PEDIATRIC VACCINATION: UPDATES & TIPS

Neha D. Chande, MD, MHS

UCLA Family Medicine Residency

Grand Rounds Lecture

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OBJECTIVES

- Understand the administration of vaccines against the following infections:
  - Influenza (Flu)
  - Human Papilloma Virus (HPV)
  - Meningococcal (Serogroups ACWY—MCV4, Serogroup B—MenB)
  - Measles/mumps/rubella, Varicella (MMR-V, MMR + VZV)
  - Covid-19
- Review tips for discussing vaccinations with parents/guardians

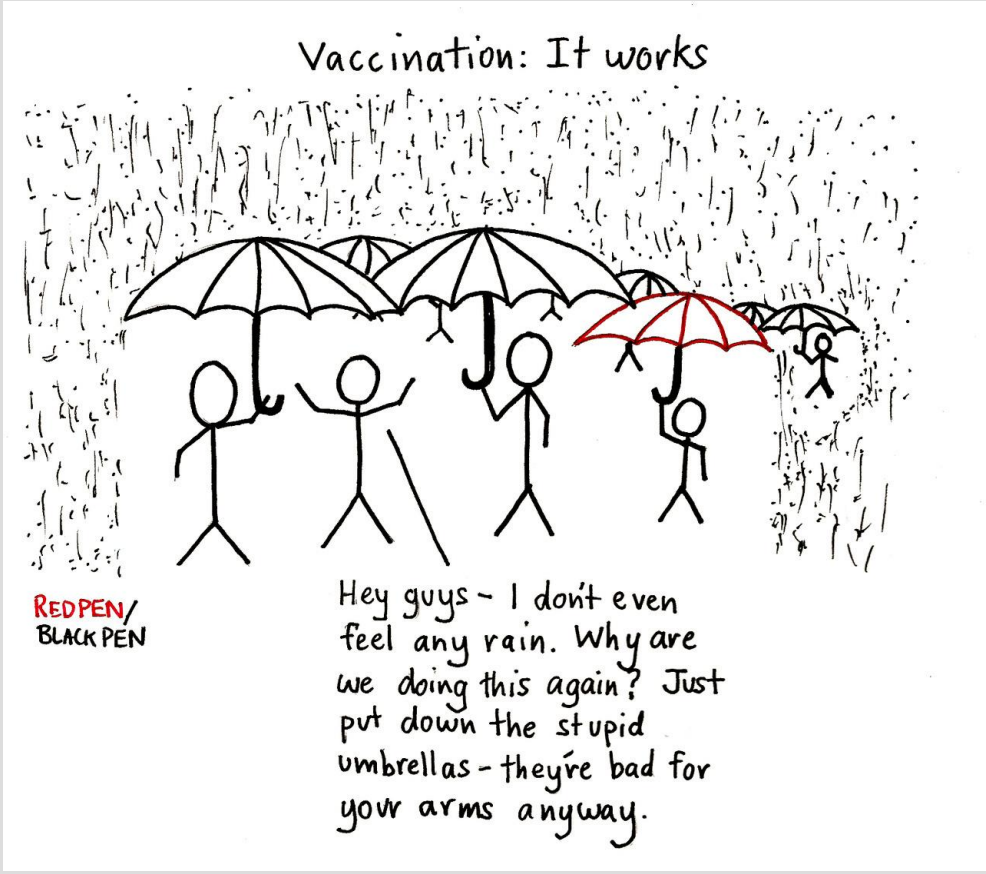


Image: redpenblackpen on Tumblr

FLU VACCINE

INFLUENZA VACCINES

- Three types of flu vaccines available in US
  - Inactivated sub-unit (grown in egg or cell culture, can have residual egg, given IM)
  - Recombinant (recombinant DNA sub-unit, no egg, given IM)
  - Live-attenuated (has residual egg, given intranasal)
- Vaccines usually trivalent (two A-strains, one B-strain)
  - Quadrivalent contains two B-strains
- Thimerosal
  - May be present in some multi-dose vials of flu vaccine
  - No known link to autism or any other illnesses in children or adults

