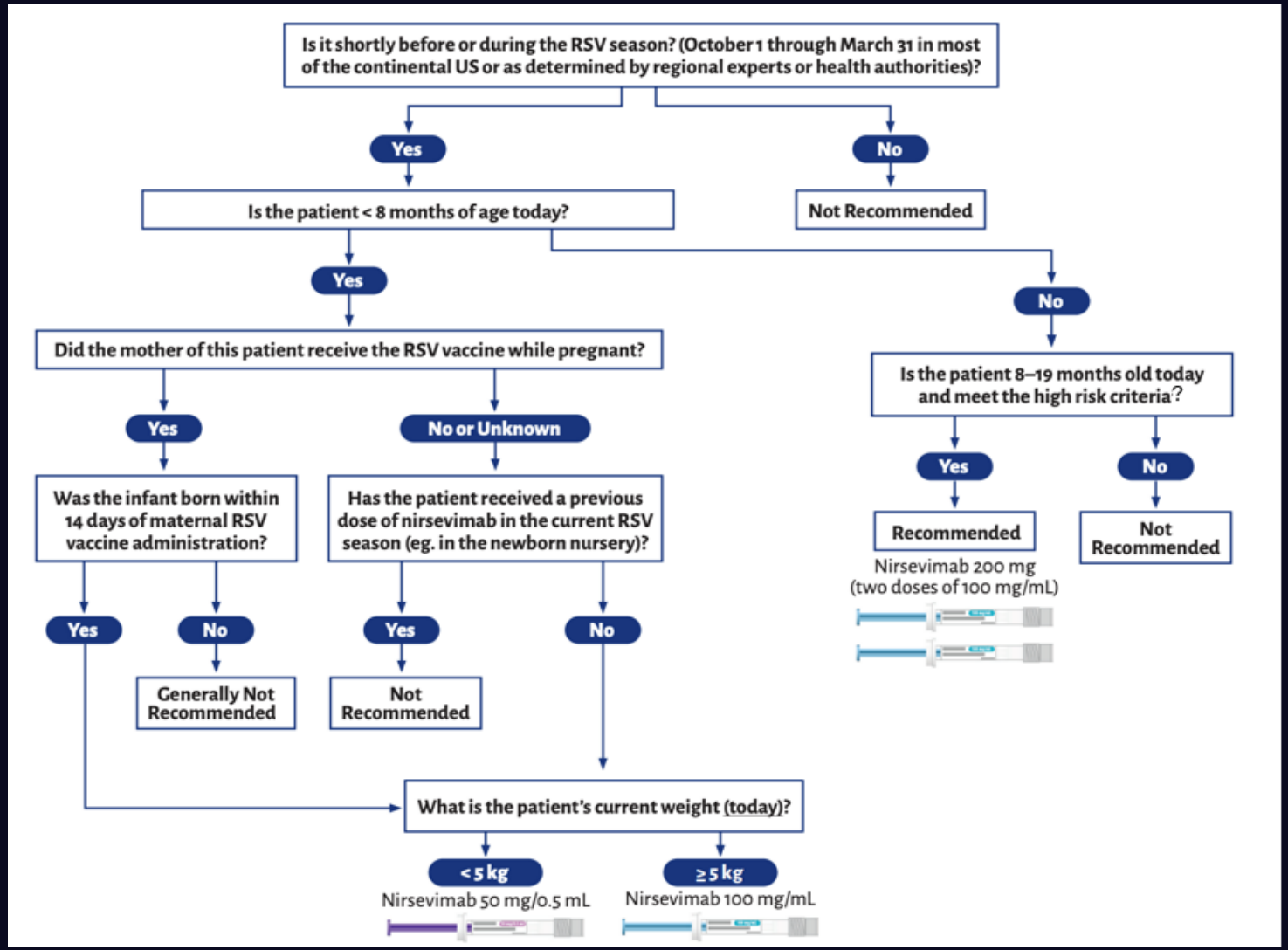
- Maternal vaccine administered to pregnant women between 32 and 36 weeks gestation in OB/GYN practice
- Single dose
- Vaccine efficacy (VE) based on Phase 3 clinical trials:
  - 81.8% against severe medically attended lower respiratory tract illness due to RSV in infants from birth through first 90 days of life.
  - 57.1% against severe medically attended lower respiratory tract illness due to RSV in mothers from birth through first 90 days of life
  - 69.4% vaccine efficacy through first 6 months of life in infants
  - 51.3% vaccine efficacy through first 6 months of life in mothers

https://www.science.org/content/article/fda-advisers-agree-maternal-rsv-vaccine-protects-infants-divided-safety; www.cdc.gov

RSV PreF Vaccine (Pfizer)

- Recommendations for the use of this vaccine have been expanded.
- This vaccine can also be administered to immunocompromised patients ≥18 years of age who are at increased risk for severe RSV disease
- Vaccine may be coadministration with all other recommended adult vaccines. This is encouraged and acceptable.

