Pneumococcal Disease Prevention in At-Risk Adults: What's the Latest?

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Educational Objectives

By completing this educational activity, the participant should be better able to:

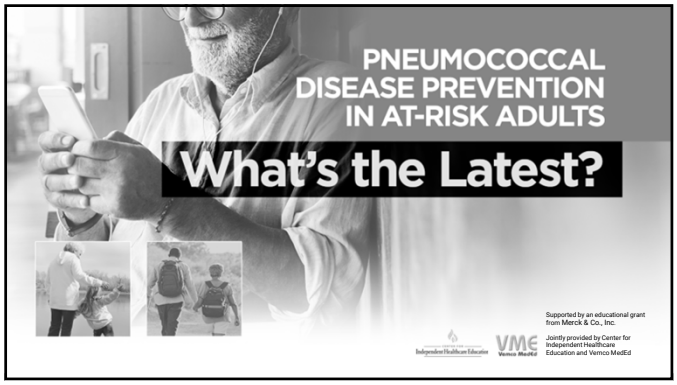
1. Assess how pneumococcal vaccine development can address the impact and burden of serotype switching.
2. Explain the latest ACIP guideline recommendations for the prevention of pneumococcal disease in at-risk adults.
3. Select an appropriate vaccine or vaccine series based on patient type to provide optimal protection against pneumococcal disease.

Speakers' Disclosures

Dr. Gravenstein has disclosed that he has received research support from Pfizer, Sanofi, and Seqirus; he is on the speaker's bureau for Catapult , GlaxoSmithKline, Longeron, Merck, Novartis, Pfizer, Sanofi, and Seqirus; he is an independent contractor for Catapult Consultants and Healthcentric Advisors; and he is on the advisory board for Longeron, Merck, and Sanofi.

Supporter Disclosure

This educational activity is supported by an educational grant from Merck & Company. It has been planned and produced by VemCo MedEd with Texas Academy of Family Physicians strictly as an accredited continuing medical education activity.



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Activity Description

Target Audience

This activity is designed as a comprehensive approach to address the practice needs of primary care providers, including primary care physicians, osteopathic physicians, physician associates, nurse practitioners, and allied healthcare professionals, who are at the forefront of caring for patients eligible for immunizations and/or at risk for vaccine-preventable diseases.

Learning Objectives

At the conclusion of the educational activity, the learner should be able to:

- Assess how pneumococcal vaccine development can address the impact and burden of serotype switching
- Explain the latest ACIP guideline recommendations for the prevention of pneumococcal disease in at-risk adults
- Select an appropriate vaccine or vaccine series based on patient type to provide optimal protection against pneumococcal disease

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Faculty and Disclosure

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Dr. Stefan Gravenstein reported the following relevant financial relationships with ineligible companies:
- Consulting: Sanofi, Merck & Co., Inc., Pfizer Inc., Novavax, VaxArt, Janssen, Moderna, GSK, Reviral, Longeveron
- Speakers Bureau: Seqirus, Sanofi, Janssen
- Research Support: Seqirus, Sanofi, Pfizer Inc., Genentech, CDC, NIH
- Advisory Board: Janssen

Dr. Gravenstein does not discuss off-label uses of any products.

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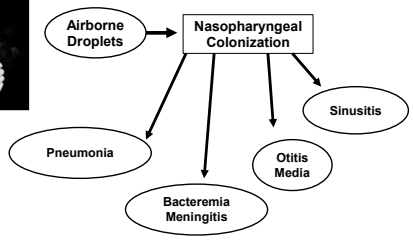
Types of Pneumococcal Disease



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Pneumococcal Disease: Scope of the Problem

PNEUMOCOCCAL DISEASE

- **Sinusitis**
- **Otitis media**
- **Pneumonia**
- **IPD**

Cases USA

- **4,000,000 cases/year**
- **445,000 hospital admissions/year**
- **22,000 deaths/year**

IPD, invasive pneumococcal disease
Centers for Disease Control and Prevention. Manual for the surveillance of vaccine-preventable diseases. http://www.cdc.gov/vaccines/pubs/surv-manual/chpt11-pneumo.html#t1.

