Michigan Immunization Update

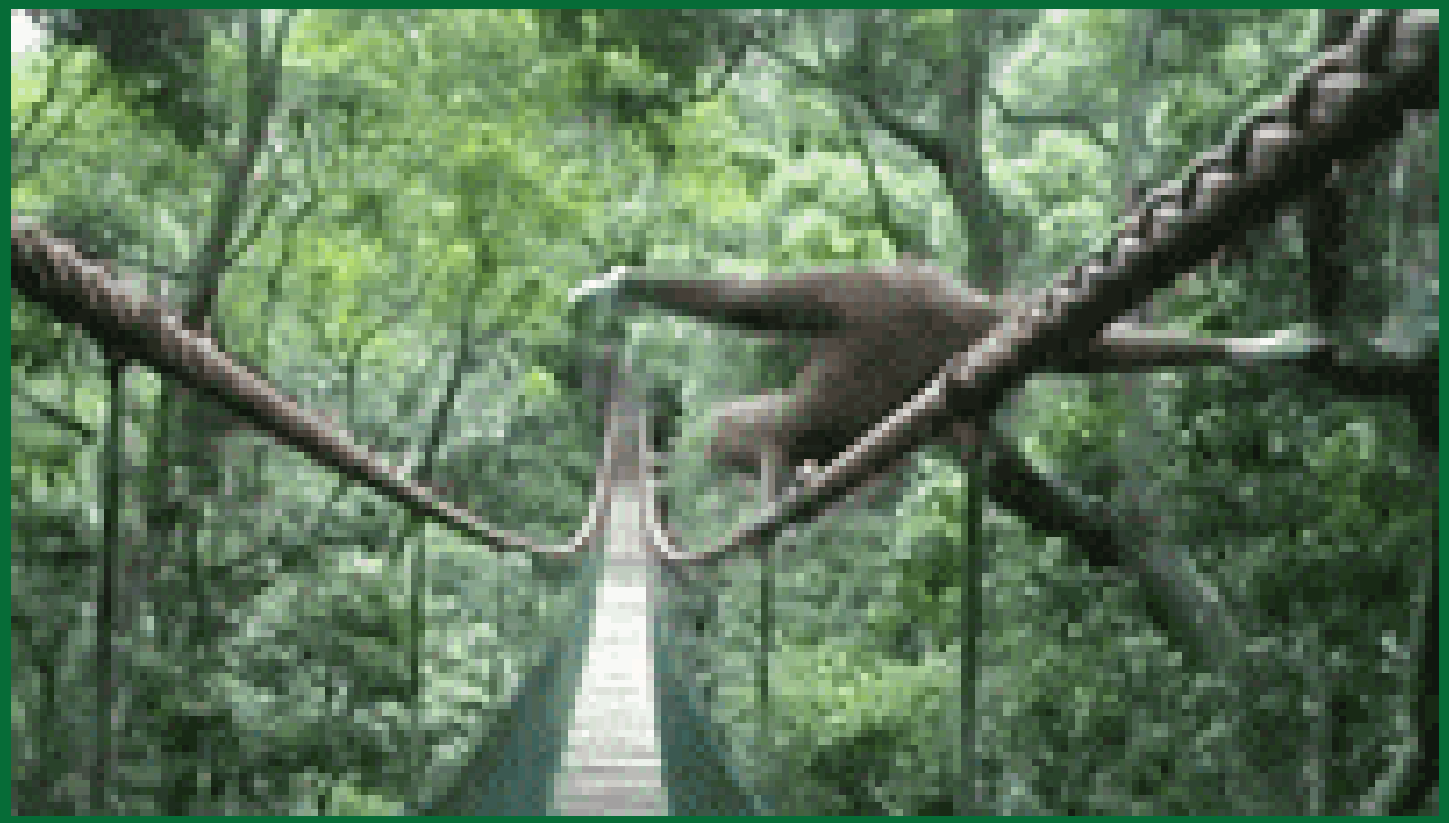
November 2023

Agenda

- Winter is coming (*winter is here*)
  - COVID Commercialization/Bridge Access Program
  - RSV
- State Immunization Coverage Rates
- Challenges
- Strategies to improve rates
- Vaccine Champions

Division of Immunization Priorities

- Ensure equitable access to all vaccines
  - Vaccine deserts
  - Additional data
- Improve routine immunization coverage
  - Best and promising practices
  - Vaccine champions
  - Retain VFC Providers
- Flu, COVID, RSV
  - Education/Training
  - https://www.michigan.gov/mdhhs/keep-mi-healthy/chronicdiseases/seasonal-respiratory-viruses
- Evaluation and Impact Assessment



COVID Commercialization and Bridge Access Program

MDHHS
Michigan Department of Health & Human Services

Key Points

- Commercialization – transition from vaccine supplied by the government to being **supplied by manufacturers for profit.**
- MDHHS **ONLY** has access to public vaccine stock through:
  - Bridge Access Program
  - VFC
- MI-AVP and VFC providers can order vaccine through MDHHS.
  - Normal process through MCIR e-ordering.
- COVID-19 vaccines are covered by private/public insurers, and provided at no cost to uninsured/underinsured adults through the Bridge Access Program.
- Pharmacies have a separate contract with the federal government to provide vaccines to uninsured.

Ordering Controls

- COVID-19 vaccines are becoming available by manufacturer over time rather than all at once.
- Vaccines will continue to vary in distribution:
  - Moderna and Novavax will be centrally distributed.
  - Pfizer will ship directly from the manufacturer.
- Controlled ordering (allocations) helps ensure that COVID-19 vaccines are available to all awardees to support their programmatic plans.
- MDHHS and CDC will regularly monitor allocations and orders in VTrckS.
- As additional COVID-19 vaccines become available, CDC will make updates and adjustments to allocations to align with the ordering activity of awardees.

What is the Role of MDHHS?

Provider Enrollment

- Leverage existing providers enrolled in the awardee's Adult/317 Program and/or enroll new providers.
- Enroll additional providers in areas with low access to vaccination sites, low COVID-19 vaccination coverage, and/or high uninsured rates or providers serving persons in carceral settings.
- Work to ensure that approximately 25% of Bridge Access Program COVID-19 vaccines are distributed through HRSA-supported health centers.
    - All HRSA-supported health centers are eligible to enroll in the awardee's existing Adult/317 Program.
- Coordinate community outreach.

