

Adult Immunization 2019: Risk-Based Update

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Objectives

- Guidelines:
 - Where do the recommendations come from
 - Tools to support your practice
- Focus Populations
 - 'Advanced Age'
 - Chronic Medical Issues [NO IS]
 - Risks based on 'life choices'
 - Immune Suppressed
 - Health Care Providers
- Putting it together
 - Standards
 - Team-based immunization

Adult Immunization Guidelines

ACIP: Annual Update, Age & Risk Based IDSA: Details re: Highest Risk

Table 2 Recommended Adult Immunization Schedule by Medical Condition and Other Indications
Updated Status: 2018

Condition	Age Group	Primary	Booster	Notes
DIPHTHERIA, TETANUS, AND PERTUSSIS (DTaP)	6 weeks to 6 years	3 doses	1 dose	DTaP-1, DTaP-2, DTaP-3
	11-12 years	1 dose	1 dose	Tdap-AC
POLIO (IPV)	12 weeks to 5 years	4 doses	0	IPV-1, IPV-2, IPV-3, IPV-4
	11-12 years	1 dose	0	IPV-5
HEPATICITIS A (HAV)	12 months to 59 years	2 doses	0	1st dose, 2nd dose (6-12 months later)
	60 years and older	1 dose	0	1 dose
HEPATICITIS B (HBV)	12 months to 59 years	3 doses	0	1st dose, 2nd dose (1-2 months), 3rd dose (4-6 months)
	60 years and older	1 dose	0	1 dose
PNEUMOCOCCAL (PPSV23)	65 years and older	1 dose	1 dose	1st dose, 2nd dose (5 years later)
	19-64 years with certain conditions	1 dose	0	1 dose
ZOSTER (Shingles)	50 years and older	1 dose	0	1 dose
	19-49 years with certain conditions	1 dose	0	1 dose

2013 IDSA Clinical Practice Guideline for Vaccination of the Immunocompromised Host

Key Points: Vaccinate immunocompromised patients, immunocompetent contacts, immunocompetent contacts, immunocompetent contacts, immunocompetent contacts.


2 Complimentary evidence-based guidelines: support immunization practice, disease prevention.

Tools to support Immunization Practice

- Apps
 - <https://www.cdc.gov/vaccines/schedules/hcp/schedule-app.html>
 - <http://www.immunize.org/resources/apps.asp>
 - CDC Health Information for International Traveler
 - CDC Vaccine Schedules
 - The Vaccine Handbook
- Websites
 - <https://www.cdc.gov/vaccines/schedules/index.html>
 - <http://www.immunize.org/>
 - <https://www.idsociety.org/Templates/Content.aspx?id=32212256011>
 - <https://www.aqponline.org/clinical-information/clinical-resources/products/adult-immunization>
 - <https://www.aafp.org/patient-care/public-health/immunizations/schedules.html>

Healthy Young...

Young adults without chronic medical issues



- Childhood and Adolescent vaccination
 - Ongoing challenges of vaccine hesitance, resistance
 - Places individuals and society at risk
 - Community Immunity required to protect most vulnerable in society
 - Childhood/Adolescent vaccination outside scope of this talk...
 - Recent introduction of legislation to allow 'emancipated vaccination' of teens is intriguing...
- Pregnant women
 - Assure optimal health, minimize risks for mom, baby
 - Prior to pregnancy: (hope for) immunized and protected

<https://www.cdc.gov/vaccines/schedules/hcp/imz/child-adolescent.html>

Age Based Immunization: Vaccines which should have been completed in childhood but may impact adult medical practice...

- MMR**
 - MMR: 2 doses for HCW*, all adults born after 1957 **unless IC** [Live-virus vaccine]
 - Measles is most contagious viral VPD- w/o high level immunity, outbreaks **WILL** continue...
- Varicella**
 - VARicella: 2 doses for HCW*, all adults born after 1980 **unless IC** [Live-virus vaccine]
 - Prevent Varicella and associated complications...
 - Vaccinated patients w/o wild-type disease not at risk to develop Zoster.
- HPV**
 - HPV: Cancer-Prevention Vaccine [2 doses if vax @ 9-14 years, 3 doses @ 15+ years]
 - Underutilized, safe, highly effective
 - Ineffective for strains patient exposed to prior to vaccination...
 - Indications:
 - All women aged 9-26 years
 - All men aged 9-21 years + highest risk 22-26 [MSM, HIV, Immunosup.]
 - [FDA approved to age 45 years- ACIP to evaluate evidence]
 - *Without evidence of immunity:
 - Serologic evidence of Immunity
 - Documentation of prior appropriate vaccination
 - Verification of Varicella or Zoster by a HCP