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INVASIVE PNEUMOCOCCAL DISEASE

- **Bacteremia**
- **Meningitis**
- **Sepsis**
- **Cases USA**
  - **12.9 cases/100K**
  - **~10% case-fatality rate**
  - **More frequent in seniors, persons with chronic medical conditions**
  - **>2000 deaths/year in 65+**

IPD, invasive pneumococcal disease
Centers for Disease Control and Prevention. Manual for the surveillance of vaccine-preventable diseases. http://www.cdc.gov/vaccines/pubs/surv-manual/chpt11-pneumo.html#t1.

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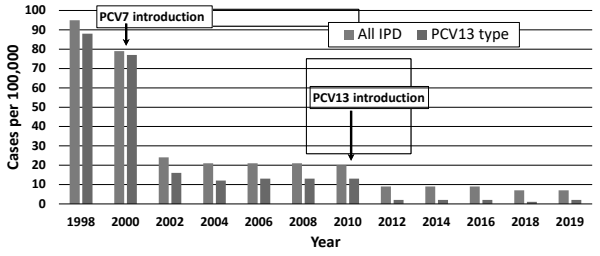
Childhood PCV and IPD: Trends in IPD among Children <5 years old



Centers for Disease Control and Prevention. Surveillance and reporting. https://www.cdc.gov/pneumococcal/surveillance.html.

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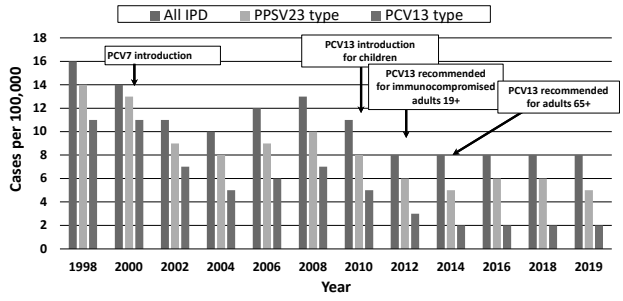
Childhood PCV and IPD: Adults 19-64 Years



Centers for Disease Control and Prevention. Surveillance and reporting. https://www.cdc.gov/pneumococcal/surveillance.html.

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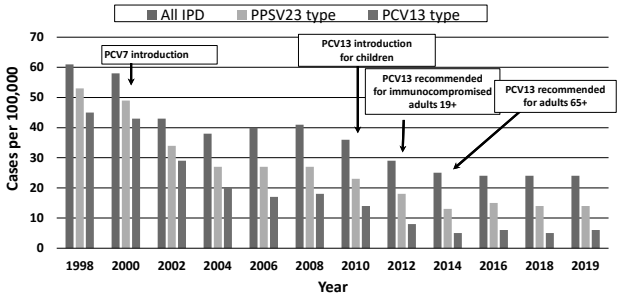
Childhood PCV and IPD: Adults ≥65 Years



Centers for Disease Control and Prevention. Surveillance and reporting. https://www.cdc.gov/pneumococcal/surveillance.html.

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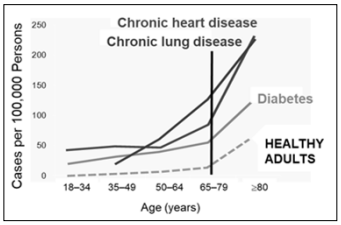
Incidence of Pneumococcal Disease Increases With Age and Certain Chronic Conditions

Incidence of IPD — United States, 1999–2000



Diabetes mellitus
3X the risk of IPD compared with that in healthy adults

Chronic heart disease
6X the risk of IPD compared with that in healthy adults

Chronic lung disease
6X the risk of IPD compared with that in healthy adults

Adapted from Kyaw MH, et al; Active Bacterial Core Surveillance Program of the Emerging Infections Program Network. *J Infect Dis.* 2005;192(3):377-386.