Bridge Program

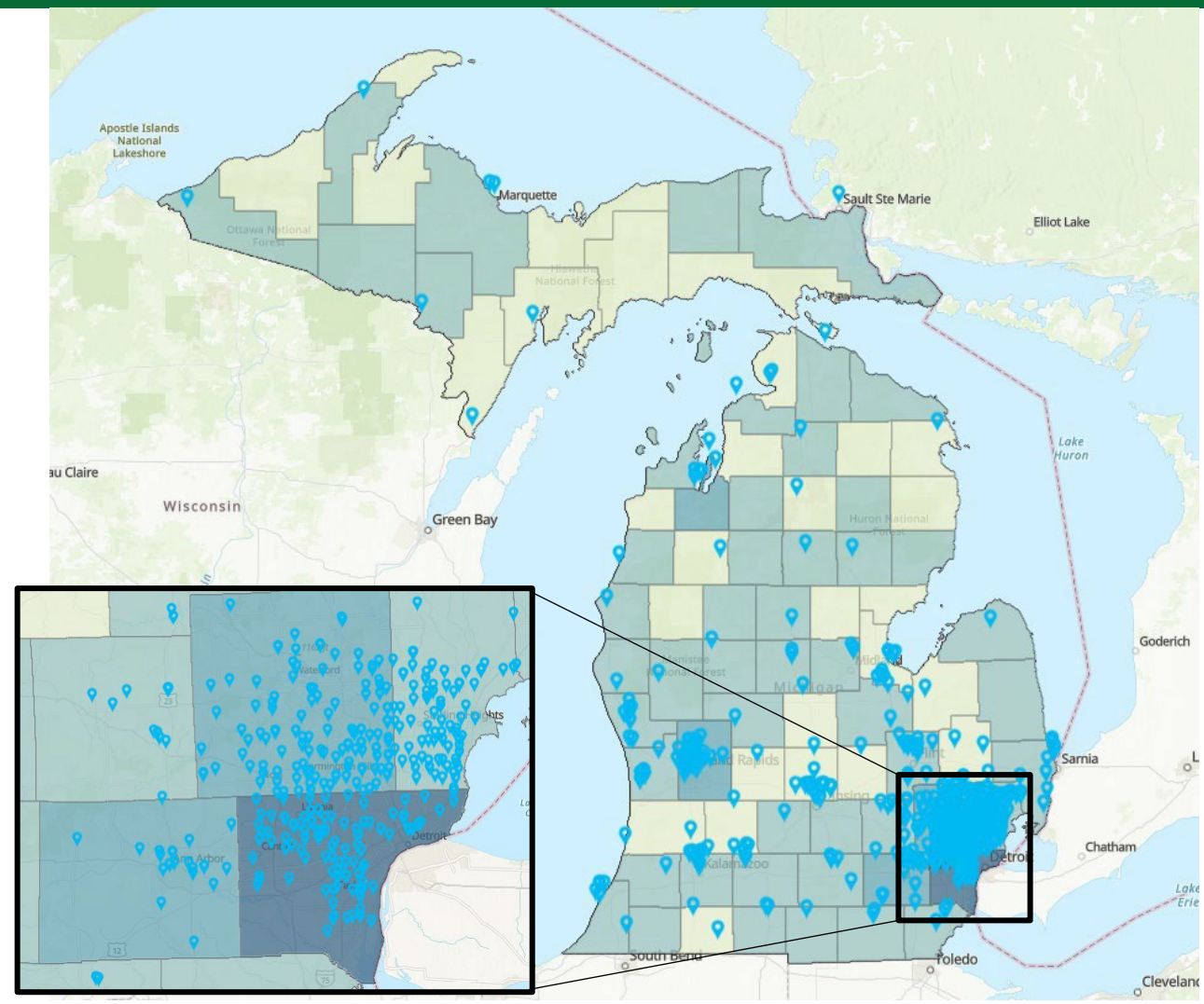
MI-AVP Providers

- LHDs
- FQHCs
- Migrant, tribal, and rural health centers

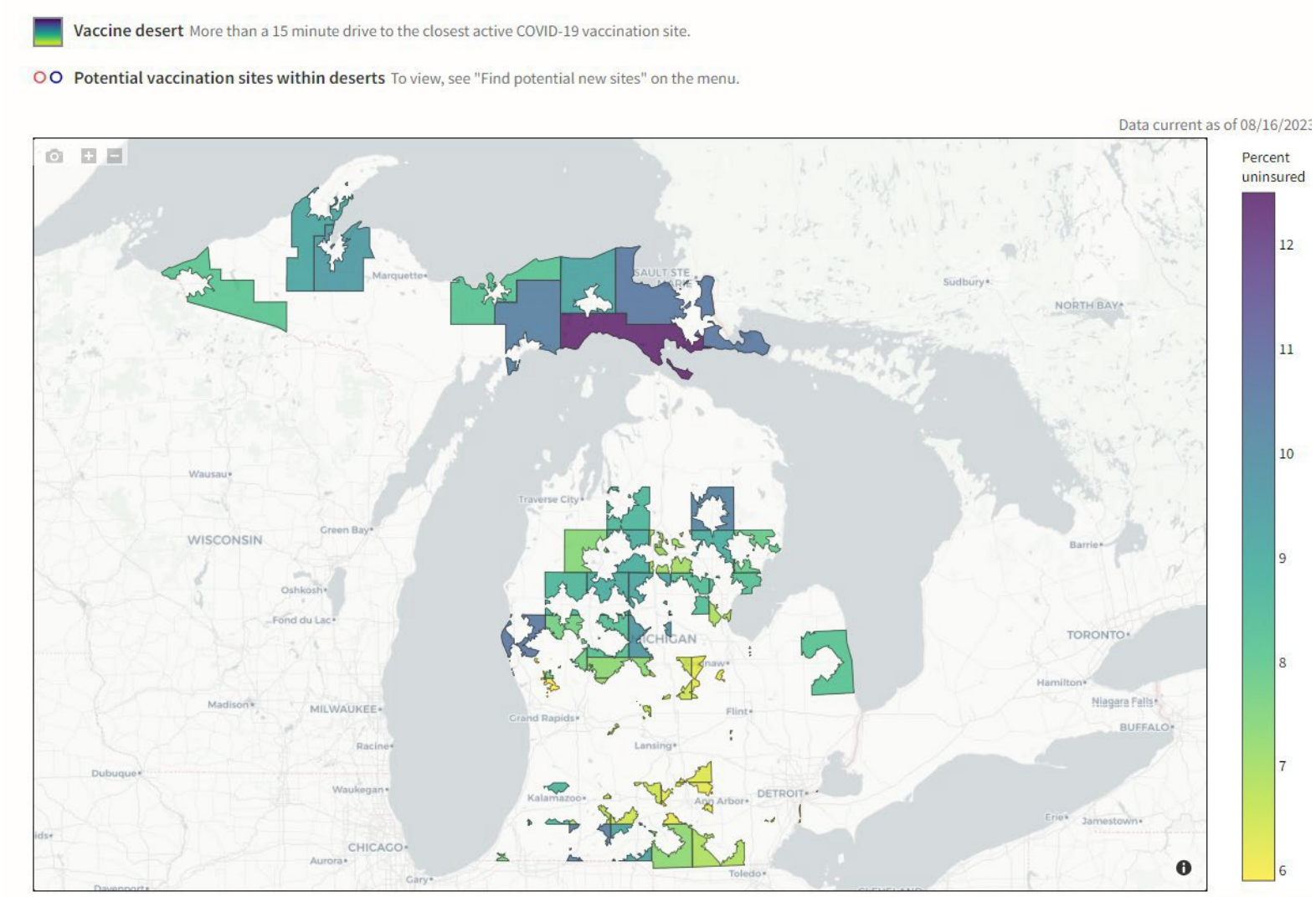
Pharmacies

- Walgreens
- CVS
- eTrueNorth

To sign up, please visit:
www.joinetruenorth.com



COVID Vaccine Provider Deserts



- Work with eTrueNorth to identify independent pharmacies and encourage them to enroll.
- Identify opportunities for community outreach.
- Work with vaccine champions.

RSV Vaccines

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RSV Protection this Season

MDHHS Michigan Department of Health & Human Services

New Immunizations to Protect Against Severe RSV

Who Does It Protect?	Type of Product	Is It for Everyone in Group?
Adults 60 and over	RSV vaccine	Talk to your doctor first
Babies	RSV antibody given to baby	All infants entering or born during RSV season. Small group of older babies for second season.
	OR	
Babies	RSV vaccine given during pregnancy	Can get if you are 32–36 weeks pregnant during September–January

www.cdc.gov/rsv

CDC

RSV Monoclonal Antibody

- August - ACIP met to discuss nirsevimab and voted unanimously on the inclusion of the new monoclonal on the VFC contract; it is recommended for:
  - Infants younger than 8 months in their first RSV season.
  - Children aged 8 months to 19 months who are at higher risk for contracting RSV.

- Challenges:
  - Limited supply
  - Cost
  - Timing
  - Administration considerations
  - Birthing facility vs pediatric office
  - Recording inventory and administrations in MCIR

MDHHS Prioritization

- Limited allocations of nirsevimab.
- MDHHS implements CDC recommendations for healthcare providers on use of nirsevimab during limited allocations:
  - For infants weighing <5 kg, ACIP recommendations are unchanged.
  - For infants weighing ≥5 kg, prioritize using 100 mg nirsevimab doses in infants at highest risk of severe RSV disease:
    - Young infants aged <6 months.
    - American Indian and Alaska Native infants aged <8 months.
    - Infants aged 6 through 7 months with conditions that place them at high risk of severe RSV disease.
  - In palivizumab-eligible children aged 8–19 months, suspend using nirsevimab for the 2023–2024 RSV season. These children should receive palivizumab per AAP recommendations.
  - Continue offering nirsevimab to American Indian and Alaska Native children aged 8–19 months who are not palivizumab-eligible and who live in remote regions.
  - Follow AAP recommendations for palivizumab-eligible infants aged <8 months when the appropriate dose of nirsevimab is not available.

MDHHS Prioritization cont.…

- **Avoid using two 50 mg doses for infants weighing ≥5 kilograms** (≥11 pounds), because 50 mg doses should be reserved only for infants weighing <5 kilograms (<11 pounds).
- Providers should encourage pregnant people to receive RSVpreF vaccine (Abrysvo, Pfizer) during 32 weeks' gestation through 36 weeks.
- **VFC supply stock should remain prioritized for VFC eligible children**.
  - While there are supply constraints for nirsevimab, bi-directional borrowing will not be allowed for VFC providers.
- MDHHS will continue to review nirsevimab supply and send further messages regarding its usage and prioritization.
- Noontime knowledge slides cover prioritization guidance in detail:
  - https://www.michigan.gov/mdhhs/adult-child-serv/childrenfamilies/immunization/mdhhs-covid-19-vaccine-webinars

RSV Pregnant Persons

- September 22 – ACIP met to discuss RSV vaccines for pregnant persons to protect infants:
  - Recommended administration 32-36 weeks.
  - VFC doses for pregnant persons < 18 years.

- Challenges:
  - Provider awareness of birth parent immunization status at pediatric visits for the infant.
  - MCIR forecasting.