<https://www.cdc.gov/vaccines/schedules/index.html>

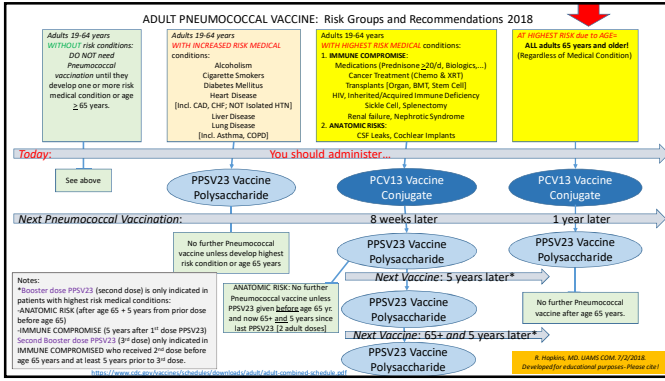
Immunizations Recommended in Pregnant Women

- Influenza Annual**
 - Influenza: [every pregnancy] **Annual**
AAAA Vaccine (=All Adults And kids 6+ months Annually)
No missed opportunities (Egg-allergy NOT a contraindication)
- Tetanus + Pertussis**
 - Tdap: [every pregnancy] **27-36 weeks gestation**
- OTHER= Variable**
 - Other vaccines if age and/or other medical conditions indicate need
 - MMR, VAR, ZVL CONTRAINDICATED during pregnancy Live virus vaccines
 - If MMR, VAR series incomplete, give dose after delivery and before DC from hospital
 - HPV no evidence of harm but should not be given in pregnancy, delay additional doses until after delivery

Advanced Age

65+ is artificial *but* also convenient, based on some evidence and a major societal difference...

- Biology of Aging**
 - 'Immune senescence'** and **'Inflammaging'** are real biologic phenomena
 - The human immune system undergoes significant changes based on age
 - Lifestyle, chronic disease and other factors can modify this to a degree
 - Persons at different ages/stages respond differently to vaccines and infections
- Milieu**
 - Community Immunity (~ Herd Immunity = degree of Immunity vs. particular disease in the locality) can have a major impact
 - Living situation: communal or residential care increases risk
- 'Infectivity'** and **'Potency'** of infectious agent
- Societal**
 - Insurance coverage/Cost can impact access to some vaccines
 - Physical access to vaccine/vaccinators (particular concern in areas with few healthcare providers)



Immunizations Recommended at 65+

- Influenza Annual:** Influenza: **Annual, AAAA Vaccine (=All Adults And kids 6+ months Annually)**
- Pneumococcal:** Pneumococcal: PCV13 1 dose as an adult (lifetime)
PPSV23 1 dose after age 65
No missed opportunities (but consider HD-IIV or α-IIV vs.) TIV/QIV
- Tetanus + Pertussis:** Tdap: 1 adult dose [incorporate into 'Td every 10 years' schedule]
- Shingles:** Shingles: 2 doses RZV, 2-6 mo. apart in all adults 50+ years of age [at least 2 months after ZVL in those who received that vaccine]
- OTHER=Variable:** Other vaccines: As indicated based on medical conditions...

