"DO" IMMUNIZE THE CHILDREN

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OBJECTIVES AND CONFLICTS OF INTEREST

Objectives

After the presentation, the participant should be able to:

- Diagnose re-occurring vaccine preventable diseases (1)
- Understand the need for vaccinations (2)
- Recommend appropriate childhood and adolescent immunizations (3)

- **Conflicts of interest**
  - I have no conflicts of interest for this presentation

REFERENCES

1. Diseases you almost forgot about: https://www.**healthyoptions.com**.ph/newsdigest/thanks-to-vaccines/thanks-to-vaccines-14-diseases-you-almost-forgot-about

2. Why you should vaccinate: https://www.**healthychildren.org**/English/safety-prevention/immunizations/Pages/5-things-you-may-not-know-about-vaccines.aspx

3. Vaccine Schedules: https://www.**cdc.gov/vaccines**/schedules/hcp/imz/child-adolescent.html

VICTIMS OF CORONAVIRUS: EFFECTS ON VACCINATIONS AND THE FEARS

- **Experts Worry Postponement Of Routine Immunizations Due To Social Distancing Measures May Lead To Outbreak Of Vaccine-Preventable Diseases**
- Modern Healthcare (4/14, Subscription Publication) reports, "As hospitals and clinics across the country limit 'non-essential' healthcare services to stem the spread of the coronavirus, experts worry that the **postponement of routine immunizations could lead to an outbreak of vaccine-preventable diseases** after social distancing practices begin to relax."
- In the US, there are signs that "indicate fewer children may be getting their routine vaccines as individuals and providers practice social distancing."

AMERICAN ACADEMY OF PEDIATRICS(AAP) ISSUED GUIDANCE IN MARCH

- Recommended
- 1. People balance the benefits of getting immunizations with the risks of exposure to the virus
- 2. Recommended clinicians continue with routine immunization schedule but might opt to prioritize children under 24 months

Children Clinics

MAINTAINING CLINICAL PREVENTIVE SERVICES, INCLUDING IMMUNIZATIONS, DURING THE COVID-19 PANDEMIC

- Some strategies used:
  - Postponing or cancelling non-urgent elective procedures
  - Use telemedicine instead of face-to-face encounters for routine medical encounters
- Separate well visits from sick. Examples include:
  - Schedule well visits in the morning and sick visits in the afternoon
  - Separating patients spatially:
    - Place patients with sick visits in different areas of the clinic or another location from patients with well visits
- If a practice can provide only limited well child visits, prioritize newborn care and vaccination of infants and young children (through 24 months of age) when possible

WATCH FOR NEW CORONAVIRUS VACCINE(S) IN 12-18 MONTHS – REALISTIC?

From Bloomberg News

Vaccine specialists this time are turning to technology aimed at speeding up a process that has traditionally taken 10 years or more. National Institute of Allergy and Infectious Diseases Director Anthony Fauci and others have predicted a coronavirus vaccine could be ready in a year to 18 months. Dozens of companies and universities around the world are pursuing a vaccine, among them Sanofi, Johnson & Johnson and Moderna Inc.

CORONAVIRUS VACCINE(S) IN 12-18 MONTHS – REALISTIC? CON'T

One of the front-runners, backed by the U.S. institute, is the approach used by Moderna that involves adding viral genetic material to human cells, inducing them to make proteins that spur an immune response. The U.S. company said March 16 that it treated its first patient in an early study.

The novel method is largely untested, and Holden Thorp, editor in chief of the Science family of journals, points out there are no guarantees that such messenger RNA vaccines, and others like it, will achieve their ambitious targets. Falling short could cost both society and faith in science, he said.

The Cost of Not Getting Vaccinated

- Vaccine preventable diseases in adults cost the U.S. $8.95 billion in 2015
- 80 percent of that cost or $7.1 billion can be blamed on unvaccinated adults.

UNC
EYERMAN
SCHOOL OF PHARMACY

The Total Cost of Vaccine Preventable Diseases

Pathogen	Total Cost
Influenza	$5,790,000,000
Pneumococcal	$1,860,000,000
Herpes Zoster	$782,000,000
HPV	$333,000,000
Hepatitis B	$173,000,000
Menigococcal	$5,000,000
Hepatitis A	$3,000,000
Pertussis	$2,680,000
Varicella	$2,200,000
Measles	$233,000
Tetanus	$14,000
Mumps	$12,000
Diphtheria	$400
Rubella	$300