Hall, Pinkbook Chap 12, 2021

FLU VACCINE ADMINISTRATION

- Starting at age 6 mo→ ideally, should be fully vaccinated by end of Oct
- **Age <9 yo and received one or fewer flu doses previously**
  - Give TWO doses of flu vaccine 4 weeks apart (even if they turn 9 between doses)
- **Age <9 yo and received two or more flu doses previously**
  - Give ONE dose of flu vaccine
- **Age ≥9 yo, regardless of prior vaccinations**
  - Give ONE dose of flu vaccine
- Afterward, everyone gets one dose annually

ACIP Summary of Rec, 2022

FLU VACCINE ADMINISTRATION

Examples: pediatric patients coming in for vaccines during flu season

- 3 yo; has received flu dose regularly since age 12 mo
  - Give one dose of flu shot now, then continue annually
- 6 yo; never received flu shot before
  - Give one dose of flu shot now, return in one MONTH for second shot, then annually
- 7 yo; received first dose of flu shot last year, never got second dose
  - Give one dose of flu shot now, return in one MONTH for second shot, then annually
- 9 yo; never received flu shot before
  - Give one dose of flu shot now, return in one MONTH for second shot, then annually

HPV VACCINE

HPV VACCINES

- Current HPV vaccine (Gardasil-9) is protective against 9 strains of HPV
  - 7 strains that cause cancer: 16, 18, 31, 33, 45, 52, 58
  - 2 strains that cause warts: 6, 11
- Recombinant vaccine based on L1 capsid protein of HPV that self-assembles into viral capsid (non-infectious, non-oncogenic)
- Note: Older 2-valent and 4-valent vaccines still licensed but not distributed/available

Meites, Pinkbook Chap 11, 2021

HPV VACCINE ADMINISTRATION

- Routinely given starting ages 11-12 yo
  - May give as early as 9 yo
- **Ages 9 to <15 yo at first dose**
  - Give TWO doses 6 mo apart
- **Age ≥15 yo at first dose**
  - Give THREE doses at 0, 2, 6 mo apart
- Special situations
  - Immunocompromising conditions: give three-dose series regardless of age
  - Hx sexual abuse: start age 9 y
  - Pregnancy: wait till after pregnancy, no additional steps if accidentally given during

Meites, Pinkbook Chap 11, 2021;
CDC HPV Rec 11/2021

MENINGOCOCCAL VACCINE

QUADRIVALENT MENINGITIS VACCINATION

- There are three MCV4 vaccines available in the US
  - Menveo, Menactra, MedQuadfi
- All are quadrivalent (protection against 4 strains of MCV): Offer protection against serogroups A, C, W, Y
- All are conjugate vaccines (capsule polysaccharide attached to protein)

Meites, Pinkbook Chap 14, 2021

QUADRIVALENT MENINGITIS VACCINATION

- Routinely given as two-dose series→ ages 11-12 y and 16 y-18 y
  - Immunity typically wanes after 5 y
- **Age <16 y at first dose**
  - Give one dose now, then 2nd dose at 16 y-18 y (at least 2 mo apart)
- **Age ≥16 y**
  - One dose
- Special situations (specifics on dose timing depends on age and vaccine)
  - Children w/ asplenia or other immunodeficiencies: first dose should start at age of diagnosis and then receive regular boosters; see high-risk schedule
  - Travel to endemic countries: multi-dose series

Meites, Pinkbook Chap 11, 2021;
CDC HPV Rec 11/2021

GROUP B MENINGOCOCCAL VACCINE

- There are two MenB vaccines available in the US
  - Trumenba, Bexsero
  - Both offer protection against Group B serotype
  - All are conjugate vaccines (capsule polysaccharide attached to protein)

Meites, Pinkbook Chap 11, 2021;
CDC HPV Rec 11/2021

GROUP B MENINGOCOCCAL VACCINE

- May give any 16-18 yo (up to 23 yo) one dose MenB vaccine if desired
- Should give vaccine to adolescents/young adults w/ asplenia, compliment deficiency, anti-compliment meds b/c they are high risk for disease from encapsulated bacteria like meningococcal
  - These patients will also typically require periodic boosters
- MenB vaccine can be given at the same time as MCV4 (but different site)