Chronic Medical Conditions w/o IS [<65 years]
Diabetes Mellitus, Chronic Lung Disease, Chronic Heart Disease, Chronic Liver Disease

- Chronic medical conditions which result in increased risk for one or more vaccine-preventable medical condition.
- Chronic **LUNG** disease [Includes asthma, COPD]
 - Risk for Pneumococcal infections 6 fold greater than healthy adults @ similar age
- Chronic **HEART** disease [does NOT include isolated HTN]
 - Risk for Pneumococcal infections 6 fold greater than healthy adults @ similar age
- Diabetes Mellitus**
 - Risk for Pneumococcal infections up to 3 fold greater than healthy adults @ similar age
 - Risk for Hepatitis B is 2.1 fold that of adults without DM; significant # with fatty liver.
- Chronic **LIVER** disease [includes NASH, cirrhosis, chronic HBV, HCV]
 - Includes all with AST or ALT > 2 x upper limit of normal
 - Risk for Pneumococcal infections greater than healthy adults @ similar age

Immunizations Recommended in Adults with Chronic Liver Disease

- Influenza Annual:** Influenza: **Annual, AAAAA** Vaccine (=All Adults And kids 6+ months Annually)
No missed opportunities
- Pneumococcal:** Pneumococcal: **PPSV23 1 dose** [as soon as possible after diagnosis
[No more Pneumococcal vaccine *unless Condition/until Age 65+*]
- Tetanus + Pertussis:** Tdap: 1 adult dose [incorporate into 'Td every 10 years' schedule] then Td every 10 years...
- Hepatitis A+B:** Hepatitis A+B: **3 dose series in Chronic Liver Dz** [Now, 1+ mo., 6+ mo.]
(Test first vs. Primary vaccination= Provider discretion)
- OTHER= Variable:** Other vaccines: As indicated based on patient age and medical conditions...
- Shingles RZV:** Zoster (RZV): 2 doses for all age 50+

Risks based on Life Choices [Lifestyle...]

- Smoking
 - Cigarettes (ANY): 50% otherwise healthy adults <65 who develop IPD are smokers
 - Marijuana, e-cigs, other 'smoked products': No evidence-> judgement call...
- Drug use: Increased risk for blood-borne pathogens
- Alcoholism
- Living in communal setting/dormitory/barracks
- Sexual...
 - MSM
 - Lack of mutual monogamy, STD evaluation or HBV carrier partner
- Occupational [Healthcare, Public Safety]

Immunizations Recommended in Adults with Alcoholism and who Smoke Cigarettes

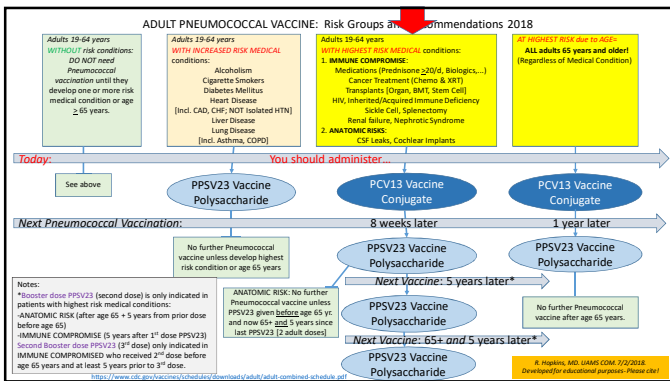
- Influenza Annual:** Influenza: **Annual, AAAAA** Vaccine (=All Adults And kids 6+ months Annually)
No missed opportunities
- Pneumococcal:** Pneumococcal: **PPSV23 1 dose** [as soon as possible after diagnosis
[No more Pneumococcal vaccine *unless Condition/until Age 65+*]
- Tetanus + Pertussis:** Tdap: 1 adult dose [incorporate into 'Td every 10 years' schedule] then Td every 10 years...
- OTHER= Variable:** Other vaccines: As indicated based on patient age and medical conditions...
(If Alcoholism with chronic liver disease, vaccinate as for CHRONIC LIVER DISEASE)
- Shingles RZV:** Zoster (RZV): 2 doses for all age 50+

Immunizations Recommended in Adults with STD Exposures, HBV in Home, Drug Use

Influenza Annual	Influenza:	Annual, AAAAA Vaccine (=All Adults And kids 6+ months Annually) No missed opportunities
Tetanus + Pertussis	Tdap:	1 adult dose [incorporate into 'Td every 10 years' schedule] then Td every 10 years...
Hepatitis B	Hepatitis B:	3 dose series [Now, 1+ mo., 6+ mo.]
Hepatitis A	Hepatitis A:	Recommended in MSM, drug use 2-3 dose series [separate vaccine or combined with HBV]
OTHER= Variable	Other vaccines:	As indicated based on patient age and medical conditions...
Shingles RZV	Zoster (RZV):	2 doses for all age 50+