Guidelines for Administration of Nirsevimab RSV Monoclonal Ab



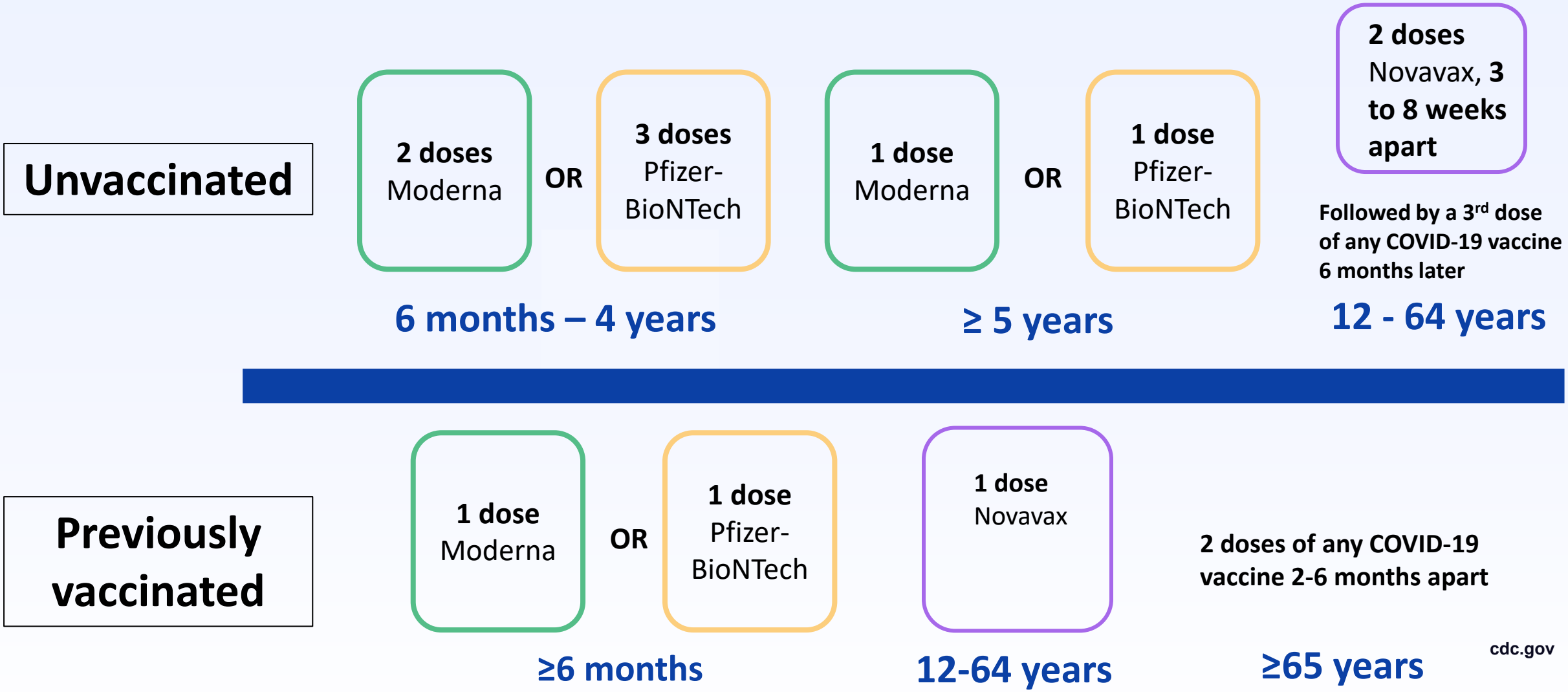
www.cdc.gov

COVID-19

- In the US, since the start of the COVID-19 pandemic, there have been over 103.5 million persons that have been infected of which over 84 million were adults. This has resulted in over 1.14 million deaths in the adult population.
- Persons of any age with underlying conditions are at increased risk for severe disease, complications, and hospitalization if they become infected with the COVID-19 virus.
- 10% of persons who have been infected with the COVID-19 virus (mild to severe) continue to have moderate to severe symptoms that persists for multiple months after recovering from an acute COVID-19 infection – long COVID. Women, persons aged 35-49 years and Hispanic ethnicity have the highest rates.
- COVID-19 vaccine is protective with less than 3.5% of vaccinated persons (primary series) developing long COVID.
- The negative economic, emotional and psychologic impact of the COVID-19 pandemic has been significant.
- COVID-19 Omicron subvariants continue to emerge and circulate – currently the most common are: KP.3.1.1 (44%), followed by XEC (38%), and MC.1 (6%). Other subvariants of omicron that are circulating, including LB.1, KP.2, and KP.3.

www.CDC.gov

2024 – 2025 COVID-19 vaccine recommendations for COVID-19 vaccines



cdc.gov

Note: Those ages 6 months – 4 years who have previously received a single dose of Pfizer-BioNTech would need 2 additional doses. Additional doses are recommended for persons with immunocompromising conditions.