RSV Older Adults

- Shared clinical decision making
  - High risk due to comorbidities
  - Frailty
  - Long term care residents

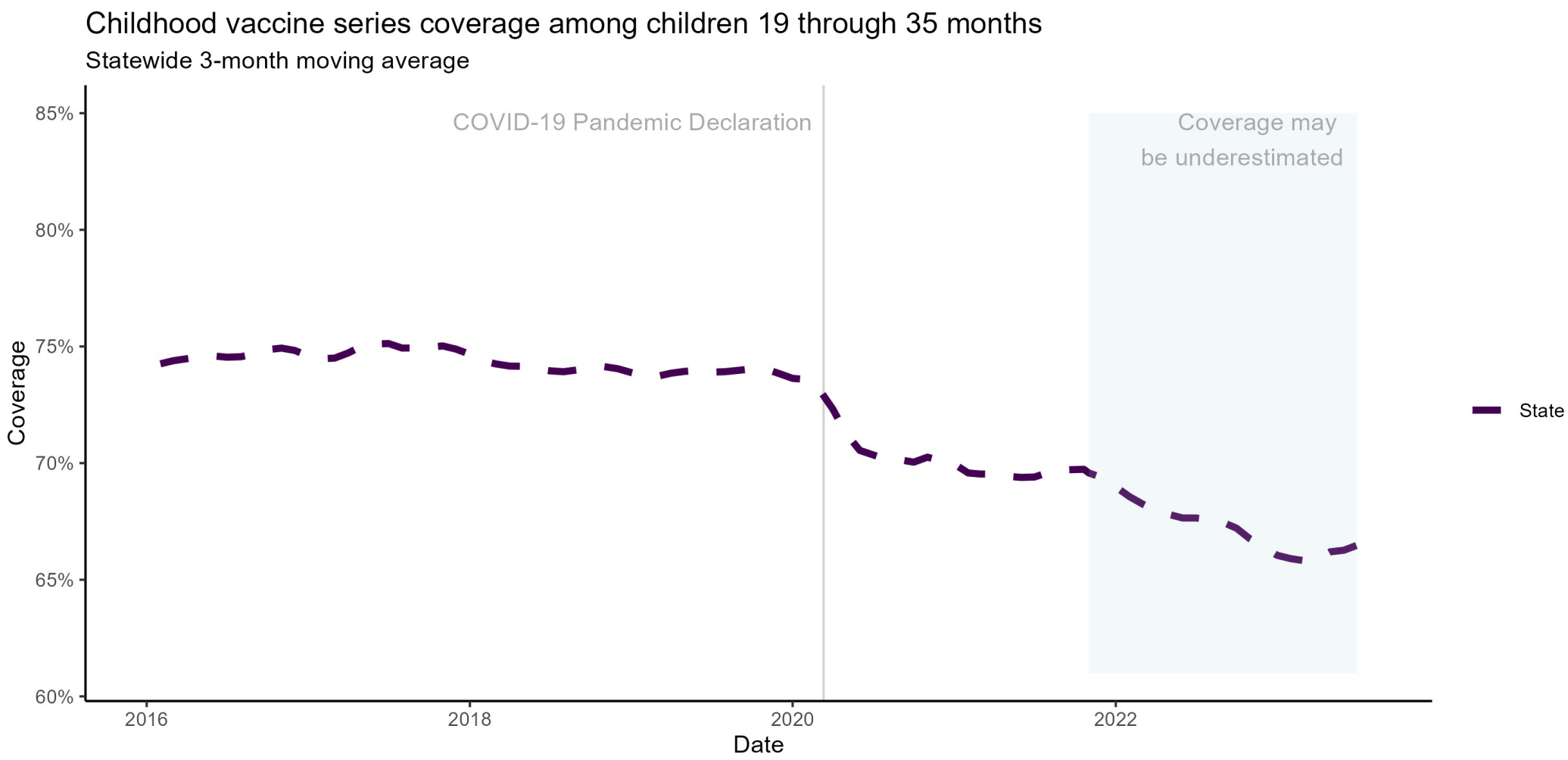
- Challenges
  - Billing insurance
  - Coadministration