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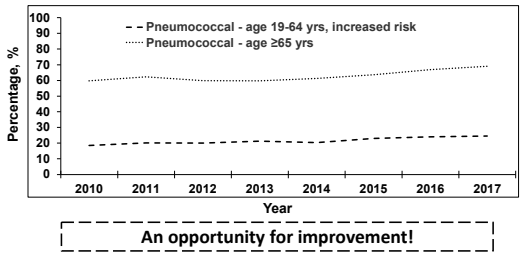
Adult Vaccination Rates Remain Low



An opportunity for improvement!

Vaccination Coverage among Adults in the United States, National Health Interview Survey, 2017: CDC https://www.cdc.gov/vaccines/imz-managers/coverage/adultvaxview/pubs-resources/NHIS-2017.html.

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Pneumococcal Vaccines

PPSV23
- Purified capsular polysaccharide→ 'traditional' pneumococcal vaccine
- Contains 23 types—cause ~88% bacteremic pneumococcal disease
- 60%–70% effectiveness vs. invasive disease
  - Challenge to assess prevention of pneumococcal pneumonia
- Immunity lasts at least 5 years following 1 dose
- FDA-approved for all persons ≥2 years at increased risk for pneumococcal disease
- Local reactions – only common adverse event

PCV13
- Conjugate vaccine – more immunogenic
- Replaced PCV7 for childhood immunization [6 wk–6 yr] in 2010
- 2011 FDA-approved for adults >50 years: prevent pneumonia, IPD
  - Based on immunogenicity and safety studies
- 2012 ACIP recommends PCV: IPD prevention, highest-risk adults
  - Highest risk based on anatomic and immunocompromised
  - Best practice: give BEFORE PPSV23
- 2014 ACIP recommends PCV/PPS combination strategy in aged 65+
- Local reactions – only common adverse event

CDC. *MMWR Morb Mortal Wkly Rep.* 2012;61(21):394-395.
CDC. *MMWR Morb Mortal Wkly Rep.* 2014;63(37):822-5.

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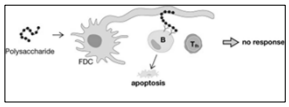
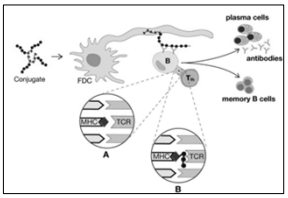
Immunogenicity of Pneumococcal Vaccines

Polysaccharide vaccines do not engage T cells, resulting in diminished immune response





Conjugate vaccines involve both B cells and T cells

- **Leads to affinity maturation and proliferation of plasma cells (produce antibodies) and memory B cells (long-term immunity)**

FDC, follicular dendritic cell; MHC, major histocompatibility complex; TCR, T cell receptor
Rappuoli R, et al. *PNAS*. 2019;116:14-16.

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PCV13 Adult Vaccine Effectiveness

CAPiTA Study

- Placebo-controlled RCT of PCV13 in unimmunized adults 65+ years
  - Netherlands
    - No routine pneumococcal vaccine in adults
    - PCV7 in Dutch infants since 6/2006, then PCV10 in March 2011
- Over 84,000 participants enrolled 9/2008–1/2010; follow-up thru 8/2013
- Vaccine Efficacy:
  - 45.6% for CAP due to vaccine-type strain
  - 45.0% for non-invasive/non-bacteremic CAP
  - 75.0% for invasive pneumococcal disease

CAP, community-acquired pneumonia
Bonten MJ, et al. *N Engl J Med*. 2015;372:1114-25.

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A New Day for Pneumococcal Disease Prevention

- New pneumococcal vaccines
- Simplified vaccine recommendations
- An opportunity to recharge vaccine efforts

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Pneumococcal Vaccination 2022

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New Pneumococcal Vaccination Recommendations: Adults

PCV 15

1 year later

PPSV23

-or-

PCV 20

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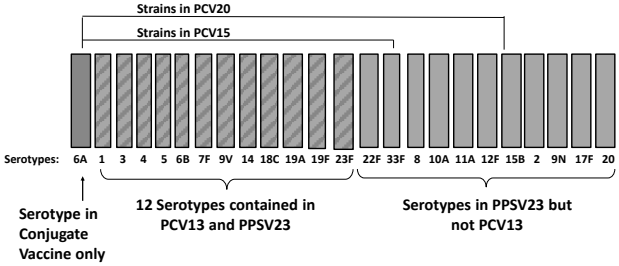
Pneumococcal Serotypes in PPSV23 and PCV13