Pneumococcal Disease

- *Streptococcus pneumoniae* is a major bacterial cause of otitis media, pneumonia, meningitis and sepsis worldwide accounting for 1 million childhood deaths each year
- In the US prior to the licensure of PCV7, there were 65,000 cases of invasive pneumococcal disease (IPD) that occurred each year

  - 25% of the disease occurred in children < 5 years of age (highest incidence in children < 2 years)

  - over 80% of the disease in this group was caused by the 7 serotypes in PCV7

- With the introduction of PCV7 in 2000, and PCV13 in 2010, the overall rates of bacteremia, pneumonia, and meningitis have significantly decreased among all age groups.

Tan TQ. Clin Microbiol Rev. 2012 Jul; 25(3): 409–419

Pneumococcal Disease

- However, with the emergence of non-PCV13 serotypes, IPD continues to be an important cause of illness and death with an estimated 400,000 hospitalizations and 3,250 deaths occurring among persons of all ages each year. In 2019 (pre-pandemic), it is estimated that there were 30,300 cases of IPD and 3,000 deaths in adults.
- Young children < 5 years of age and person ≥ 65 years of age have the highest incidence of serious disease
- Approximately 91% of IPD cases (pneumonia, meningitis, and bloodstream infections) occur in adults, especially those ≥ 50 years of age
- 10-30% of adult patients with pneumonia will also have bacteremia and the mortality rate for bacteremic pneumonia is 24.4% vs. 9.7% for non-bacteremic pneumonia

Conditions and other factors that increase someone's risk for pneumococcal disease

- Alcoholism
- Cerebrospinal (around the brain and spinal cord) fluid leak
- Chronic heart, kidney, liver, or lung disease
- Cigarette smoking
- Cochlear implant (a surgically implanted device to help people with severe hearing loss hear)
- Diabetes
- Chronic lung disease includes chronic obstructive pulmonary disease (COPD), emphysema, and asthma.
- Older age (50 years of age and older)
- Immunocompromising conditions that weaken the immune system
- Functional and anatomic asplenia
- Disease or condition treated with medicine that weakens the immune system (including for cancers and solid organ transplant)
- HIV infection
- Kidney failure requiring maintenance dialysis or nephrotic syndrome (a kidney disorder)
- Sickle cell disease or other inherited blood disorders

Active Bacterial Core Surveillance (ABCs) Report
Emerging Infections Program Network
Streptococcus pneumoniae, 2022

ABCs Areas: California (3 county San Francisco Bay area); Colorado (5 county Denver area); Connecticut; Georgia (20 county Atlanta area); Maryland (6 county Baltimore area); Minnesota; New Mexico; New York (15 county Rochester and Albany areas and children <5 years in Erie county); Oregon (3 county Portland area); Tennessee (20 counties).

ABCs Population: The surveillance areas represent 35,040,342 persons. Source: Census Bureau's Vintage 2022 population estimates.

ABCs Case Definition: Disease is defined as isolation of *S. pneumoniae* from a normally sterile site or detection of pathogen-specific nucleic acid in a specimen obtained from a normally sterile body site, using a validated molecular test in a resident of one of the surveillance areas.

ABCs Methodology: ABCs personnel routinely contacted microbiology laboratories serving acute care hospitals to identify cases. Standardized case report forms that include information on demographic characteristics, clinical syndrome, and outcome of illness were completed for each identified case. Whole genome sequencing (WGS) based characterization was conducted on all pneumococcal isolates, which includes deduction of capsular serotype and minimum inhibitory concentration (MIC) predictions (including PBP typing system for determining beta lactam antibiotic MICs). Conventional MIC testing is conducted on selected strains. Regular laboratory audits assessed completeness of active surveillance and detected additional cases.
Rates of invasive pneumococcal disease were calculated using population estimates from the Vintage 2022 file. For national estimates, race- and age-specific rates of disease were applied from the aggregate surveillance area to the age and racial distribution of the U.S. population. Cases with missing data, excluding ethnicity, were multiply imputed using sequential regression imputation methods.¶

ABCs Profiles

Race	No.	Rate*
Black	707	12.1
White	1,959	7.9
Other	255	5.7

	Cases		Deaths	
Age (years)	No.	Rate*	No.	Rate*
<1	42	10.8	2	0.52
1	29	7.6	0	0.00
2-4	81	6.8	4	0.34
5-17	126	2.3	6	0.11
18-34	250	3.1	17	0.21
35-49	517	7.4	39	0.56
50-64	884	13.2	118	1.78
65-74	536	15.8	59	1.73
75-84	279	16.4	46	2.70
≥85	176	27.5	48	7.49
Total	2,920	8.3	340	0.97

*Rates are per 100,000 population for ABCs areas

¶ Surveillance Note

Missing race (n=223) data were multiply imputed using sequential regression imputation methods.

Antibiotic Susceptibility

Antibiotic	S*	I†	R‡
TMPsulfa	78.4	15.2	6.4
Erythromycin	73.8	0.3	25.8
Levofloxacin	100.0	0.0	0.0
Penicillin+	96.2	1.2	2.3
Cefotaxime	96.4	1.5	0.2
Tetracycline	89.6	0.0	10.4
Vancomycin	100.0	0.0	0.0

Based on reference lab testing of 2,429 isolates.
*Susceptible; †Intermediate; ‡Resistant based on 2022 CLSI definitions. +Penicillin CLSI breakpoints changed 2009.