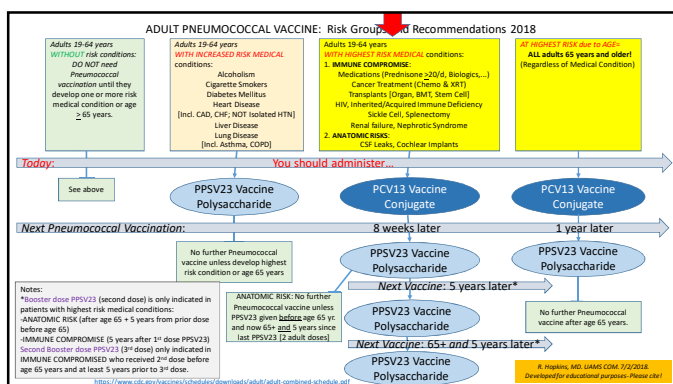
Immune Compromise

- Defects in Humoral Immunity
- Defects in Cellular Immunity
- Splenic dysfunction/absence
- Anatomic barrier defects



Immunizations Recommended in patients with Anatomic risk factors: CSF Leak, Cochlear Implant

- Influenza Annual:** Influenza: **Annual, AAAA** Vaccine (=All Adults And kids 6+ months Annually)
No missed opportunities
- Pneumococcal:** Pneumococcal: **PCV13 1 dose followed 8 weeks later by PPSV23 1 dose**
[No more Pneumococcal vaccine *unless Condition/until Age 65+*]
- Tetanus + Pertussis:** Tdap: 1 adult dose [incorporate into 'Td every 10 years' schedule] then Td every 10 years...
- OTHER= Variable:** Other vaccines: As indicated based on patient age and medical conditions...
- Shingles RZV:** Zoster (RZV): 2 doses for all age 50+



Immune Compromise

- Inherited Immune deficiencies
- Disease-Related
 - Splenectomy, Sickle Cell [Includes patients with other hemoglobinopathies]
 - Complement deficiencies
 - HIV Infection
 - Renal Failure and Nephrotic Syndrome
 - Active Cancer [systemic or Generalized Malignancy, not localized]
 - Transplants [Solid organ, BMT, Stem Cell]
 - Hematologic Malignancy
- Iatrogenic Immune Suppression
 - Biologic Immuno-modulators
 - Corticosteroids [Prednisone 20 mg/day x 14 days or equivalent]
 - Chemotherapeutics
 - Includes 'low dose' MTX, Azathioprine, etc. used in managing IBD and Rheum conditions...
 - Radiation therapy
- Special comment: Checkpoint Inhibitors [Ipilimumab, Nivolumab, Pembrolizumab...]
- https://www.medscape.com/viewarticle/852392#vp_2 (Very little evidence, Flu likely safe...)

Immune Deficiencies

Immunizations Recommended in Adults with Splenectomy/Splenic Dysfunction, C' deficiencies

- Influenza Annual:** Influenza: **Annual, AAAAA** Vaccine (=All Adults And kids 6+ months Annually)
No missed opportunities
- Pneumo-coccal:** Pneumococcal: **PCV13 1 dose followed 8 weeks later by PPSV23 1 dose PPSV23 5 years after 1st dose and final PPSV23 after age 65 [+5yr]**
- Tetanus + Pertussis:** Tdap: 1 adult dose [incorporate into 'Td every 10 years' schedule] then Td every 10 years...
- HiB:** Hib: 1 adult dose [Encapsulated GNB]
- MCV4:** Meningococcal: 2 doses at least 8 weeks apart with booster every 5 year
Protect against Serogroups A, C, Y, W135 [Encapsulated GNB]
- MenB:** Men. Serogroup B: 2-3 doses depending on vaccine product used
- OTHER= Variable:** Other vaccines: As indicated based on patient age and medical conditions...
Includes Shingles (RZV): 2 doses at age 50+ years

Immune Deficiencies

Immunizations Recommended in Adults with Kidney Failure (ESRD), Nephrotic Synd.