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Pneumococcal Vaccination: Adults

- **Pneumococcal infections result in significant morbidity and mortality**
  - Disease rates declining in children more than adults since conjugate vaccines developed
  - Introduction of conjugate vaccine in adults with lesser population impact
- **New simplified adult immunization recommendations**
  - Prior guidelines still in place for previously vaccinated <65 yo with chronic disease
- **Development of new conjugate vaccines**
  - Conjugate vaccines result in more potent immune response
  - Expanded serotypes in new vaccine
  - Opportunity to simplify recommendations
  - Impact on disease rates will need to be monitored

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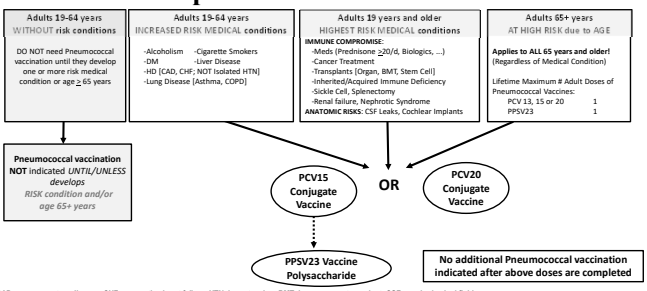
Adult Pneumococcal Vaccine: Risk Groups And Recommendations 2022



CAD, coronary artery disease; CHF, congestive heart failure; HTN, hypertension; BMT, bone marrow transplant; CSF, cerebral spinal fluid

Kobayashi M, et al. *MMWR Morb Mortal Wkly Rep.* 2022;71(4):109-117.

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Previous Pneumococcal Vaccination

- Received PPSV23 → May give PCV15 or PCV20 at least 1 year after last PPSV23
  - Do not need additional PPSV23

PPSV 23 → **≥1 year later** → **PCV 15 or PCV20**

CDC Pneumococcal Vaccine Timing; Accessed: Feb 2022 - https://www.cdc.gov/vaccines/vpd/pneumo/downloads/pneumo-vaccine-timing.pdf.

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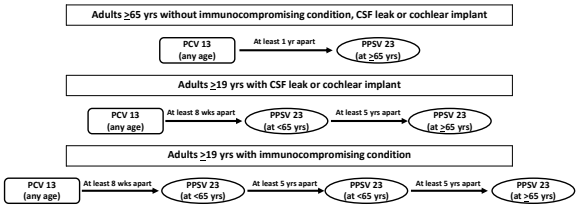
Previous Pneumococcal Vaccination

- **Received PCV13 ± PPSV23 → Complete PPSV23 per previous recommendations**
  - Benefit of PCV15 or PCV20 to adults who received PCV13 ± PPSV23 is not known



CDC Pneumococcal Vaccine Timing; Accessed: Feb 2022 - https://www.cdc.gov/vaccines/vpd/pneumo/downloads/pneumo-vaccine-timing.pdf.

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Patient Case

Joe, 66 yo

- No current health concerns
- Here for Initial Medicare Wellness visit
- PMH: No medical issues, takes no medications
- Immunizations: **No previous pneumococcal vaccine**

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Patient Case

What are your pneumococcal vaccine recommendations?

PCV20 today

OR

PCV15 today and PPSV23 in 1 year

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Patient Case

Mary, 51 yo

- Has HTN but here for preop consult prior to left mastectomy for breast cancer
- Recent diagnostic mammography, core biopsy + invasive ductal carcinoma
- Will start chemotherapy soon
- Immunizations: **No previous pneumococcal vaccines**

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Patient Case

What are your pneumococcal vaccine recommendations?