Michigan’s Immunization Rates

MDHHS
Michigan Department of Health & Human Services

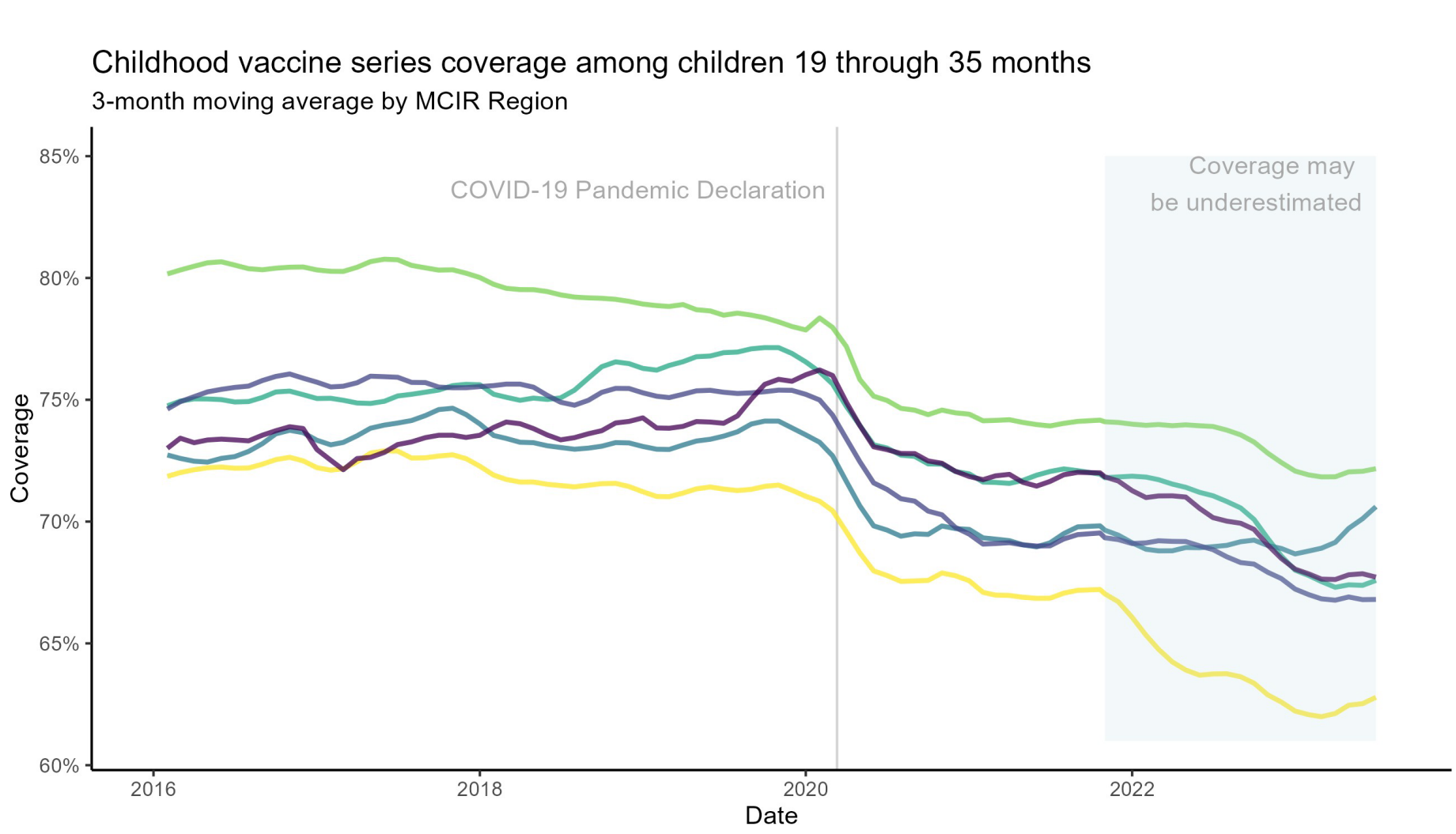
Childhood Coverage is Alarmingly Low

MDHHS
Michigan Department of Health & Human Services



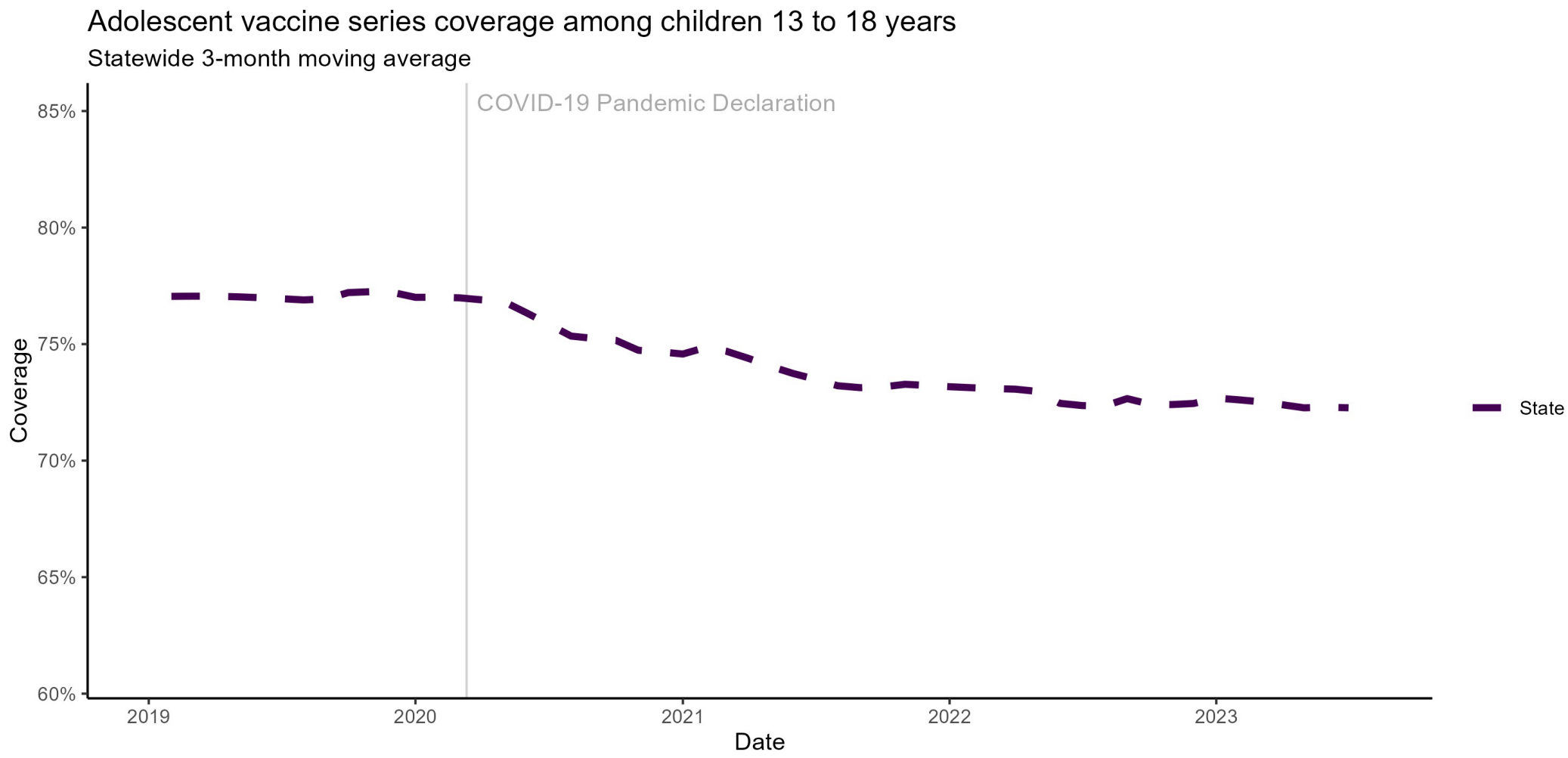
Series - 4 DTaP, 3 Polio, 1 MMR, 3 Hib, 3 HepB, 1 Varicella, 4 PCV

All Regions Impacted



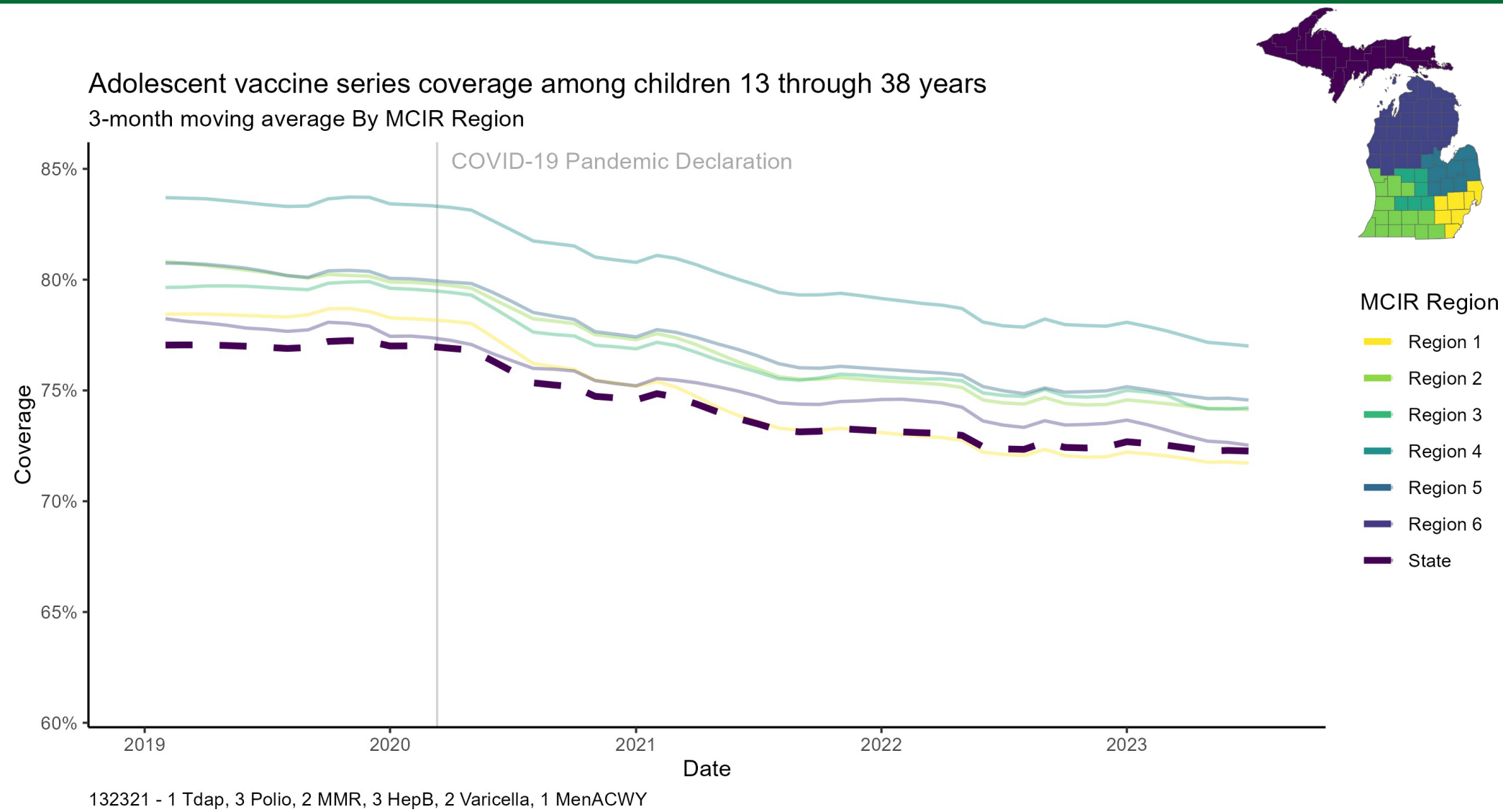
4313314 - 4 DTaP, 3 Polio, 1 MMR, 3 Hib, 3 HepB, 1 Varicella, 4 PCV

Adolescent Coverage is Not Affected as Much



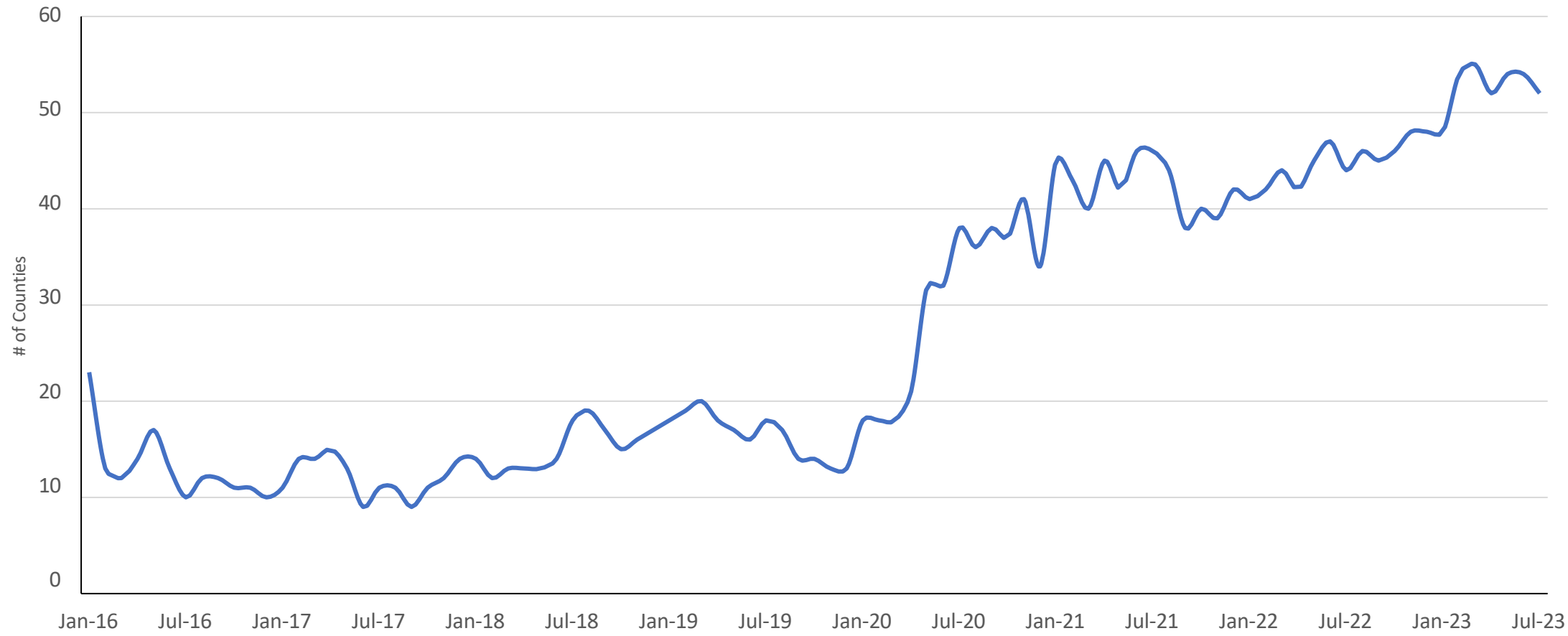
Series - 1 Tdap, 3 Polio, 2 MMR, 3 HepB, 2 Varicella, 1 MenACWY