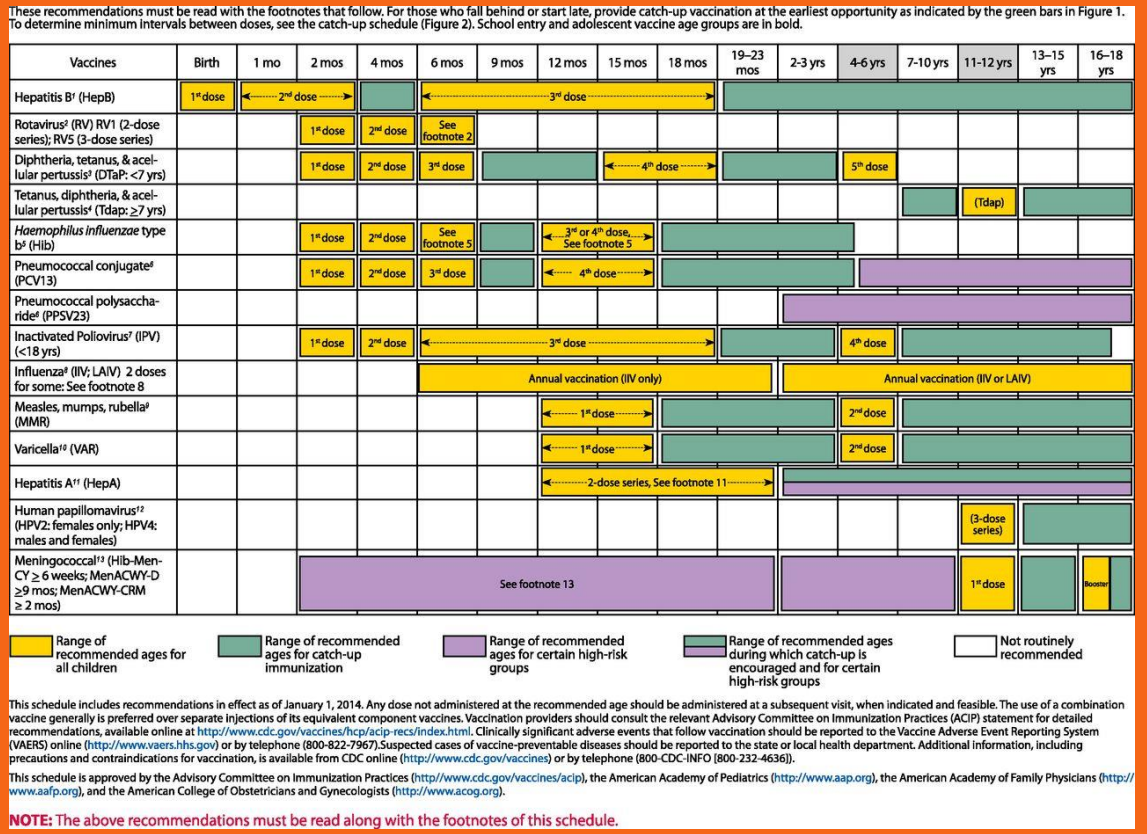
DID YOU KNOW THERE ARE EASY TO READ SCHEDULES

SCHEDULES[HTTPS://WWW.CDC.GOV/VACCINES/SCHEDULES/INDEX.HTML](https://www.cdc.gov/vaccines/schedules/index.html)

Parent simple schedule

Birth	1 month	2 months	4 months	6 months	12 months	15 months	18 months	19-23 months	2-3 years	4-6 years
HepB	HepB			HepB						
		RV	RV	RV						
		DTaP	DTaP	DTaP		DTaP				DTaP
		Hib	Hib	Hib	Hib					
		PCV13	PCV13	PCV13	PCV13					
		IPV	IPV	IPV						IPV
				Influenza (Yearly)*						
					MMR					MMR
					Varicella					Varicella
					HepA§					

Healthcare provider's schedule (Table 1 – 0-18 years)



These recommendations must be read with the footnotes that follow. For those who fall behind or start late, provide catch-up vaccination at the earliest opportunity as indicated by the green bars in Figure 1. To determine minimum intervals between doses, see the catch-up schedule (Figure 2). School entry and adolescent vaccine age groups are in bold.

Vaccines	Birth	1 mo	2 mos	4 mos	6 mos	9 mos	12 mos	15 mos	18 mos	19–23 mos	2-3 yrs	4-6 yrs	7-10 yrs	11-12 yrs	13–15 yrs	16–18 yrs
Hepatitis B[f] (HepB)	1st dose	2nd dose			3rd dose											
Rotavirus[g] (RV) RV1 (2-dose series); RV5 (3-dose series)			1st dose	2nd dose	See footnote 2											
Diphtheria, tetanus, & acellular pertussis[a] (DTaP: <7 yrs)			1st dose	2nd dose	3rd dose			4th dose				5th dose				
Tetanus, diphtheria, & acellular pertussis[a] (Tdap: ≥7 yrs)														(Tdap)		
Haemophilus influenzae type b[b] (Hib)			1st dose	2nd dose	See footnote 5		3rd or 4th dose, See footnote 5									
Pneumococcal conjugate[e] (PCV13)			1st dose	2nd dose	3rd dose		4th dose									
Pneumococcal polysaccharide[e] (PPSV23)																
Inactivated Poliovirus[f] (IPV) (<18 yrs)			1st dose	2nd dose	3rd dose							4th dose				
Influenza[g] (IIV; LAIV) 2 doses for some: See footnote 8					Annual vaccination (IIV only)						Annual vaccination (IIV or LAIV)					
Measles, mumps, rubella[g] (MMR)							1st dose					2nd dose				
Varicella[f,g] (VAR)							1st dose					2nd dose				
Hepatitis A[f,r] (HepA)							2-dose series, See footnote 11									
Human papillomavirus[r,z] (HPV2: females only; HPV4: males and females)														(3-dose series)		
Meningococcal[r,z] (Hib-MenCY ≥ 6 weeks; MenACWY-D ≥9 mos; MenACWY-CRM ≥ 2 mos)			See footnote 13											1st dose		Booster

Range of recommended ages for all children

Range of recommended ages for catch-up immunization

Range of recommended ages for certain high-risk groups

Range of recommended ages during which catch-up is encouraged and for certain high-risk groups

Not routinely recommended

This schedule includes recommendations in effect as of January 1, 2014. Any dose not administered at the recommended age should be administered at a subsequent visit, when indicated and feasible. The use of a combination vaccine generally is preferred over separate injections of its equivalent component vaccines. Vaccination providers should consult the relevant Advisory Committee on Immunization Practices (ACIP) statement for detailed recommendations, available online at http://www.cdc.gov/vaccines/hcp/acip-recs/index.html. Clinically significant adverse events that follow vaccination should be reported to the Vaccine Adverse Event Reporting System (VAERS) online (http://www.vaers.hhs.gov) or by telephone (800-822-7967).Suspected cases of vaccine-preventable diseases should be reported to the state or local health department. Additional information, including precautions and contraindications for vaccination, is available from CDC online (http://www.cdc.gov/vaccines) or by telephone (800-CDC-INFO (800-232-4636)).