Mbaeyi, Pinkbook Chap 14, 2021

MMR AND VZV VACCINES

MMR AND VZV VACCINES

- MMRV= measles, mumps, rubella, varicella
- MMR vaccine available in two formulations in the US
  - MMR, MMR-V (ProQuad)
- Varicella vaccine available in two formulations in the US
  - VZV (Varivax), MMR-V (ProQuad)
- All formulations are live-attenuated vaccines

Lopez, Pinkbook Chap 13, 2021;
Gastanaduy, Pinkbook Chap 22, 2021

MMR/VZV VACCINE ADMINISTRATION

- Routine vaccine schedule
  - Administer MMR and VZV as SEPARATE vaccines age 12-15 mo
  - Then administer MMR-VZV COMBINATION vaccine at ages 4-6 y
  - Separate MMR and VZV vaccines recommended before age 4 y due to higher risk of febrile seizure w/ combo vs separate vaccines (2x risk)
- Catch-up vaccination
  - Can administer two dose series at shorter intervals, ie 1-3 mo apart, if vaccines are given for the first time after age 6 y and/or there is no evidence of immunity (intervals depend on the age of the child)

Lopez, Pinkbook Chap 13, 2021;
Gastanaduy, Pinkbook Chap 22, 2021

MMR/VZV VACCINE CONTRAINDICATIONS

- Both MMR and VZV separate and combined vaccines are live-attenuated
- Patients with immunocompromising and certain other conditions should generally not receive the vaccine including those with
  - Acquired or congenital immunodeficiencies
  - Lymphatic or bone marrow-related cancers
  - On immunosuppressive medications
  - Concurrent moderate to severe illness
  - Within a certain amt of time before/after receiving blood products
  - Pregnancy

Lopez, Pinkbook Chap 13, 2021; Gastanaduy, Pinkbook Chap 22, 2021; CDC MMR Recs 1/2021, CDC Varicella Recs 4/2021

VARICELLA VS ZOSTER VACCINES

- Chicken pox (varicella) and shingles (zoster) are caused by the same agent (varicella zoster virus)
- What is the difference between the current varicella and zoster vaccines?
  - Varicella (Varivax): live-attenuated, approved for ages 12 mo and older, can be given to adults
  - Zoster (Shingrix): uses viral protein, (recombinant glycoprotein E)→ not live, approved for ages 50 y and older
- Patients w/ prior history of chicken pox and shingles should still get vaccinated

Lopez, Pinkbook Chap 13, 2021;
Gastanaduy, Pinkbook Chap 22, 2021

COVID-19 VACCINE

COVID-19 VACCINATION

- Three covid-19 vaccines are available in the US
  - mRNA: Pfizer/Biontec, Moderna→ approved for ages 6 mo+ (bivalent)
  - Protein subunit: Novavax→ approved for ages 12 y+ (monovalent)
  - Johnson & Johnson/Janssen vaccine is no longer available
- Monovalent vs bivalent vaccine
  - Monovalent: based on "ancestral" (ie original) Covid-19 strain--> NO LONGER FDA-APPROVED FOR USE IN THE US
  - Bivalent: protects against both ancestral and omicron BA4/BA5 strains
  - All currently available mRNA covid vaccines in the US are bivalent

COVID-19 MRNA VACCINE ADMINISTRATION

- Covid-19 pediatric vaccination guidelines vary by:
  - Age, w/ guidelines for ages 6 mo-4 yo, 5 yo, and 6-11 yo, and 12 yo
  - Prior vaccination status, ie unvaccinated vs ever vaccinated
  - Vaccine brand received (ie Pfizer vs moderna)
- However, there are general guidelines to use
  - Remember, all vaccines are BIVALENT only now
  - Try to keep within same brand of vaccine if possible (though not necessary)
  - Immunocompromised patients should get two bivalent doses