Similar Pattern in All Regions



132321 - 1 Tdap, 3 Polio, 2 MMR, 3 HepB, 2 Varicella, 1 MenACWY

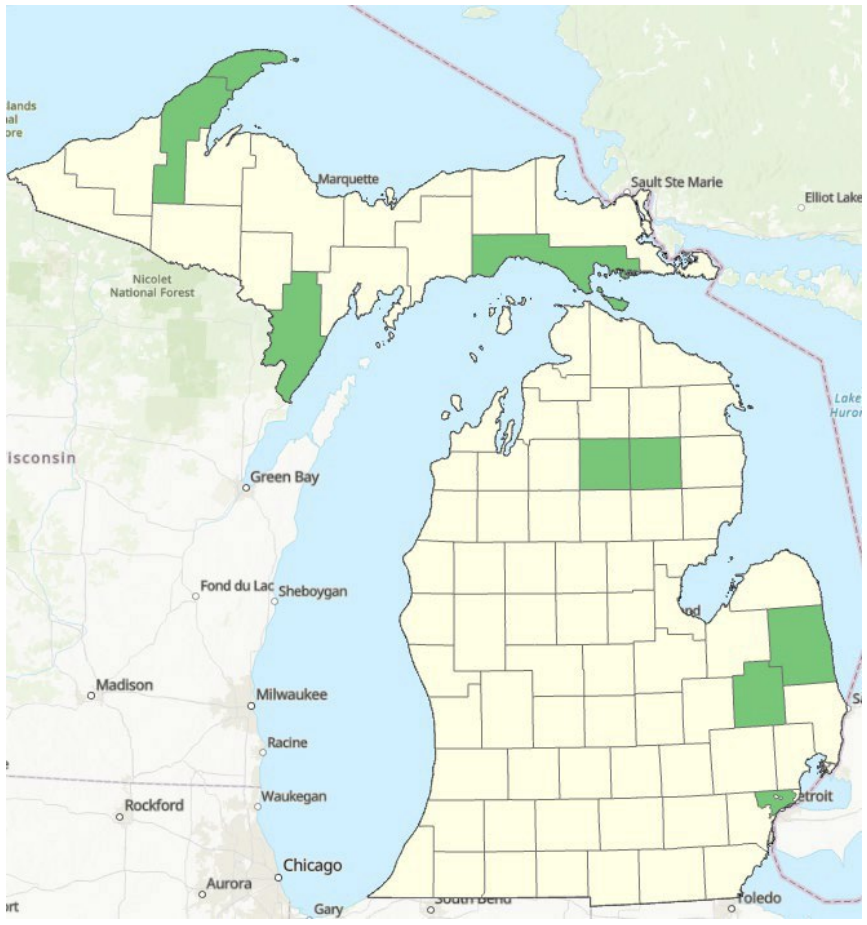
Number of Counties with Childhood Coverage of 70% or Lower