This schedule is approved by the Advisory Committee on Immunization Practices (http://www.cdc.gov/vaccines/acip), the American Academy of Pediatrics (http://www.aap.org), the American Academy of Family Physicians (http://www.aafp.org), and the American College of Obstetricians and Gynecologists (http://www.acog.org).

NOTE: The above recommendations must be read along with the footnotes of this schedule.

AS A PEDIATRICIAN, I LIKE TO KEEP IT SIMPLE

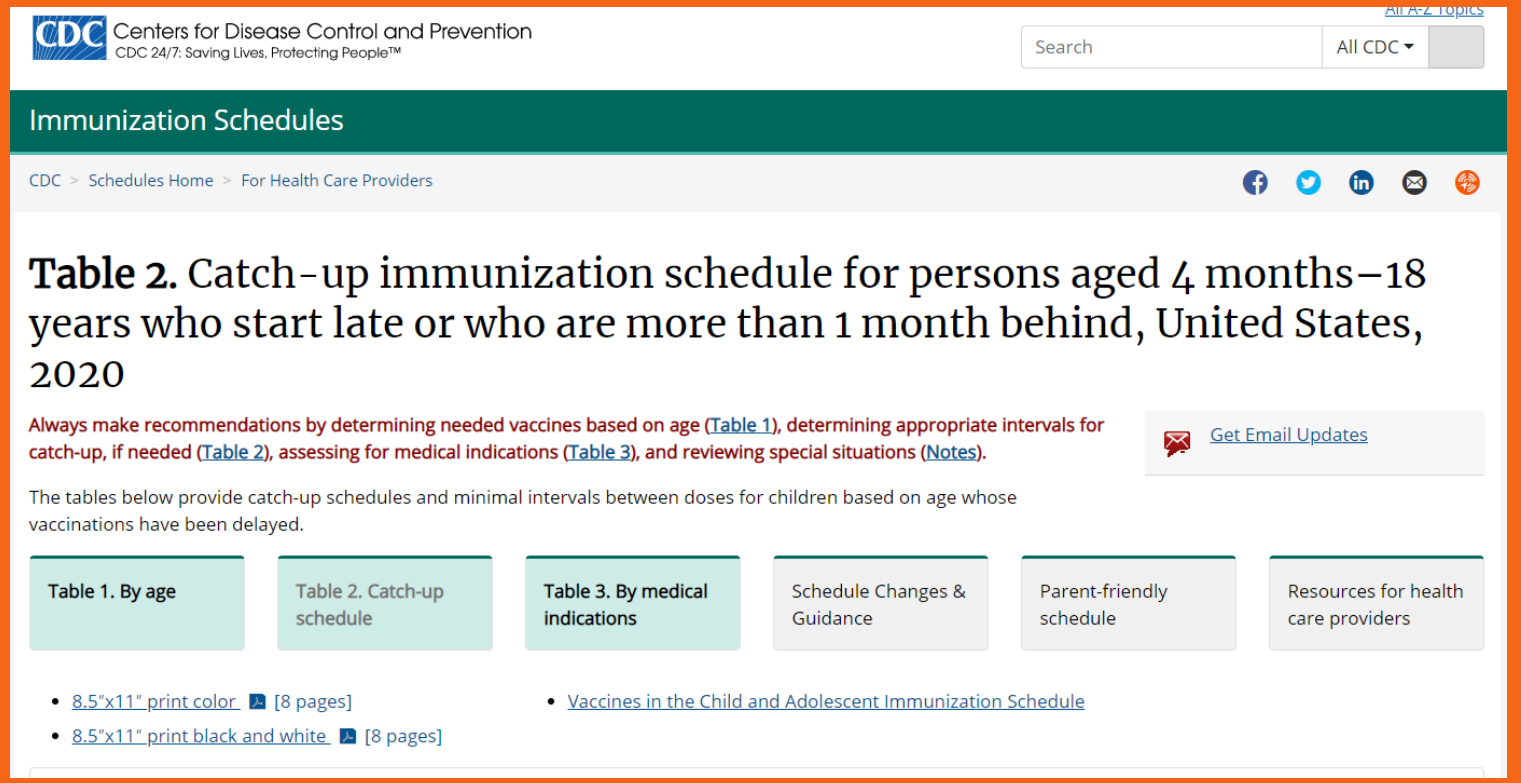
(HTTPS://WWW.CDC.GOV/VACCINES/SCHEDULES/EASY-TO-READ/CHILD-SHELL-**EASYREAD**.HTML)

Birth	1 month	2 months	4 months	6 months	12 months	15 months	18 months	19-23 months	2-3 years	4-6 years
HepB	HepB			HepB						
		RV	RV	RV						
		DTaP	DTaP	DTaP		DTaP				DTaP
		Hib	Hib	Hib	Hib					
		PCV13	PCV13	PCV13	PCV13					
		IPV	IPV	IPV						IPV
				Influenza (Yearly)*						
					MMR					MMR
					Varicella					Varicella
						HepA§				

Note: If your child misses a shot, you don't need to start over. Just go back to your child's doctor for the next shot. Talk with your child's doctor if you have questions about vaccines.