National Estimates of Invasive Disease

Total Cases: 27,770 (8.3/100,000 populatio
Deaths: 3,230 (0.97/100,000 population)

Syndromes

Syndrome	No.	%
Meningitis	230	7
Bacteremia Without Focus	385	13
Bacteremia With Pneumonia	2,065	70

*Percent of Cases

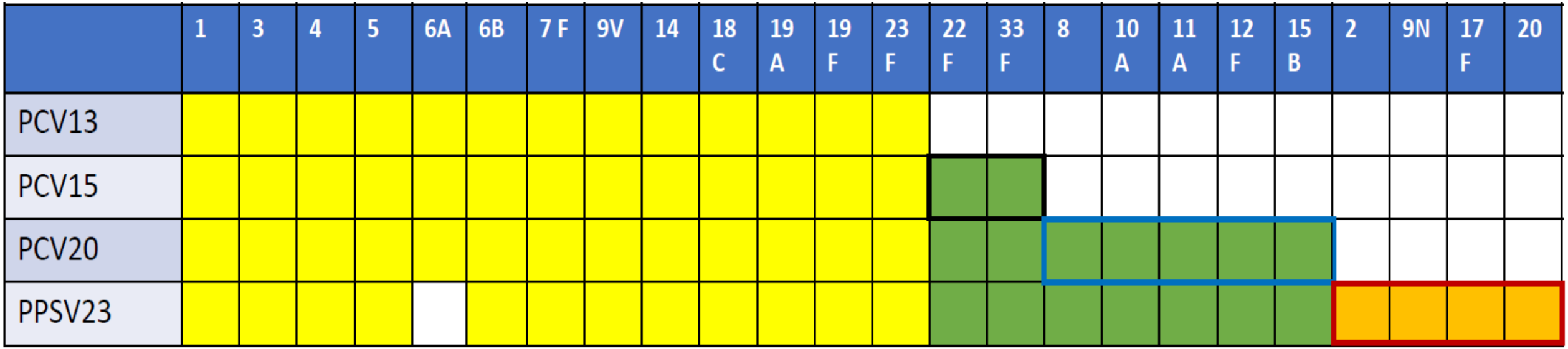
Citation

Centers for Disease Control and Prevention. 2022. Active Bacterial Core Surveillance Report, Emerging Infections Program Network, Streptococcus pneumoniae, 2022.

Pneumococcal Vaccination Rates in Persons 19-64 years and ≥65 years

Pneumococcal Vaccines (PPSV23 and PCV15 or PCV20) in persons at increased risk for disease	Coverage Rate
19 to 64 years of age	19% to 24%
≥ 65 years of age	50% to 69%