PCV20 today

OR

PCV15 today and PPSV23 in 1 year

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Pneumococcal Immunization: Patients with Immune Suppression

Patient Populations

- Congenital or Acquired Asplenia
- Sickle Cell Disease (and other Hemoglobinopathies)
- Congenital or Acquired Immunodeficiency
- Generalized Malignancy
- HIV Infection
- Hodgkin Disease
- Iatrogenic immunosuppression
- Leukemia
- Lymphoma
- Multiple Myeloma
- Chronic Renal Failure
- Nephrotic Syndrome
- Solid Organ Transplant

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Immune Suppression and Prior Pneumococcal Immunization

Includes splenectomy, sickle cell

Prior Adult Vaccine [If unknown, assume none]	Next Pneumococcal Vaccination*	Additional Pneumococcal Vaccine Doses
None	PCV15 -OR- PCV20	PPSV23 in 1 year ONLY IF initial vaccine was PCV15
PCV13	PPSV23	PPSV23 in 5 years if not yet >60 years, final PPSV23 after age 65 years and at least 5 years after 2nd dose PPSV23
PPSV23	PCV15 -OR- PCV20	NONE
PCV13 + PPSV23	PPSV23 IF last PPSV23 > 5 years ago	PPSV23 at least 5 years later and after age 65 years only if last dose was given before age 65 years
PCV13 + PPSV23 + PPSV23	PPSV23 IF last dose given 5+ years ago was before age 65 and now 65+ years	
PCV15	PPSV23	NONE
PCV20	None	NONE

*At least 1 year after prior Pneumococcal vaccine dose

Kobayashi M, et al. *MMWR Morb Mortal Wkly Rep.* 2022;71(4):109-117.

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Patient Case

Aisha, 28 yo

- Here for annual checkup, follow up of Sickle Cell Disease
- Immunizations: **up to date**

Vaccine	Date
Influenza	11/14/2019, 10/13/2021
Pneumococcal	PCV13 8/1/2019 PPSV23 11/12/2019
Meningococcal	MCV4 8/1/2019 MenB 8/1/2019
HiB	[Childhood series]

MCV, meningococcal conjugate vaccine; MenB, meningococcal B vaccine; HiB, Haemophilus influenzae type b

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Patient Case

What pneumococcal immunization is recommended?

Vaccine	Date
Influenza	11/14/2019, 10/13/2021
Pneumococcal	PCV13 8/1/2019 PPSV23 11/12/2019
Meningococcal	MCV4 8/1/2019 MenB 8/1/2019
HiB	[Childhood series]

PPSV23 is recommended in 2024 and final dose after age 65 years

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PCV20	None	NONE

*At least 1 year after prior Pneumococcal vaccine dose

Kobayashi M, et al. *MMWR Morb Mortal Wkly Rep.* 2022;71(4):109-117.

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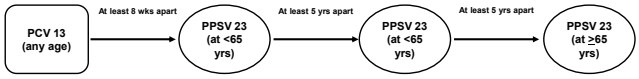
Immunizations: Adults ≥19 yrs with Immunocompromising Condition



CDC Pneumococcal Vaccine Timing; Accessed: Feb 2022 - https://www.cdc.gov/vaccines/vpd/pneumo/downloads/pneumo-vaccine-timing.pdf.

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Immunization in Sickle Cell, Splenectomy

- **Splenic dysfunction/splenectomy = lifelong increased risk for invasive infection with encapsulated bacteria**
  - *Streptococcus pneumoniae*
  - *Hemophilus influenzae*
  - *Neisseria meningitidis*
- **Immunization against these pathogens is important to reduce risk**
- **Best case**
  - Complete childhood immunization
  - Initial immunization prior to Splenectomy
    - Pneumococcal conjugate vaccine
    - Pneumococcal polysaccharide vaccine [if conjugate vaccine was not PCV20]

Lee GM. *Hematology Am Soc Hematol Educ Program.* 2020;1:328–335.

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Patient Case

Nabil, 73 yo

- Here for follow up of diabetes and hypertension
- Immunizations:

Vaccine	Date
Pneumococcal [PPSV23]	2/22/2017

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Patient Case

What vaccine could you consider?