CATCH UP VACCINATIONS: HTTPS://WWW.CDC.GOV/VACCINES/SCHEDULES/HCP/IMZ/CATCHUP.HTML

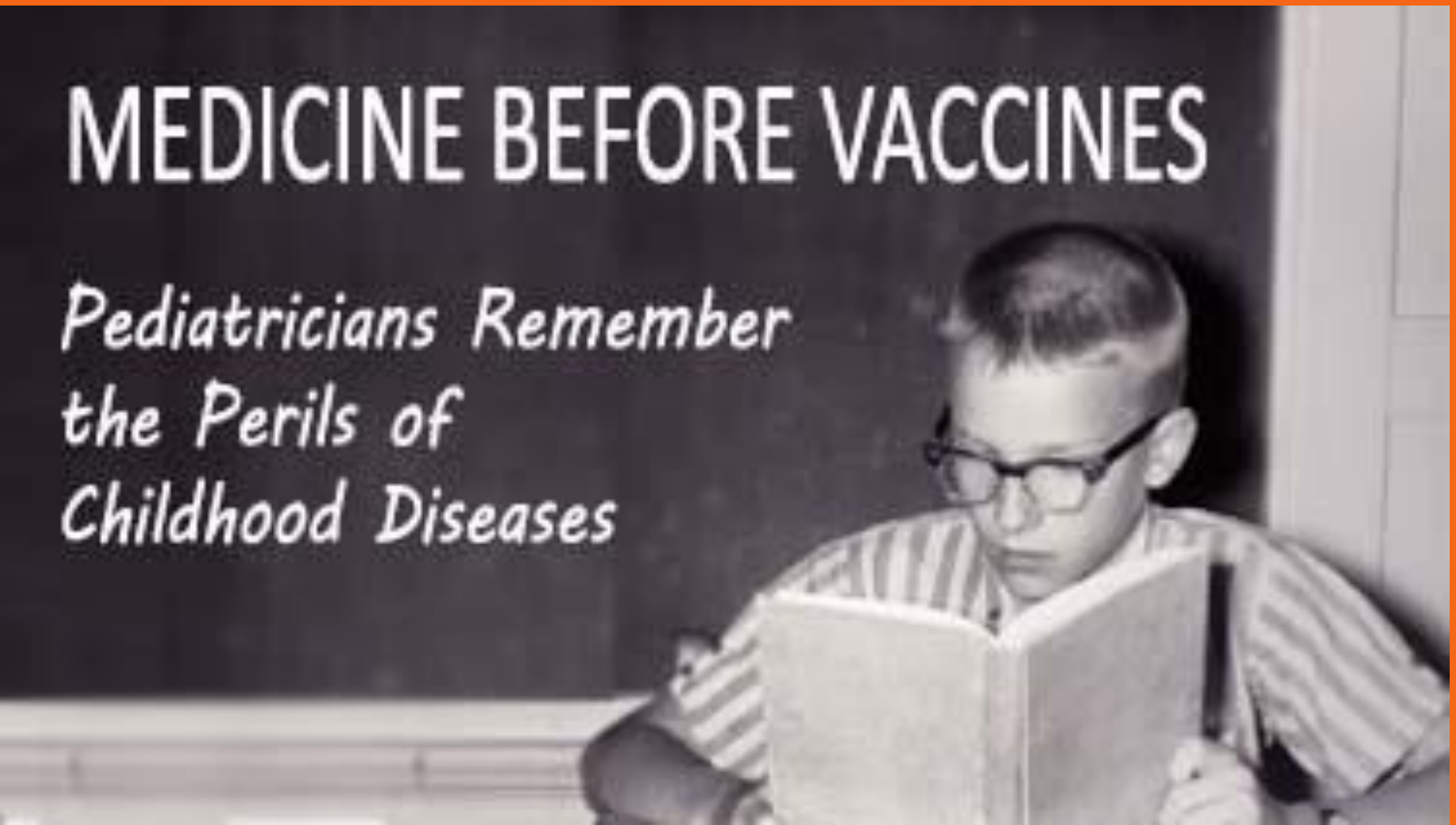
- If a child misses a shot, do you need to start over?
  - NO
    - Except for one travel vaccine, which is?
      - Oral typhoid



2020 CHILD AND ADOLESCENT IMMUNIZATION SCHEDULE **CHANGES**

- Hepatitis A
- Tetanus, diphtheria and acellular pertussis (**Tdap**) vaccines
- The terms "individual clinical decision-making" and "clinical discretion" have been replaced with "shared clinical decision-making.
- These changes will be discussed during the presentation

MOST HEALTHCARE PROFESSIONALS UNDER 45 YEARS OF AGE HAVE NOT SEEN A LOT OF THE VACCINE PREVENTABLE DISEASE (VPD)