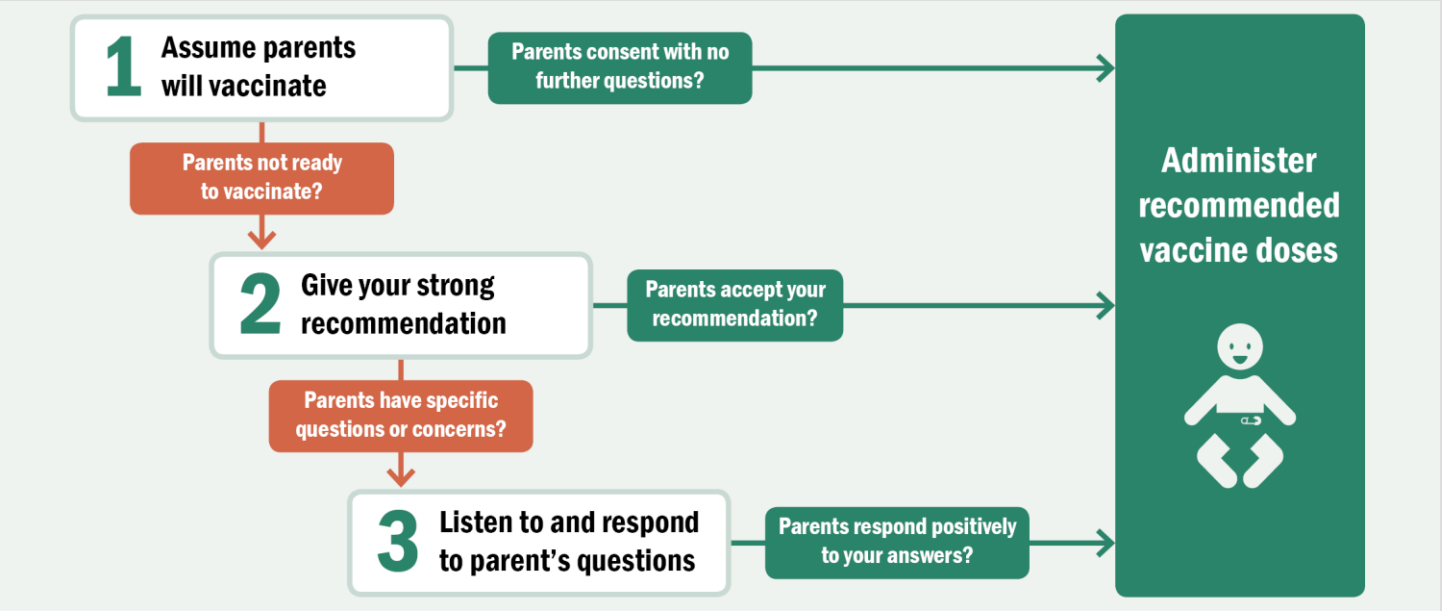
COVID-19 VACCINE ADMINISTRATION: GENERAL GUIDELINES

- For patients <6 yo
  - If completely unvaccinated, give full primary series of vaccine (2 doses Moderna, 3 doses Pfizer)
  - If previously partially vaccinated, just complete the series (ie if a 2 yo received one dose of moderna monovalent, now give one dose of moderna bivalent)
- Can give just one dose of bivalent vaccine if:
  - Patient has never received a bivalent vaccine before
  - Patient is 6 yo+, regardless of vaccination status

PARENTS AND VACCINES

DISCUSSING VACCINES WITH PARENTS

- CDC recommends the following approach



- And if the parent/guardian chooses not to vaccinate, continue the conversation at future visits

DISCUSSING VACCINES WITH PARENTS

- Assume parents will vaccinate→ ie state which vaccines their child needs today rather than asking them if/how they want to vaccinate
- If still hesitant, move on to providing a strong recommendation→ state that you strongly recommend vaccines and supporting statements, ie "I strongly recommend these vaccines b/c they protect against serious diseases," or "Our office has years of experience safely administering vaccines to children," etc
- If still hesitant, hear out concerns w/ empathy and respond to concerns→ can provide parent handouts from the CDC, AAP, AAFP and point patients to reputable websites
- Continue to bring up vaccination at future visits

EDUCATE YOURSELF

- Arm yourself with information before the visit when possible
- When pre-charting, review/document what vaccines you anticipate the patient is due for
- Review the CDC/ACIP's pediatric vaccination table
- Review the CAIR (CAlifornia Immunization Registry) report
- When discussing parent/guardian concerns or debunking misinformation, be empathetic and remember that you share the common of goal of ensuring the health and safety of the patient
- Be confident in your recommendations

THANK YOU!

QUESTIONS?

Image: Something of That Ilk, 2010

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IMAGE CREDITS

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