Serotypes contained in current and new pneumococcal vaccines



PCV21: 3 6A 7F 19A 22F 33F 8 10A 11A 12F 15B 17F 20A

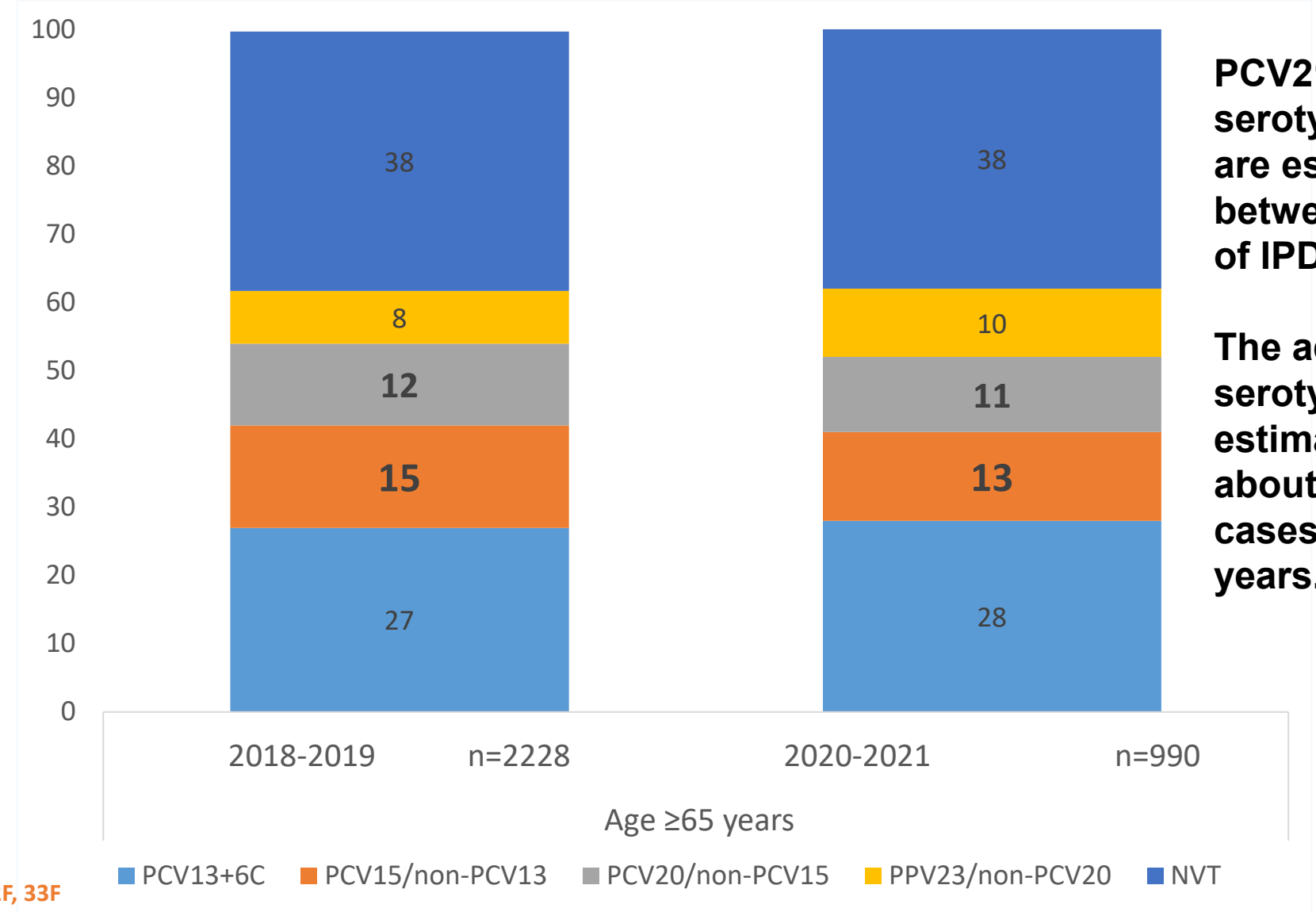
Non-PCV20 serotypes include: 9N,15A,16F, 23A, 23B, 24F, 31, 35B

PCV15 and PCV20 were licensed for use in adults in 2021. PCV21 was licensed for use in adults aged 19 and older in June 2024

- **PCV15 non-PCV13**: includes serotypes **22F and 33F**
- **PCV20 non-PCV15**: includes serotypes **8, 10A, 11A, 12F, and 15B**
- **PPSV23 non-PCV20**: includes serotypes **2, 9N, 17F, and 20**

https://www.cdc.gov/acip/grade/pcv21-adults-19-and-older.html

Additional serotypes contained in PCV15 and PCV20 caused about 15% and 27% of IPD cases in adults ≥65 years of age , respectively.



PCV21 targets serotypes that cause are estimated to cause between 77% and 85% of IPD in older adults.

The additional serotypes are estimated to cause about 30% of the IPD cases in adults ≥65 years.

https://www.cdc.gov/acip/grade/pcv21-adults-19-and-older.html

PCV15 non-PCV13 serotypes: 22F, 33F
PCV20 non-PCV15 serotypes: 8, 10A, 11A, 12F, 15B
PPSV23 non-PCV20 serotype: 2, 9N, 17F ,20
CDC Active Bacterial Core surveillance

ACIP recommendations for pneumococcal vaccines in adults aged ≥65 years

Persons who are pneumococcal vaccine naïve or whose vaccination history is unknown	Single dose PCV20, PCV21 OR PCV 15 followed by PPSV23 ≥ 1 year later
Persons who have started their pneumococcal vaccine series with PCV13 but have not received recommended PPSV23 dose	Single dose PCV20, PCV21 OR Dose of PPSV23
Persons who have completed their recommended vaccine series with both PCV13 and PPSV23	Shared clinical decision making recommended regarding use of a supplemental PCV20, PCV21 dose

PCV13: 13-valent pneumococcal conjugate vaccine, PCV15: 15-valent pneumococcal conjugate vaccine, PCV20: 20-valent pneumococcal conjugate vaccine, PCV21: 21-valent pneumococcal conjugate vaccine, PPSV23: 23-valent pneumococcal polysaccharide vaccine

https://www.cdc.gov/vaccines/vpd/pneumo/downloads/pneumo-vaccine-timing.pdf

ACIP recommendations for pneumococcal vaccines in adults aged 19-64 years with risk conditions

Persons who are pneumococcal vaccine naïve or whose vaccination history is unknown	Single dose PCV20/PCV21 OR PCV 15 followed by PPSV23 ≥ 1 year later
Persons who have started their pneumococcal vaccine series with PCV13 but have not received all recommended PPSV23 doses	Single dose PCV20/PCV21 OR ≥ 1 dose of PPSV23
Persons who have received PPSV23 only	Single dose PCV20/PCV21 OR Single dose PCV15 If it has been ≥1 year since receiving PPSV23
Persons who are hematopoietic stem cell transplant (HSCT) recipients	Recommended to receive 4 doses of PCV20/PCV21 starting 3-6 months after HSCT. Administer 3 doses of PCV20/PCV21, 4 weeks apart. Adminster the 4th PCV20 dose ≥6 months after the 3rd dose or ≥ 12 months after HSCT, whichever is later. IF PCV20/PCV21 not available, give 3 dose PCV15 4 weeks apart, followed by a single dose of PPSV23 ≥ 12 months after HSCT