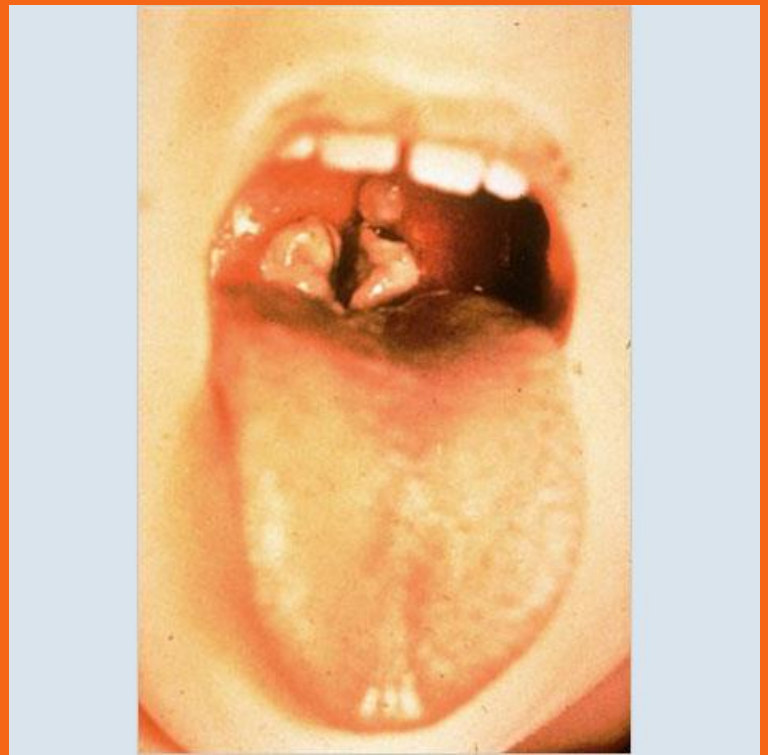
Photos obtained from Immunization Action Coalition (IAC) Photo Library https://www.immunize.org/photos

CASE 1 – WHAT VACCINE COULD HAVE PREVENTED THIS DISEASE?

- Obscure disease from long ago, still exists
- Causes a thick covering in the back of the nose or throat
- Can lead to difficulty breathing, heart failure, paralysis, and even death
- Make sure to vaccinate to help keep this dangerous infection from your kids

Bull neck caused by hypertrophied muscles or enlarged cervical lymph nodes.

Thick gray coating over back of throat



WHAT VACCINE PREVENTS DIPHTHERIA? WHEN IS IT GIVEN?

Diphtheria

- Transmission Air, direct contact
  - Sore throat
  - Mild fever
  - Weakness
  - Swollen glands in neck
- **Bad if**: Swelling of the heart muscle, heart failure, coma, paralysis, death

Td, DTaP, Tdap all protect against Diphtheria

One dose DTaP at each of the following ages:

2 months

4 months

6 months

12 through 18 months

4 through 6 years

WHAT VACCINE COULD HAVE PREVENTED THESE TWO DISEASE

Tetanus

Pertussis

A child receives a Tdap at 7 years of age. He is now 12 years. You only have Tdap in your office, Can you give the Tdap or should you send him to the health department for a Td? If no Td in the office, you may use Tdap

CASE 2: AN 18- MONTH OLD HAS NOT RECEIVED ANY OF HIS IMMUNIZATIONS. NOW HE HAS FEVER AND SOMEWHAT ITCHY RASH.

What disease?

Chickenpox

- Can be serious and even life-threatening, especially in babies, adults, and people with weakened immune systems
- Even healthy children can get really sick.
- Doctors recommend that your child get two doses of the chickenpox shot for best protection.
- One dose at each of the following ages:
  - 12 through 15 months
  - 4 through 6 years

CHICKENPOX VACCINES: CHILDREN UNDER AGE 13 YEARS SHOULD GET TWO DOSES

- First dose at age 12 through 15 months
- Second dose at age 4 through 6 years
- Two types of vaccines
  - Single-antigen vaccine (**Varivax**)
  - Combination: MMRV (**Proquad**)
    - 1st dose
    - CDC recommends that MMR and varicella vaccines be given separately in children 12 through 47 months old unless the parent or caregiver expresses a preference for MMRV vaccine.

Why not Proquad as 1st dose?

- Children who get the first dose of MMRV at age 12 to 23 months **MAY** have a higher chance of a seizure caused by fever.
  - These seizures are not common
  - May be scary for parents, but they are not harmful to children
  - Should be a "shared clinical decision"

PRIOR TO THE INTRODUCTION OF VARICELLA VACCINATION

HTTPS://WWW.CDC.GOV/VACCINES/PUBS/PINKBOOK/VARICELLA.HTML

- Fatality **rates** for **varicella** were approximately
  - 1 per 100,000 cases among children 1-14 years of age
  - 2.7 per 100,000 cases among persons 15-19 years of age
  - 25.2 per 100,000 cases among adults 30-49 years of age
- **Necrotizing fasciitis: may** follow a chickenpox infection.
  - Commonly known as "flesh-eating disease"
  - Spreads quickly through the tissue (flesh) surrounding the muscles
  - Kills about 1 in 4 people infected with it.