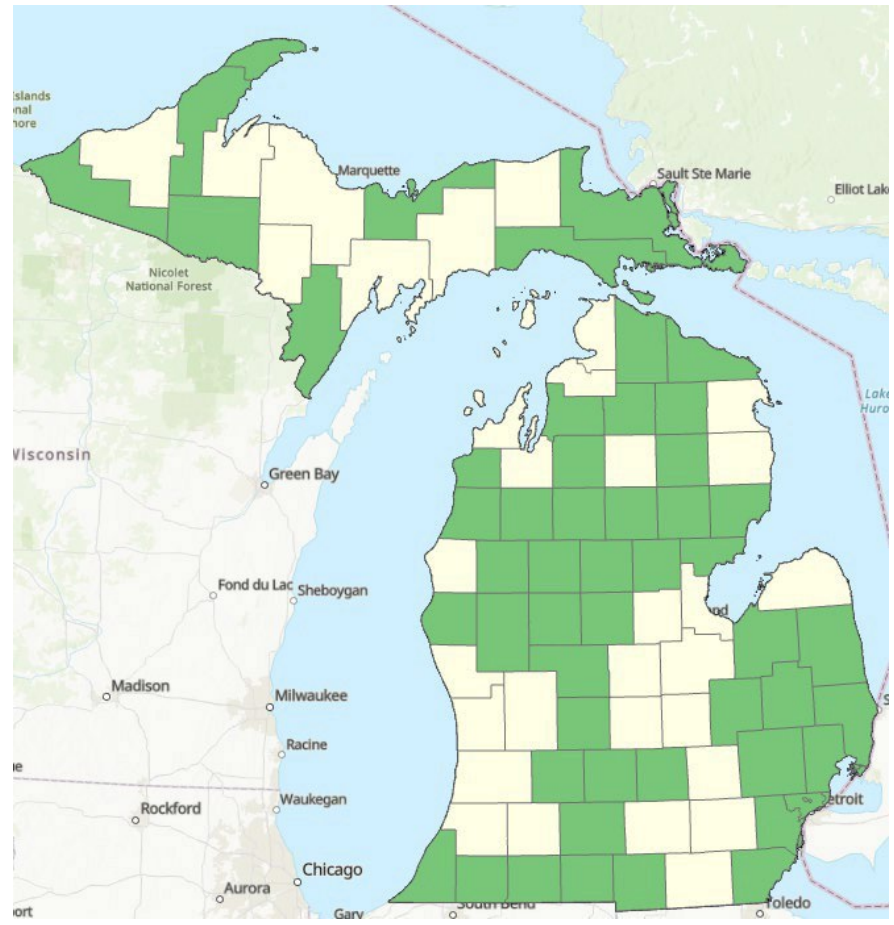
Childhood Series Coverage by County

MDHHS Michigan Department of Health & Human Services

2017

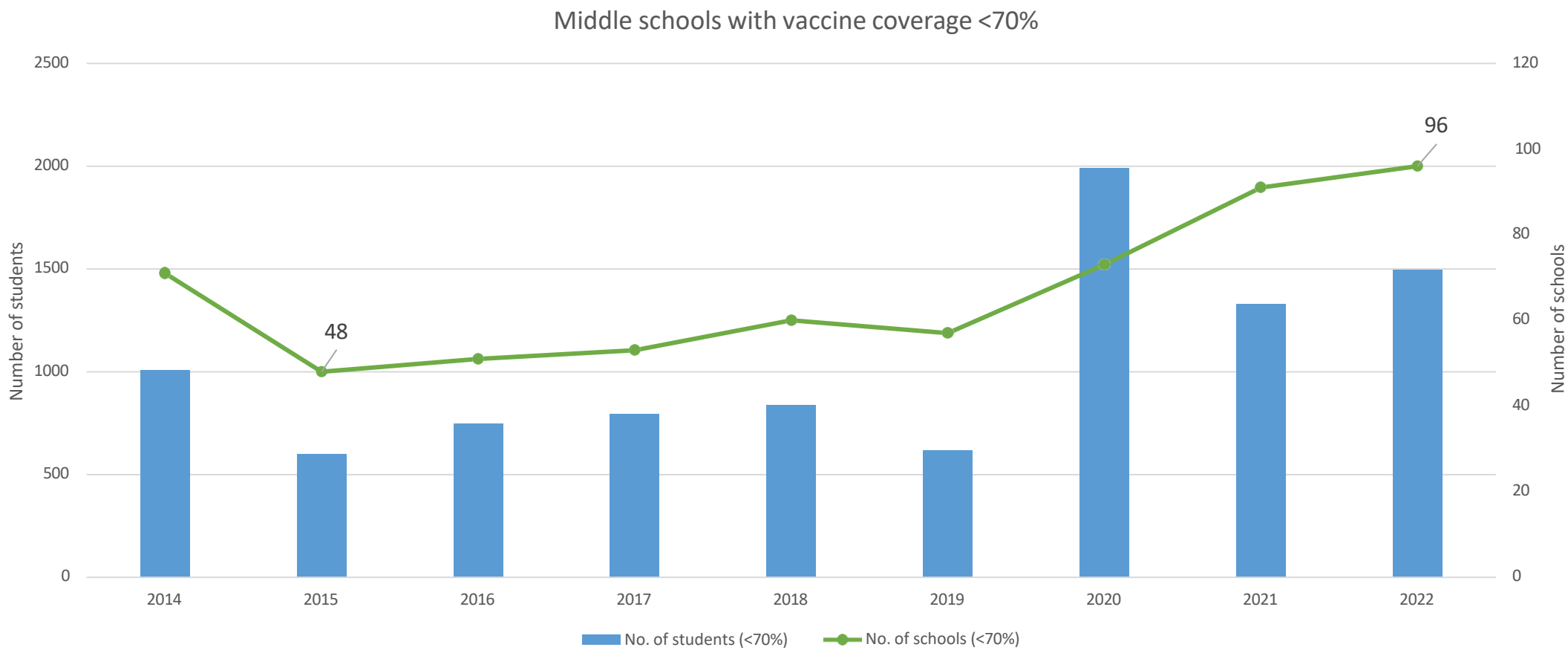


2023



Counties shaded green have coverage < 70%

More 7th Graders Attend Schools with Low Completion of Required Series

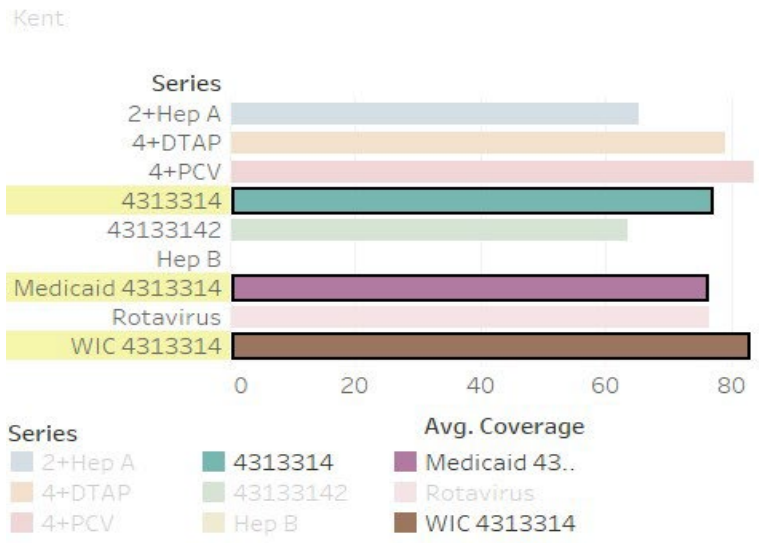


A **Bright** Spot

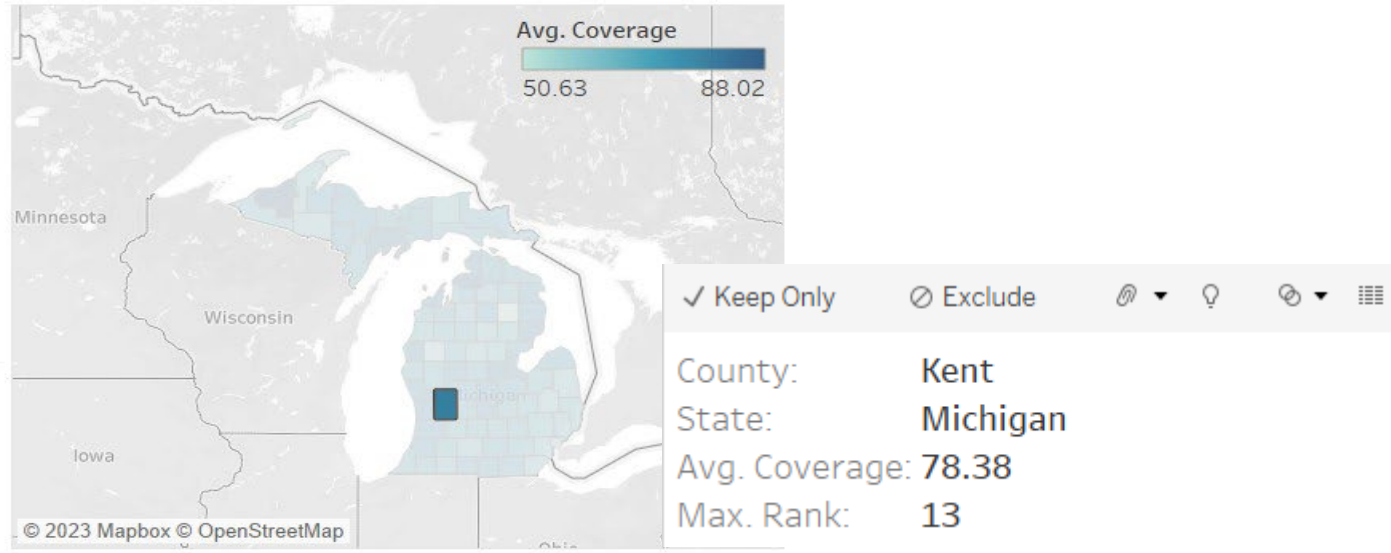
MDHHS Michigan Department of Health & Human Services

MCIR Region: All | County: All | Year of Year (Q): 2023 | Series: All

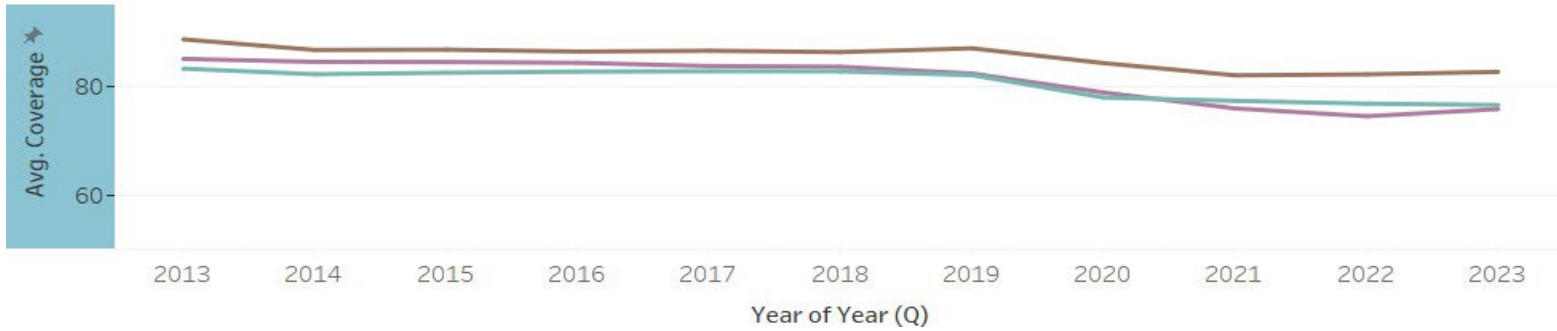
Kent



Child_1



Trends in Childhood Immunizations 2013 - 2023

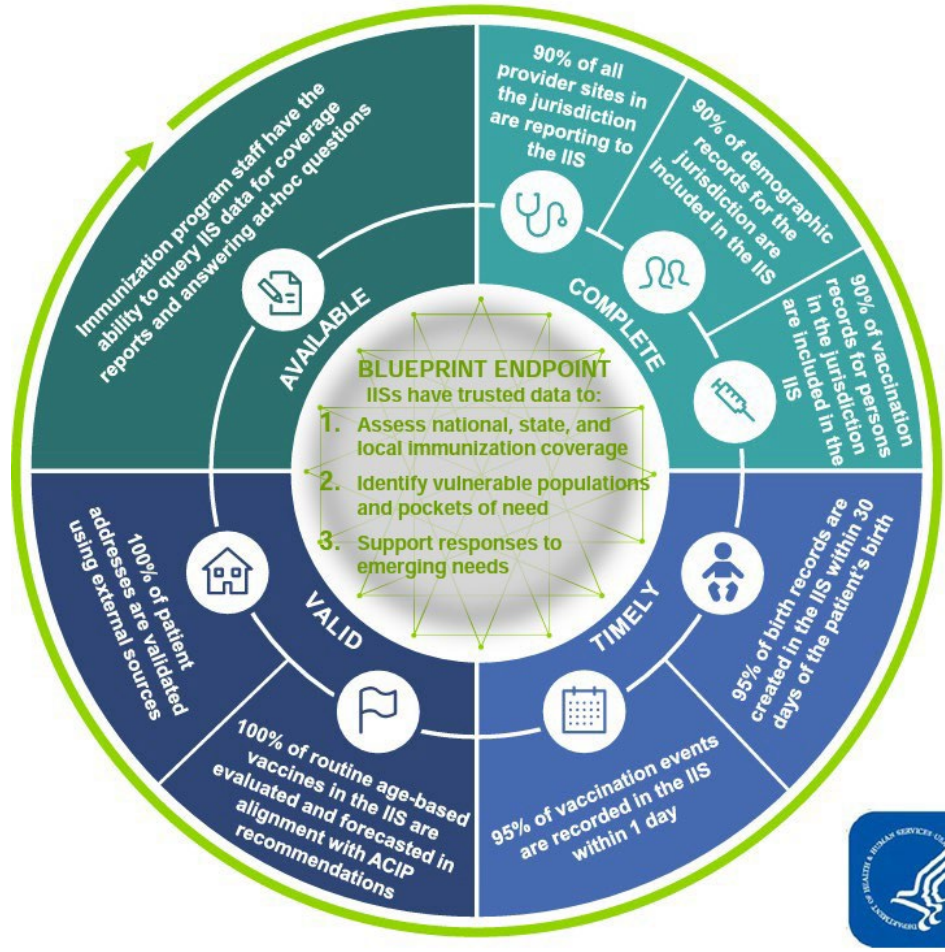


Challenges

- Increasing vaccine hesitancy
- Distrust in government
- Data quality
- New and more expensive immunization products
- Staff turnover/burnout

Strategies

- Better data, better use of the data
  - Data quality focus
  - Available, complete, timely, valid
  - Deduplication
- Trusted messengers
- Access
  - Provider deserts
  - Retain VFC providers
  - Alternative providers/community outreach



AA1 Project

Target population:

- Children 19 through 35 months of age who live in Oscoda, Gladwin, or Houghton counties.