PCV13: 13-valent pneumococcal conjugate vaccine, PCV15: 15-valent pneumococcal conjugate vaccine, PCV20: 20-valent pneumococcal conjugate vaccine, PCV21: 21-valcent pneumococcal conjugate vaccine, PPSV23: 23-valent pneumococcal polysaccharide vaccine

https://www.cdc.gov/vaccines/vpd/pneumo/downloads/pneumo-vaccine-timing.pdf

Universal Influenza Vaccine

Vaccination against influenza is an **efficient** and **cost-effective** way to contain influenza epidemics and **maintain public health**[a-c]

Current influenza vaccines have **limitations** because of the frequent **antigenic drifts** and antigenic shifts that occur among the influenza viral strains, leading to vaccine and circulating **viral mismatch** and **decreased vaccine effectiveness**[a,b]

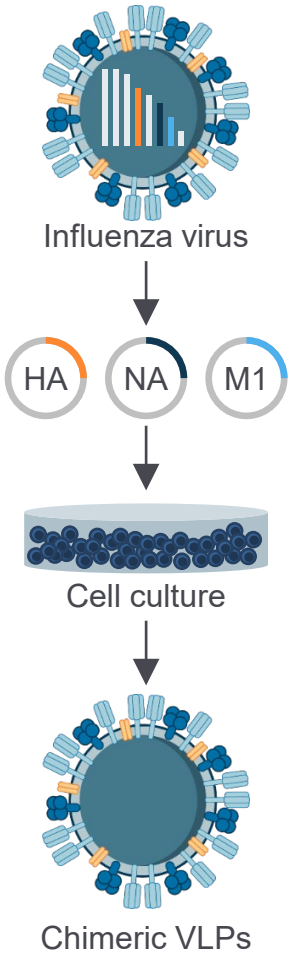
A universal influenza vaccine would provide **protection against all subtypes** of influenza viruses by providing homosubtype immunity and heterosubtype immunity, resulting in **cross-protective immunity**[a,b]

There are several **novel platforms** in clinical development that are being used in the development of a universal influenza vaccine[a,b]

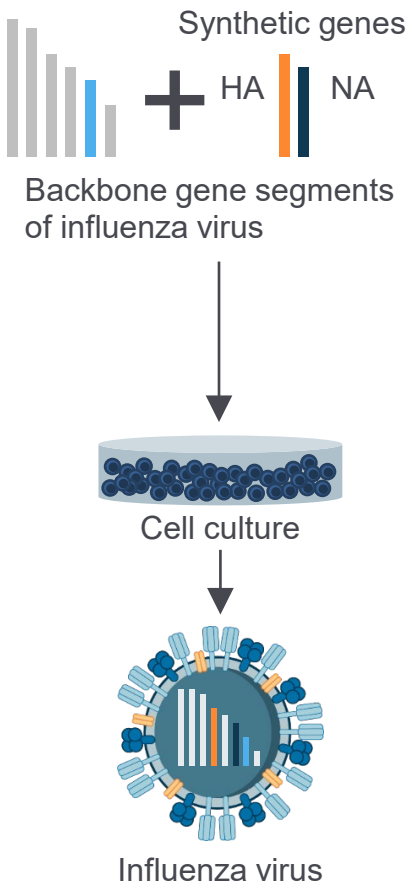
a. Kumar A, et al. Front Immunol. 2018;9:600; b. Wang WC, et al. Viruses. 2022;14:1684; c. Wei CJ, et al. Nat Rev. 2020;19:239-252.