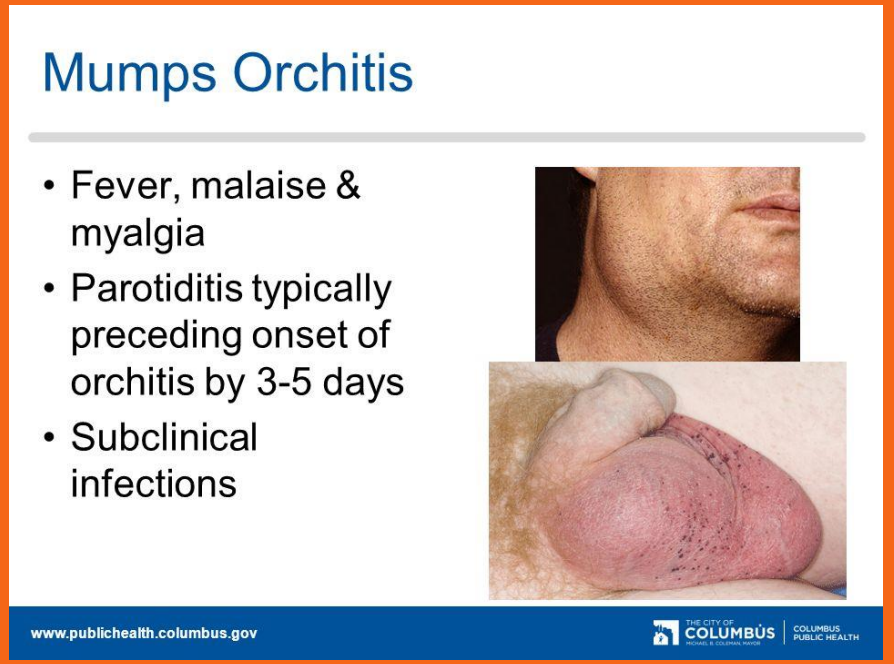
Chickenpox is NOT a benign disease

GETTING VACCINATED AFTER YOU ARE EXPOSED TO CHICKENPOX (POST-EXPOSURE)

- If you do not have immunity against chickenpox and are exposed to someone with this disease or shingles
  - You should get chickenpox **vaccine within 3 to 5 days of being exposed**.
    - Even if more than 5 days have passed since you were exposed, vaccination with two doses is still recommended to protect against future exposures.
    - You need 2 doses of vaccine separated by minimum of 28 days.
- If you previously got 1 dose of chickenpox vaccine, you should get a second dose.

CASE 3: AN UNIMMUNIZED ADOLESCENT DEVELOPS FEVER, SWELLING ABOVE THE LEFT-JAW FOR TWO DAYS

- On day 3, the young adult is complaining of pain in his right testicle.
- What vaccine could have prevented this disorder from occurring?
  - Mumps (MMR)



WHAT IS THE ACIP RECOMMENDATION FOR HEALTHCARE PROVIDERS DURING A MUMPS EPIDEMIC?

- Advisory Committee on Immunization Practices (ACIP) recommended that people identified by public health authorities as being part of a group at increased risk for acquiring mumps because of a mumps outbreak **should receive a third dose of MMR vaccine**.
- You should not give a third dose unless your patient is part of a group at increased risk as determined by your local public health authorities.
- MMR vaccine
  - Not been shown to prevent illness in persons already infected with mumps
  - Should not be used as post-exposure prophylaxis in immediate close contacts.

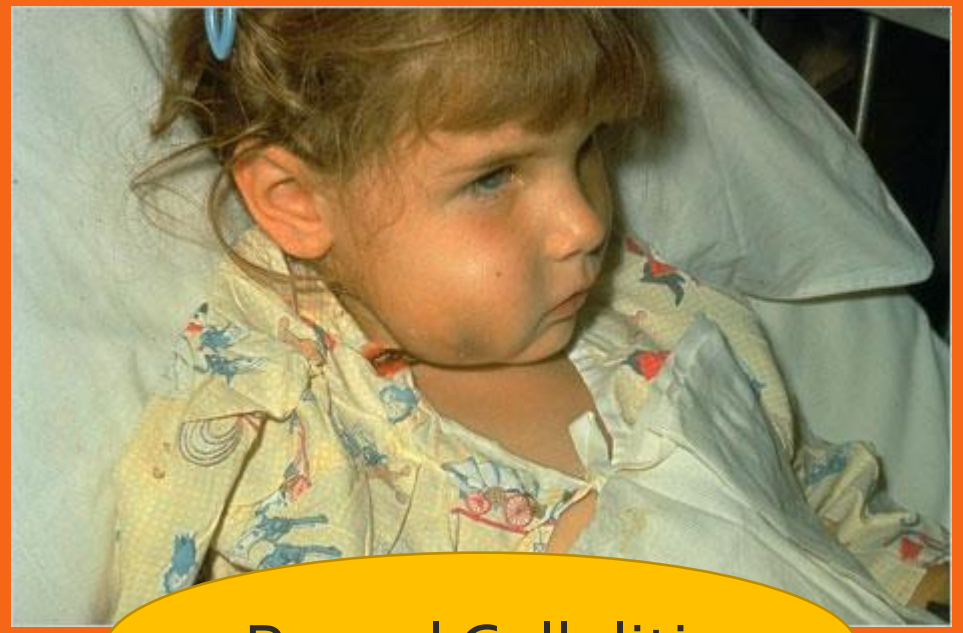
CASE 4: A 16-YEAR-OLD DEVELOPS A FEVER (104), IRRITABILITY AND

- FH: Home schooled but attends teens class at church. Parents have decided **not to vaccinate** the child.
  - What vaccine may have prevented this child's meningitis?
    1. HIB
    2. Pneumococcal (Prevnar 13 by Pfizer
    3. Meningococcal quadvalent (ACWY)
    4. Meningococcal B
    5. All of the above

  Meningococcal is typically recommended at 11-12 year-of-age

CASE 5: AN 18-MONTH-OLD NATIVE AMERICAN DEVELOPS A FEVER AND SWOLLEN CHEEK.