- Influenza Annual:** Influenza: **Annual, AAAAA** Vaccine (=All Adults And kids 6+ months Annually)
No missed opportunities
- Pneumo-coccal:** Pneumococcal: **PCV13 1 dose followed 8 weeks later by PPSV23 1 dose PPSV23 5 years after 1st dose and final PPSV23 after age 65 [+5yr]**
- Tetanus + Pertussis:** Tdap: 1 adult dose [incorporate into 'Td every 10 years' schedule] then Td every 10 years...
- Hepatitis B:** Hepatitis B: **HIGH DOSE VACCINE, 3 dose series [Annual titer, Boosters at <10]**
- OTHER= Variable:** Other vaccines: As indicated based on patient age and medical conditions...
- Shingles (RZV):** Shingles(RZV): Include RZV 2 doses for all age 50+ years

Immune Deficiencies

Immunizations Recommended in Adults with Immune Deficiencies EXCLUDING HIV

- Influenza Annual:** Influenza: **Annual, AAAAA** Vaccine (=All Adults And kids 6+ months Annually)
No missed opportunities
- Pneumo-coccal:** Pneumococcal: **PCV13 1 dose followed 8 weeks later by PPSV23 1 dose PPSV23 5 years after 1st dose and final PPSV23 after age 65 [+5yr]**
*Stem Cell TXP: Immune restart, See IDSA Guideline
- Tetanus + Pertussis:** Tdap: 1 adult dose [incorporate into 'Td every 10 years' schedule] then Td every 10 years...
- HiB:** Hib: 3 doses post-transplant in patients with Stem Cell Transplant ONLY
- NO Live Vaccines:** Live-Virus Vaccine: **Contraindicated** [Includes LAIV, MMR, VAR, ZVL]
- OTHER= Variable:** Other vaccines: As indicated based on patient age and medical conditions
Includes Zoster (RZV): 2 doses for all age 50+

Immunizations Recommended in Adults with HIV

- Influenza Annual** → Influenza: **Annual, AAAAA** Vaccine (=All Adults And kids 6+ months Annually)
No missed opportunities
- Pneumococcal** → Pneumococcal: **PCV13 1 dose followed 8 weeks later by PPSV23 1 dose PPSV23 5 years after 1st dose and final PPSV23 after age 65 [+5yr]**
- Tetanus + Pertussis** → Tdap: 1 adult dose [incorporate into 'Td every 10 years' schedule] then Td every 10 years...
- Hepatitis B** → Hepatitis B: 3 dose series
- NO Live Vaccines** → Live-Virus Vaccine: **Contraindicated ONLY if CD4 < 200** [Includes MMR, VAR, ZVL]
 - **MMR, VAR RECOMMENDED if not immune and CD4 > 200**
- OTHER= Variable** → Other vaccines: As indicated based on patient age and medical conditions...
- Shingles RZV** → Zoster [RZV]: 2 doses for all age 50+

Physician... Heal Thyself....

Immunizations Recommended in HealthCare Personnel, Public Safety Workers

- Influenza Annual** → Influenza: **Annual, AAAAA** Vaccine (=All Adults And kids 6+ months Annually)
No missed opportunities
- Tetanus + Pertussis** → Tdap: 1 adult dose [incorporate into 'Td every 10 years' schedule] then Td every 10 years...
- Hepatitis B** → Hepatitis B: 3 dose series. Titer at 1 month, repeat series ONCE if <10 [No rec. ongoing testing w/o exposure.
- MMR** → MMR: 2 dose series (or evidence of immunity)
- Varicella** → Varicella: 2 dose series (or evidence of immunity)
- OTHER= Variable** → Other vaccines: As indicated based on patient age and medical conditions...
- Shingles RZV** → Zoster [RZV]: 2 doses for all age 50+

Putting it together in practice...

- Vaccination, like much of care of chronic medical conditions, is a TEAM SPORT
- Who is in your vaccination team?
- What are you doing now?
- What is working... and what is not?
- Develop a plan for improvement [Ideas for you to consider]
 - Immunization Audit
 - Reminder-Recall
 - Pre-visit planning
 - Vaccine clinics
 - Supply, storage, billing, reimbursement cycle
- Teach your team the practical science
- Assess your progress
- Move on to other projects...