Vaccine	Date
Pneumococcal [PPSV23]	2/22/2017

PCV20 today

Or

PCV15 today

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Pneumococcal Immunization in Older Adults

- **Older adults [65+ years] are at increased risk for Pneumococcal infection regardless of other medical conditions**
  - Immunization can help mitigate this risk
- **New recommendations**
  - Recognize prior vaccination
  - Assure ongoing protection for those with prior vaccines and those without

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Pneumococcal Immunization for Adults 65+

How do I 'problem solve' patients with prior Pneumococcal Vaccination?

Prior Adult Vaccine [If unknown, assume none]	Next Pneumococcal Vaccination*	Additional Pneumococcal Vaccine Doses
None	PCV15 -*OR*- PCV20	PPSV23 in 1 year ONLY IF initial vaccine was PCV15
PCV13	PPSV23	None
PPSV23	PCV15 -*OR*- PCV20	None
PCV13 + PPSV23	PPSV23 IF last PPSV23 > 5 years ago + before 65	None
PCV13 + PPSV23 + PPSV23	PPSV23 IF last PPSV23 > 5 years ago + before 65	
PCV15	PPSV23	None
PCV20	None	None

*At least 1 year after prior Pneumococcal vaccine dose

Kobayashi M, et al. *MMWR Morb Mortal Wkly Rep.* 2022;71(4):109-117.

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Operational Considerations: Pneumococcal

- **Education:**
  - Team update: all on same page for pneumococcal vaccine use
  - Patients: understand benefits of prevention and health value. Vaccines are a medical recommendation
- **Formulary:**
  - Choose a Conjugate Vaccine product [PCV15 or PCV20]
  - *At least in the short term* will need some PPSV23
- **Vaccines, administration fees should be covered by all insurers**
  - Include public [MCARE, MCD] and private plans [ACA]
- **Collaborate:**
  - Community Immunizers, Pharmacies

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Vaccine Safety

- No vaccine is 100% safe…nothing is
  - Vaccines can cause injection site pain, sore arm, redness, fever
  - Nearly all vaccine side-effects are **very mild**
- The risk of serious adverse event from disease is *far* greater than from vaccination
- We are at far greater risk of an adverse outcome from riding in a car, crossing the street, choking on food…than from a vaccine

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Vaccine Safety Monitoring

- **Extensive safety monitoring**
  - Post-licensure manufacturer monitoring
  - Vaccine Adverse Event Reporting System (VAERS) and FDA
  - Vaccine Safety Datalink by CDC
- **The system works…**
  - Vaccines found to be extremely safe
  - Most safety issues are of limited clinical significance

Vaccine Safety Datalink Sites

Tau N, et al. *Ann Intern Med.* 2020;173(6):445-449.

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Things That Provoke Doubt in Patients

- **Follow invalid contraindications to immunization**
  - Low-grade fevers
  - Mild illness
- **Providing reading material rather than recommending**
- **Clinical team providing different recommendations**
- **Not giving a strong and clear recommendation**

American Academy of Pediatrics: Countering Vaccine Hesitancy. Accessed at: https://publications.aap.org/pediatrics/article/138/3/e20162146/52702/Countering-Vaccine-Hesitancy.

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Reminder, for the Majority of People

Start with a strong, consistent **presumptive** recommendation:

"I recommend the pneumococcal vaccine."

Rather than the participatory approach:

"Do you want to get a pneumococcal vaccine?"

Opel DJ, et al. *Pediatrics.* 2013;132(6):1037-1046.

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https://www.who.int/emergencies/ten-threats-to-global-health-in-2019

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WHO: 10 Threats to Global Health in 2019

1. Air pollution and climate change
2. Noncommunicable chronic disease
3. Global influenza pandemic
4. Fragile and vulnerable settings
5. Antimicrobial resistance
6. Ebola and other high-threat pathogens
7. Weak primary health care
8. **Vaccine hesitancy**
9. Dengue
10. HIV

https://www.who.int/emergencies/ten-threats-to-global-health-in-2019

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Summary

- *Vaccine recommendation fatigue* is felt by both clinicians and patients
- Do not take it personally!
- Keep the conversation going

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Open Forum: Q&A

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Notes