What's your diagnosis



Buccal Cellulitis

Hemophilus influenza type B (HIB)

- Hib infection can also cause:
  - Pneumonia
  - Epiglottis (severe swelling in the throat, making it hard to breathe)
  - Infections of the blood, joints, bones, and covering of the heart and death

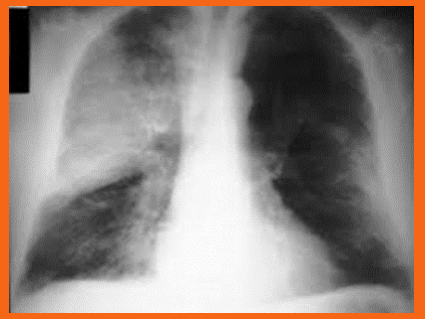
CASE 6: A 18 MON-OLD UNVACCINATED MALE HAS A RUNNY NOSE, FEVER 102 AND PULLING AT EARS

What vaccine could decrease AOM by at least 40%

- Prevnar - 13

What other disorder could be prevented by Prenar-13?

- Pneumonia



- Meningitis

- And even Pneumococcal disease in older adults

HIB VACCINE: ROUTINE IMMUNIZATION 2, 4, 6, 18 MONTHS.

Hemophilus influenza (Hib) on Navajo Reservation in the 1970s

- Children suffered the consequences of Hib
  - 20 % died
  - 20 % were left with permanent damage
    - Severe seizure disorders
    - Hearing loss
    - Learning disabilities
    - Intellectual disabilities

CDC does not recommend Hib vaccination for most people 5 years or older except:

- Children over **5 years** old and adults with:
  - Asplenia
  - Sickle cell disease
  - Before surgery to remove the spleen
  - Following a bone marrow transplant
  - HIV

  Recommend 1 dose after 5 years of age or 4 weeks before spleens surgery and 3 months after bone marrow transplants

CASE 7: A 16 Y/O MALE PRESENTS WITH HEADACHE, HIGH FEVER, LETHARGY AND PURPURIC RASH

What is the most likely diagnosis?

- Patient was up to date at age 11-12 y/o on his immunization including his "meningitis vaccine"
- He has not had any 16 y/o vaccines except for influenza in September

What vaccine could have prevented this disease?

- **Men B.**
- Adolescents and young adults aged 16–23 years can be given after shared decision making with patient and parent

NAME REASONS WHY TEENS ARE HIGH RISK FOR MEN B

- About 1 in 10 young adults carry the bacteria that cause meningitis B – usually without symptoms – and may spread it to others.
- The disease can spread from person to person through close contact
  - Coughing
  - Kissing
  - Living in close quarters
  - Drinking from same cups/bottles/glasses
  - Anything that irritates respiratory tract such as smoking/vaping

Remember: About 1 in 10 people infected with meningitis B will die.

RECOMMENDATIONS FOR HIGH-RISK PATIENTS AT 10 YR. OF AGE

- ≥10 years who are at increased risk for meningococcal disease should receive MenB vaccine. These include:
  - Persons with persistent complement component deficiencies.
  - Persons with anatomic or functional asplenia.
  - Microbiologists routinely exposed to isolates of Neisseria meningitidis.
  - Persons identified as at increased risk because of a serogroup B meningococcal disease outbreak.
- Further recommendations for **Booster doses** for the high-risk groups as follows:
  - Booster dose of MenB vaccine 1 year after completion of the primary series, with additional boosters every 2-3 years "for as long as risk

QUADRIVALENT MENINGOCOCCAL

- **MenACWY:**
  - All 11 to 12-year old's.
  - Since protection wanes, CDC recommends a booster dose at age 16 years.
    - This **booster dose** provides protection during the ages when adolescents are at highest risk of meningococcal disease
- **The Vaccines**
  - **Menactra**, Sanofi (2-55 years)
  - **Menveo**, GSK (2 months to 55 years of age)

CASE 8. MOTHER IS NOT AN ANTI-VAXXER (PRO-INFECTOR), BUT JUST DOES NOT WANT HER 2 Y/O TO HAVE 2 SHOTS FOR SEASON INFLUENZA

Any suggestions?

- Yes
  - LAIV (Flumist by Astra-Zeneca)
  - What are the recommendations for this child who has not received any influenza vaccines in the past?

Answer

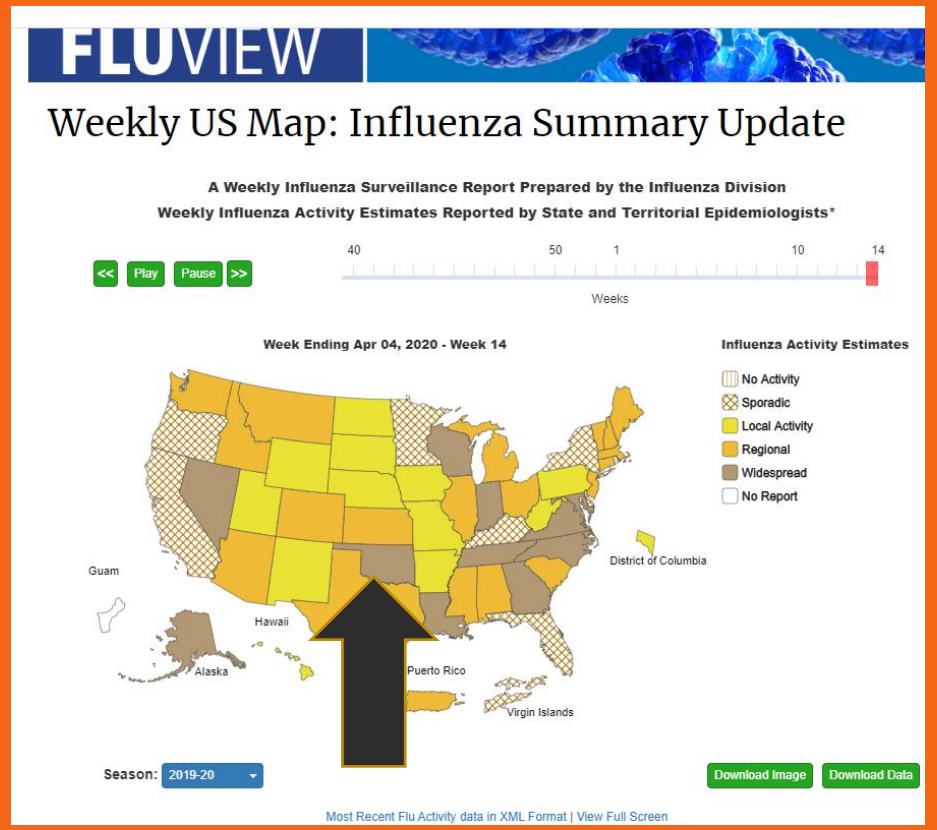
- Two doses given at least four weeks apart are recommended for children age 6 months through 8 years of age who are getting an influenza vaccine for the first time