<https://www.stepsforward.org/modules/adult-vaccinations>

Adult Immunization Standards

- **ASSESS** immunization status of all your patients at every clinical encounter.
 - Stay informed. Get the latest [CDC recommendations](#) for immunization of adults.
 - Implement protocols and policies. Ensure that patients' vaccine needs are routinely reviewed and patients get reminders about vaccines they need.
- Strongly **RECOMMEND** vaccines that patients need.
 - Share tailored reasons why vaccination is right for the patient.
 - Highlight positive experiences with vaccination.
 - Address patient questions and concerns.
 - Remind patients that vaccines protect them and their loved ones against a number of common and serious diseases.
 - Explain the potential costs of getting sick.
- **ADMINISTER** needed vaccines or **REFER** your patients to a vaccination provider.
 - Offer the vaccines you stock.
 - Refer patients to [providers in the area](#) that offer vaccines that you don't stock.
- **DOCUMENT** vaccines received by your patients.
 - Participate in your state's immunization registry. Help your office, your patients, and your patients' other providers know which vaccines your patients have had.
 - Follow up. Confirm that patients received recommended vaccines that you referred them to get from other immunization providers.

<https://www.cdc.gov/vaccines/hcp/adults/for-practice/standards/index.html>

Vaccine Recommendation and Problem Solving the 'Hesitant to Vax' Patient

- PRACTICE LEVEL:
 - Initial recommendation: **Who will deliver?**
 - Assure Scripts are: **Strong, Specific, Succinct**
 - Refer the hesitant: Provider? Pharmacist? Physician?
- Make the diagnosis in patients who say 'No' or 'But'
 - Hesitant ?
 - Questioning ?
 - Fearful ?
 - Anti-Vaccine zealot .
- Unless unlimited time and patience, spend your resources on those who are not zealots...

Managing Vaccine Hesitant Patients

- Message targeted to 'diagnosis' (cause for hesitance)
 - a. Motivation
 - b. Maximize value
 - c. Contextual example [put a face on recommendation]
- Assure vaccine recommendation is **presumptive**
- **Specify the vaccination plan** (options)
 - Show or
 - Revisit and specifics or
 - Unless anti-vaccine zealot, must verbalize and document plan to revisit
 - If documentation and followup is not carried out as planned- *you have missed an opportunity...*
- Keep in mind that different people have different learning and decision-making styles
 - While you may not achieve your goal in 1 visit: a good physician-patient relationship will go a long way in helping you reach your goal?

Eilers R. et al. Vaccine, 35(2017): 2823-30.
 Jain A. et al. Vaccine, 35(2017): 2315-28.
 Poland and Poland. Vaccine, 29(2011): 6145-8.

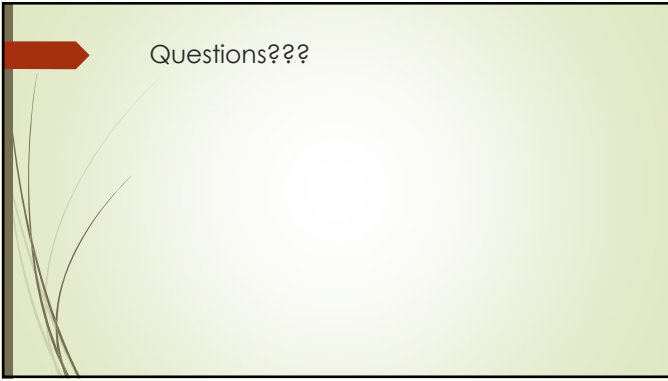
Vaccine Attributes/Basic Vaccinology

Inactivated Vaccines Live virus vaccines Adjuvanted vaccines Egg-Containing Neomycin-Gelatin IM Administration	Influenza TIV/QIV/RIV/hdIV, Pneumococcal, Hepatitis, HPV, Meningococcal LAIV, MMR, VAR, ZVL RZV, allIV, Hep B MMR VAR, ZVL, ccIV Adult: Posterior Deltoid- Landmarks R for R, L for L Kids: Anterolateral thigh- Landmarks L for R, R for L
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Travel Vaccines

- CDC Travel Site is a wealth of information
 - Assure 'routine vaccines' are UTD
 - Consider travel vaccines
 - Don't forget other travel precautions
 - Food/Beverages
 - Mosquito and other insect protection

<https://wwwnc.cdc.gov/travel>



Questions???