Approaches to Universal Influenza Vaccine Development

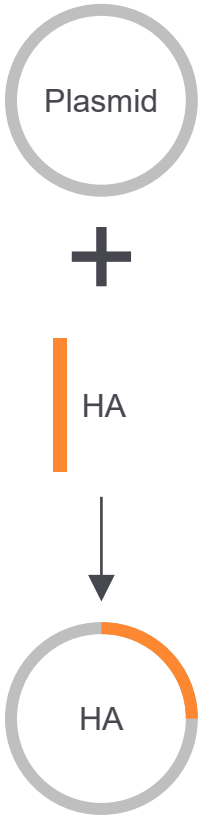
Virus-like particles (VLPs) platform



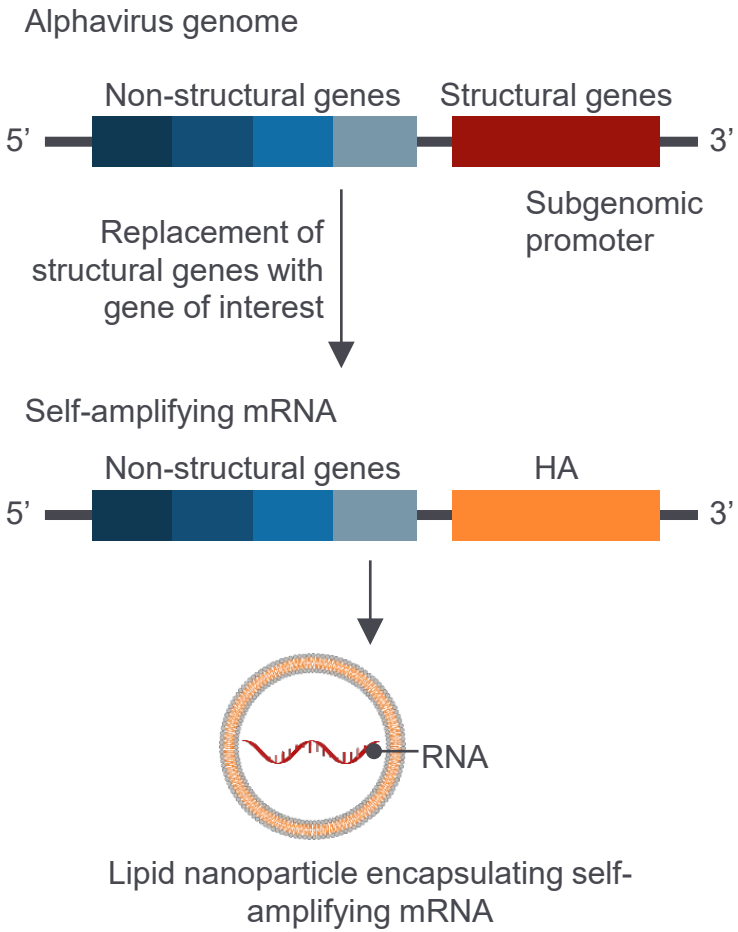
Synthetic virus platform



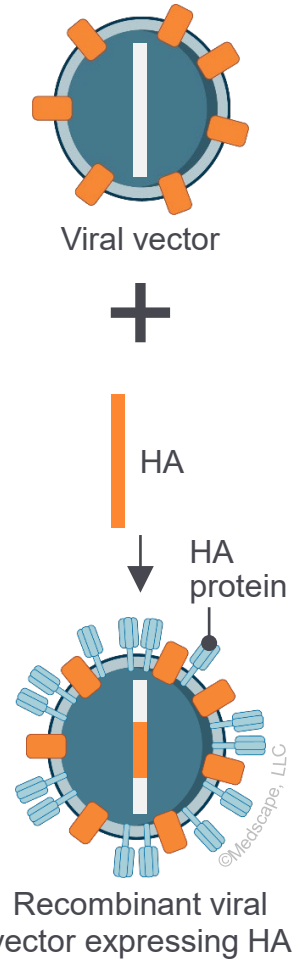
DNA vaccine platform



RNA vaccine platform: Self-amplifying mRNA technology



Viral vector platform



M1, matrix protein 1; mRNA, messenger RNA; NA, neuraminidase; VLP, virus-like particle.

Kumar A, et al. Front Immunol. 2018;9:600, Wei CJ et al. Nature Reviews.2020;19:239252

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Combination Vaccines in Development

Influenza and COVID-19 Combination Vaccine

- Produced by Pfizer and BioNTech and Moderna
- Novel combination vaccine which combines Pfizer's quadrivalent modRNA-based influenza vaccine candidate (Phase 3 trials) with their Omicron-adapted bivalent COVID-19 vaccine based on BA.4/BA.5 using mRNA platform technology
- Currently in Phase I/2 trials which is evaluating safety, tolerability, and immunogenicity

  - Given as a single dose

Influenza and RSV Combination Vaccine

- Produced by Moderna
- Currently in Phase I/2 trials

Influenza/COVID-19/RSV Combination Vaccine

- Produced by Moderna
- Novel combination of three vaccines (mRNA-1230: Influenza, RSV, and SARS-CoV-2) vaccines
- Currently in Phase I/2 trials in 675 adults aged 50 to 75 years, which is expected to completed by November 2023