Goals:

- Identify and establish collaborations with influential community members and organizations
- Conduct listening sessions/focus groups
- Conduct vaccine clinics at non-traditional venues
- Reduce provider level-vaccine hesitancy.
- Increase vaccination coverage and timeliness in these jurisdictions.
- Reduce school and childcare waivers.
- Established a model that can be used in other jurisdictions or scaled up to regional or statewide interventions.

Socioeconomic indicators	**Oscoda**	**Gladwin**	**Houghton**	**State Average**
Percent ≤ 150% poverty level	24.7	29.0	30.5	23.2
Percent Uninsured	13.6	9.0	7.0	6.3
Medicaid Eligibility among children 19-36 months	53.2	52.8	47.9	47.5
Vaccination	**Oscoda**	**Gladwin**	**Houghton**	**State Average**
Primary childhood series (4313314)	31.8%	58.9%	55.5%	65.8%

Vaccine Champions

- Convene identified vaccine champions from a variety of health organizations to discuss immunization priorities in Michigan
- First step in aligning and advancing shared goals, developing relationships, and re-establishing a statewide Immunization Coalition.
- Commit to prioritizing vaccine uptake across the state and identify best practices to move this important work forward.
- “Vaccine Champions” will meet leaders from other sectors (health insurance payers, medical organizations, health systems, and local health departments) resulting in opportunities for cross-collaboration.

Recap

- COVID Vaccines are commercialized.
  - MDHHS has a role in Bridge and VFC and in coordinating community outreach.
- RSV immunizations (vaccines for pregnancy and monoclonal antibodies) are being rolled out.
- Immunization coverage continues to decline statewide and retention of VFC Providers is a key part of reversing that trend.
- Rebuilding trust, ensuring equitable access, improving the way we gather and use data will also be keys to improving our coverage.

Back to Basics: Vaccine Errors and Ways to Avoid Them- Pediatric and Adult Case Studies

FALL IMMUNIZATION CONFERENCE 2023

PRESENTER: DIANNE ANKLEY BSN, RN

Use the Vaccine Administration Protocols:

Review Immunization History

Reviewing and assessing a patient's immunization history should be done at every health care visit to help determine which vaccines may be needed

Assess for Needed Immunizations

Use the current Advisory Committee on Immunization Practices (ACIP) immunization schedule to determine what recommended vaccines are needed based on the patient's immunization history

Screen for Contraindications and Precautions

Screening for contraindications and precautions can prevent adverse events following vaccination. All patients should be screened for contraindications and precautions prior to administering any vaccine, even if the patient has previously received that vaccine

Vaccine Administration Protocols | CDC

Vaccine Administration Protocols Cont:

Educate the Patient

Health care professionals should be prepared to provide comprehensive vaccine information

Prepare the Vaccine(s)

Proper preparation is critical for maintaining the integrity of the vaccine during transfer from the vial to the syringe

Administer the Vaccine(s)

Each vaccine has a recommended administration route and site, which are based on clinical trials, practical experience, and theoretical considerations

Document the Vaccination(s)

Health care providers are required by law to record certain information in a patient's medical record

Vaccine Administration Protocols | CDC

Before You Vaccinate Consider the Following:

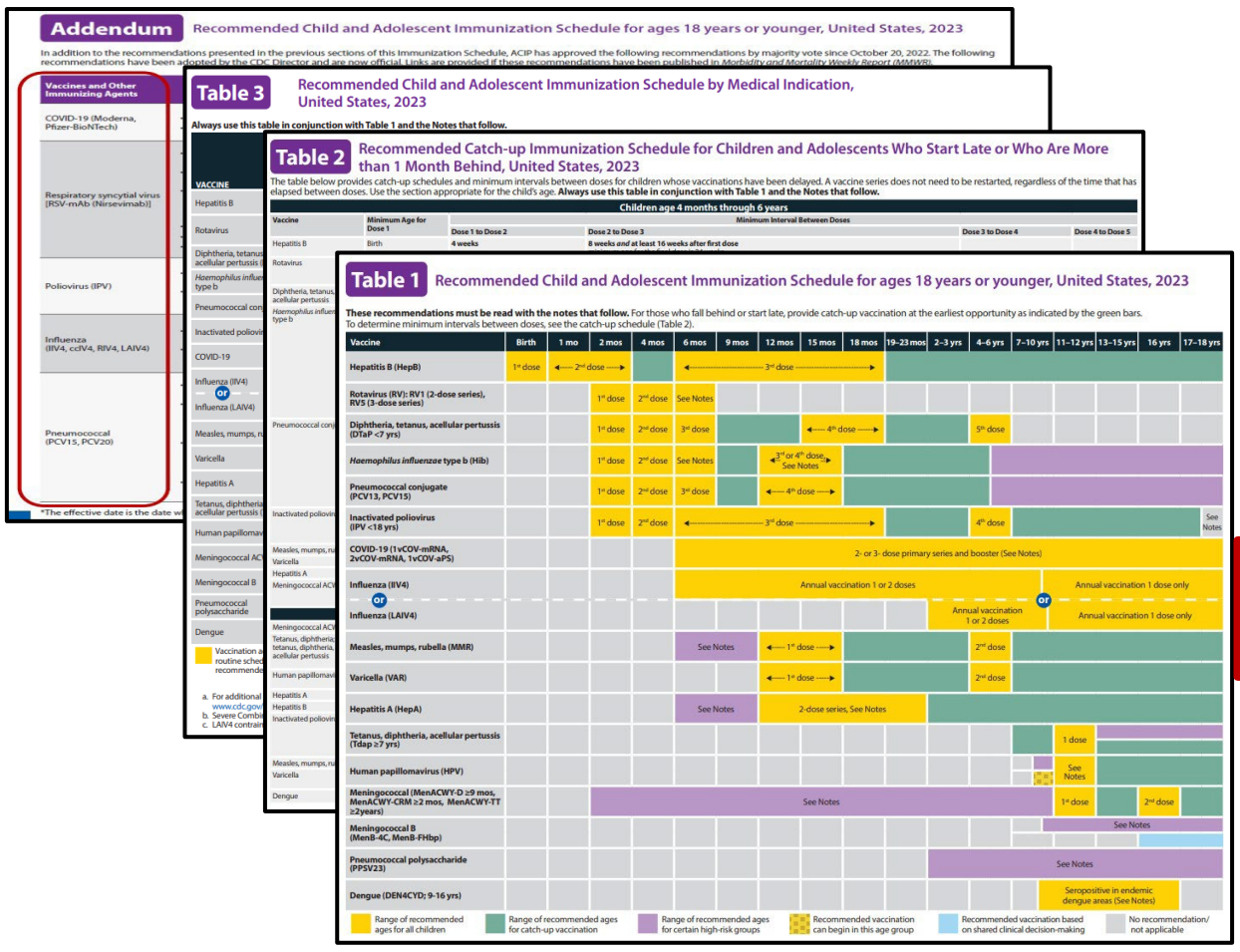
During your assessment, respond to these four questions:

1. What vaccine(s) does the person need today?
2. Based on the persons current medical history are there any contraindications or precautions to receiving the recommended vaccines today?
3. Are there any medical conditions or other indications that would suggest the need for additional vaccines?
4. What vaccine(s) will you give today?
5. When should this person return and what vaccines will be recommended at that visit?

Vaccine Administration Protocols | CDC

Know Your Pediatric Resources and Where to Find Them

2023 Recommended Immunization Schedule for Children and Adolescents



- Immunization schedules for those birth through 18 years of age
  - Schedule by Vaccine and Age Group
  - Catch-Up Schedule
  - Schedule by Medical Indication
  - Addendum
- Addendum includes new or updated ACIP vaccine recommendations
- Schedule notes include information on risk groups, minimum and recommended intervals

2023 Centers for Disease Control (CDC) Child and adolescent Immunization Schedule

Table 1 COVID-19 vaccination recommendations have changed. Find the latest recommendations at www.cdc.gov/covidschedule

Recommended Child and Adolescent Immunization Schedule for ages 18 years or younger, United States, 2023

These recommendations must be read with the notes that follow. For those who fall behind or start late, provide catch-up vaccination at the earliest opportunity as indicated by the green bars. To determine minimum intervals between doses, see the catch-up schedule (Table 2).