IS INFLUENZA DANGEROUS IN CHILDREN?

As of April 10, 2020 USA

- CDC estimates about 39 million people have been sick with flu, 410,000 have been hospitalized and 24,000 have died this season.
- **166 children** have died from influenza
- **Flu deaths in Oklahoma 53**

April 4, Influenza is widespread in OK



CASE 9. A 15 Y/O MALE PRESENTS WITH GENITAL WARTS

- What vaccine given at 11-12 years of age could have prevented this disorder?
  - HPV-9 (Gardasil by Merck)
  - If the vaccine had been given at 11 years of age, how many doses would have been recommended
    - 2 doses from 9 – 14 years of age
  - How many doses does this young man require?
    - 3 doses

ACIP Recommendations for HPV-9 vaccination

- For children and adults age 9 through 26 years
  - Routinely recommended at age 11 or 12 years, but vaccination can be given starting at age 9 years.
  - For adults age 27 through 45 years who have not been vaccinated; the ACIP recommends shared clinical decision making to determine whether a patient would benefit

HOW MANY DOSES OF HPV SHOULD BE GIVEN?

- Those who begin the HPV series before their 15th birthday should receive 2 doses, separated by 6–12 months (The minimum interval between doses is 5 calendar months)
- People who start the series on or after the 15th birthday and those with certain immunocompromising conditions (such as cancer, HIV infection, or taking immunosuppressive drugs) should receive a 3-dose series
- 2nd dose should be given 1 to 2 months after the first dose
- 3rd dose should be given 6 months after the first dose

CASE 10. A 2 Y/O CHILD STAYS WITH HER MOTHER WHO IS HOMELESS

- What vaccine is now recommended for all homeless individuals?
- HEP A
- Why?
- Widespread person-to-person outbreaks of hepatitis A across the United States. Groups at highest risk for acquiring HAV infection or having complications:
  - People who use drugs (injection or non-injection)
  - People experiencing unstable housing or **homelessness**
  - Men who have sex with men (MSM)
  - People who are currently or were recently incarcerated
  - People with chronic liver disease, including cirrhosis, hepatitis B, or hepatitis C

HEP A RECOMMENDATIONS BY ACIP

- Routine vaccination
  - 2-dose series (minimum interval: 6 months) beginning at age 12 months
- Unvaccinated persons through 18 years should complete a 2-dose series (minimum interval is 6 months).
- Persons who previously received 1 dose at age 12 months or older should receive dose 2 at least 6 months after dose 1.
- Adolescents 18 years and older may receive the combined HepA and HepB vaccine, **Twinrix®**, as a 3-dose series (0, 1, and 6 months) or 4-dose series (0, 7, and 21–30 days, followed by a dose at 12 months)

HEP A FOR CHILDREN TRAVELING TO ENDEMIC AREAS

- Persons traveling to or working in countries with high or intermediate endemic hepatitis A:
  - **Infants age 6–11 months:** 1 dose before departure; revaccinate with 2 doses, separated by at least 6 months, between 12 and 23 months of age
  - **Unvaccinated age 12 months and older:** Administer dose 1 as soon as travel is considered

CASE 11. A MOTHER COMES IN DURING PREGNANCY TO DISCUSS HER NEWBORN NEED FOR HEP B VACCINE

- She wants to know why her newborn child will need a Hepatitis B vaccine. Her Hep B profile does not show any evidence of her having Hep B. She is due to deliver in 2 weeks.
- 1. It is possible for the birth mother to pass the infection onto the baby, which is known as a perinatal infection
- 2. There is no cure for hepatitis B infection, so doctors rely on vaccinations to help prevent it. Hepatitis B attacks the liver and may lead to life-threatening complications without treatment.
- 3. The vaccine is very safe

AN 18 Y/O FEMALE IS TRAVELING ON A GLOBAL HEALTH MISSION TO NIGERIA WITH POWER OF A NICKEL

- She is up to date on all of her routine immunizations . Does she need an IPV (polio) vaccine?
- Persons at greatest risk for acquiring polio are unvaccinated persons. In the United States, infants and children should be vaccinated against polio as part of a routine immunization series. Before traveling to areas with WPV circulation, all travelers should ensure that they have completed the recommended age-appropriate polio vaccine series and have received a **booster dose**, if necessary.
- Three countries are still endemic for polio (Afghanistan, Nigeria, and Pakistan).

GO WITH US ON A GLOBAL HEALTH TRIP WHEN AVAILABLE☺

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- Global Health Non-Profit agency whose mission is to provide medical care, medicines and medical equipment to underserved populations of the world.

QUESTIONS/COMMENTS