Pneumococcal Vaccines in Development

Vaccine	Comments	Clinical Trial Phase
Killed whole-cell vaccine	Derived from strain RM200 and inactivated with beta propiolactone. Given as 3 dose series. Safety and immunogenicity shown in Phase 1 trials.	Phase 2 clinical trial in healthy young Kenyan adults (18 to 45 years) and toddlers (12 to 15 years)
PnuBioVax	Uses a mutated pneumococcal toxin, pneumolysin, of a serotype 4 strain that was made into a nonnnnn-toxic form. Immunogenicity of the toxin preserved so it is a potent activator of the complement system, the toll-like receptor 4 and CD4 T-cell migration. Offers the potential for broad-based protection via multiple mechanisms of action irrespective of serotype.	Phase 1 clinical trial in healthy adults (18 to 40 years) in UK. Found to be safe and immunogenic.
Protein-based vaccine, PPrV	Trivalent protein vain carrying recombined recombinant proteins, PcpA, PhtD, and PlyD1. Safety and immunogenicity shown in Phase 1 trials in adults, toddlers and infants.	Phase 2 clinical trial in pneumococcal vaccine-naïve children - vaccine was coadministered with PHiD-CV vaccine. Vaccine well tolerated and immunogenic.
Vax-24 (Vaxcyte, GSK)	24 valent, broad spectrum, carrier-sparing PCV	Phase 2 trials in adults (18-64 years of age and ≥65 years) – shown to be safe and immunogenic. Phase 3 trial set to start. Phase 2 trial in infants starting
Vax-31 (Vaxcyte, GSK)	31 valent, broad spectrum, carrier-sparing PCV; GSK vaccine is in preclinical development	Phase 1/2 clinical trials in adults (18-64 years) on going
Nanoparticle vaccines	Nanoparticles adsorbed with PspA within L-leucine microcarriers for mucosal delivery targeting the lungs. Promising candidate for the development of a universal serotype-independent vaccine.	Preclinical trials.

Muscher DM et al. Pneumonia 2022;14(5), Oliveira GS et al. Vaccines 2021, 9, 1338, investors.vaxcyte.com/news-releases/news-release-details/vaxcyte-reports-positive-data-phase-2-study-its-24-valent.

Ten Reasons For Adults to be Vaccinated

1) **Vaccine-preventable diseases have not gone away**

   The viruses and bacteria that cause illness and death still exist and can be passed on to those who are not protected by vaccines. Global travel makes it easy for diseases to spread.

2) **Vaccines will help keep you healthy**

   The CDC recommends vaccinations throughout your life to protect against many infections. When you skip vaccines, you leave yourself vulnerable to illnesses such as shingles, pneumococcal disease, flu, and hepatitis B just to name a few.

3) **Vaccines are as important to your overall health as diet and exercise**

   Vaccines play a vital role in keeping you healthy. Vaccines are one of the most convenient and safest preventive care measures available.

4) **Vaccination can mean the difference between life and death**

   Vaccine-preventable infections can be deadly. Every year in the US, prior to the COVID-19 pandemic, approximately 50,000 – 90,000 adults died from vaccine-preventable diseases. This number is considerably higher since the COVID-19 pandemic.

National Infectious Diseases Foundation; CDC

Ten Reasons For Adults to be Vaccinated

5) **Vaccines are safe**

The US has a robust approval process and monitoring process to ensure that all licensed vaccines are safe. Potential side effects associated with vaccines are uncommon and much less severe than the diseases they prevent.

6) **Vaccines will not cause the diseases they are designed to prevent**

Vaccines contain either killed pieces of bacteria or viruses or weakened viruses or bacteria, making it impossible to get the disease from the vaccine.

7) **Young and healthy people can get very sick, too**

Infants and older adults are at increased risk for serious infections and complications, but vaccine-preventable diseases can strike anyone.

8) **Vaccine-preventable diseases are expensive**

Diseases not only have a direct impact on individuals and their families, but also carry a high price tag for society as a whole. An average flu illness can last up to 15 days, typically with five or six missed work or school days. Adults who get pertussis lose an average of one month of work.

National Foundation for Infectious Diseases; CDC

Ten Reasons for Adults to be Vaccinated

9) When you get sick, your children, grandchildren, and parents may be at risk, too
   - Adults are the most common source of pertussis (whooping cough) infection in infants which can be deadly for babies. When you get vaccinated, you are protecting yourself and your family, as well as, those in your community who may not be able to be vaccinated.

10) Your family and co-workers need you
   - In the US each year, millions of adults get sick from vaccine-preventable diseases, causing them to miss work and leaving them unable to care for those who depend on them, including their children and/or aging parents.

National Foundation for Infectious Diseases; CDC

Strategies for Improving Adult Immunization Rates

- Improve and enhance healthcare system immunization registries
- Increase awareness and understanding of adult vaccine recommendations among all healthcare professionals in all specialties (HCP)
- Increase patient awareness and understanding of importance of vaccines
- Increase HCP understanding of the impact and importance that their recommendation and endorsement of vaccines has on patient acceptance. Provide training to HCP on how to provide strong recommendations to position vaccination as an integral part of patient care
- Address disparities and expand clinical support for vaccines
- Develop messaging to address common misinformation, disinformation, and antivaccine rhetoric
- Take advantage of all opportunities to vaccinate
- Endorse legislative and public policy initiatives and advocate for funding
- Mobilize the community stakeholders to address vaccine awareness, importance and access

Conclusions

- All persons of any age need vaccines to help them prevent getting and spreading serious diseases that could result in poor health, missed work, hospitalizations, complications, financial hardship, not being able to care for family, and even death.
- Preventative vaccinations are recommended throughout the lifespan and are the best method of protecting individuals against vaccine preventable diseases and the morbidity and mortality associated with them.
- New vaccines in development will have improved protection and immunity against a variety of diseases.
- Receiving preventative vaccines provide added protection against infections for everyone in the family and are an important part of keeping you healthy.


THANK YOU!