Vaccine	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 yrs	17–18 yrs
Hepatitis B (HepB)	1st dose	◄---- 2nd dose ----►			◄---------- 3rd dose ----------►												
Rotavirus (RV): RV1 (2-dose series), RV5 (3-dose series)			1st dose	2nd dose	See Notes												
Diphtheria, tetanus, acellular pertussis (DTaP <7 yrs)			1st dose	2nd dose	3rd dose		◄---- 4th dose ----►					5th dose					
Haemophilus influenzae type b (Hib)			1st dose	2nd dose	See Notes		◄---- 3rd or 4th dose, See Notes ----►										
Pneumococcal conjugate (PCV13, PCV15)			1st dose	2nd dose	3rd dose		◄---- 4th dose ----►										
Inactivated poliovirus (IPV <18 yrs)			1st dose	2nd dose	◄---------- 3rd dose ----------►							4th dose					
COVID-19 (1vCOV-mRNA, 2vCOV-mRNA, 1vCOV-aPS)					2- or 3- dose primary series and booster (See Notes)												
Influenza (IIV4)					Annual vaccination 1 or 2 doses												
or																	
Influenza (LAIV4)												Annual vaccination 1 or 2 doses					
Measles, mumps, rubella (MMR)					See Notes		◄---- 1st dose ----►					2nd dose					
Varicella (VAR)							◄---- 1st dose ----►					2nd dose					
Hepatitis A (HepA)					See Notes		2-dose series, See Notes										
Tetanus, diphtheria, acellular pertussis (Tdap ≥7 yrs)																	
Human papillomavirus (HPV)																	
Meningococcal (MenACWY-D ≥9 mos, MenACWY-CRM ≥2 mos, MenACWY-TT ≥2years)			See Notes														
Meningococcal B (MenB-4C, MenB-FHbp)																	
Pneumococcal polysaccharide (PPSV23)											See Notes						
Dengue (DEN4CYD; 9-16 yrs)													Seropositive in endemic dengue areas (See Notes)				

Range of recommended ages for all children | Range of recommended ages for catch-up vaccination | Range of recommended ages for certain high-risk groups | Recommended vaccination can begin in this age group | Recommended vaccination based on shared clinical decision-making | No recommendation/ not applicable

- = Range of recommended ages for all children
- = Range of recommended ages for catch-up
- = Range of recommended ages for certain high-risk groups
- = Recommended vaccination can begin in this age group
- = Recommended based on shared clinical decision making
- = No recommendation/not applicable

[Birth-18 Years Immunization Schedule – Healthcare Providers | CDC]

Table 3

Recommended Child and Adolescent Immunization Schedule by Medical Indication, United States, 2023

Always use this table in conjunction with Table 1 and the Notes that follow.

VACCINE	INDICATION										
	Pregnancy	Immunocompromised status (excluding HIV infection)	HIV infection CD4+ count[a]		Kidney failure, end-stage renal disease, or on hemodialysis	Heart disease or chronic lung disease	CSF leak or cochlear implant	Asplenia or persistent complement component deficiencies	Chronic liver disease	Diabetes
			<15% or total CD4 cell count of <200/mm³	≥15% and total CD4 cell count of ≥200/mm³						
Hepatitis B										
Rotavirus		SCID[b]								
Diphtheria, tetanus, and acellular pertussis (DTaP)										
Haemophilus influenzae type b										
Pneumococcal conjugate										
Inactivated poliovirus										
COVID-19		See Notes	See Notes							
Influenza (IIV4)										
or										
Influenza (LAIV4)						Asthma, wheezin				
Measles, mumps, rubella	*									
Varicella	*									
Hepatitis A										
Tetanus, diphtheria, and acellular pertussis (Tdap)										
Human papillomavirus	*									
Meningococcal ACWY										
Meningococcal B										
Pneumococcal polysaccharide										
Dengue										

Vaccination according to the routine schedule recommended

Recommended for persons with an additional risk factor for which the vaccine would be indicated

Vaccination is recommended, and additional doses may be necessary based on medical condition or vaccine. See Notes.

Precaution–vaccine might be indicated if benefit of protection outweighs risk of adverse reaction

Contraindicated or not recommended–vaccine should not be administered

*Vaccinate after pregnancy

No recommendation/not applicable

a. For additional information regarding HIV laboratory parameters and use of live vaccines, see the *General Best Practice Guidelines for Immunization*, "Altered Immunocompetence," at www.cdc.gov/vaccines/hcp/acip-recs/general-recs/immunocompetence.html and Table 4-1 (footnote J) at www.cdc.gov/vaccines/hcp/acip-recs/general-recs/contraindications.html.
b. Severe Combined Immunodeficiency
c. LAIV4 contraindicated for children 2–4 years of age with asthma or wheezing during the preceding 12 months

= Vaccination according to the routine recommended schedule

= Recommended for persons with an additional risk factor for which the vaccine would be indicated

= Vaccination is recommended, and additional doses may be necessary based on medical condition. See Notes

= Precaution-vaccine might be indicated if benefit of protection outweighs risk of adverse reaction

= Contraindicated or not recommended-vaccine should not be administered (*Vaccinate after pregnancy)

= No recommendation/not applicable

Birth-18 Years Immunization Schedule – Healthcare Providers | CDC

Notes — Recommended Child and Adolescent Immunization Schedule for ages 18 years or younger, United States, 2023

Haemophilus influenzae type b vaccination (minimum age: 6 weeks)

Routine vaccination

- **ActHIB®, Hiberix®, Pentacel®, or Vaxelis®:** 4-dose series (3-dose primary series at age 2, 4, and 6 months, followed by a booster dose* at age 12–15 months)
  - *Vaxelis® is not recommended for use as a booster dose. A different Hib-containing vaccine should be used for the booster dose.
- **PedvaxHIB®:** 3-dose series (2-dose primary series at age 2 and 4 months, followed by a booster dose at age 12–15 months)

Catch-up vaccination

- **Dose 1 at age 7–11 months:** Administer dose 2 at least 4 weeks later and dose 3 (final dose) at age12–15 months or 8 weeks after dose 2 (whichever is later).
- **Dose 1 at age 12–14 months:** Administer dose 2 (final dose) at least 8 weeks after dose 1.
- **Dose 1 before age 12 months and dose 2 before age 15 months:** Administer dose 3 (final dose) at least 8 weeks after dose 2.
- **2 doses of PedvaxHIB® before age 12 months:** Administer dose 3 (final dose) at age12–59 months and at least 8 weeks after dose 2.
- **1 dose administered at age 15 months or older:** No further doses needed
- **Unvaccinated at age 15–59 months:** Administer 1 dose.
- **Previously unvaccinated children age 60 months or older who are not considered high risk:** Do not require catch-up vaccination

For other catch-up guidance, see Table 2. Vaxelis® can be used for catch-up vaccination in children less than age 5 years. Follow the catch-up schedule even if Vaxelis® is used for one or more doses. For detailed information on use of Vaxelis® see www.cdc.gov/mmwr/volumes/69/wr/mm6905a5.htm.

Special situations

- **Chemotherapy or radiation treatment:**
  Age 12–59 months
  - Unvaccinated or only 1 dose before age 12 months: 2 doses, 8 weeks apart
  - 2 or more doses before age 12 months: 1 dose at least 8 weeks after previous dose

  Doses administered within 14 days of starting therapy or during therapy should be repeated at least 3 months after therapy completion.
- **Hematopoietic stem cell**
  - 3-dose series 4 weeks ap
  - successful transplant, reg
- **Anatomic or functional a**
  sickle cell disease):
  Age 12–59 months
  - Unvaccinated or only 1 d
    2 doses, 8 weeks apart
  - 2 or more doses before a
    1 dose at least 8 weeks a

  Unvaccinated persons age*
  - 1 dose
- **Elective splenectomy:**
  Unvaccinated persons age*
  - 1 dose (preferably at leas
- **HIV infection:**
  Age 12–59 months
  - Unvaccinated or only 1 d
    2 doses, 8 weeks apart
  - 2 or more doses before a
    1 dose at least 8 weeks a

  Unvaccinated persons age*
  - 1 dose
- **Immunoglobulin deficie**
  complement deficiency:
  Age 12–59 months
  - Unvaccinated or only 1 d
    2 doses, 8 weeks apart
  - 2 or more doses before a
    1 dose at least 8 weeks a

*Unvaccinated = Less than r
14 months) OR no doses (a

Hepatitis A vaccinati (minimum age: 12 mor

Routine vaccination

- 2-dose series (minimum i
  age 12–23 months

Catch-up vaccination

- Unvaccinated persons thr
  a 2-dose series (minimum
- Persons who previously re
  older should receive dose

See Addendum for new or updated ACIP vaccine recommendations

Notes — Recommended Child and Adolescent Immunization Schedule for ages 18 years or younger, United States, 2023

For vaccination recommendations for persons ages 19 years or older, see the Recommended Adult Immunization Schedule, 2023.

Additional information

- Consult relevant ACIP statements for detailed recommendations at www.cdc.gov/vaccines/hcp/acip-recs/index.html.
- For calculating intervals between doses, 4 weeks = 28 days. Intervals of ≥4 months are determined by calendar months.
- Within a number range (e.g., 12–18), a dash (–) should be read as "through."
- Vaccine doses administered ≤4 days before the minimum age or interval are considered valid. Doses of any vaccine administered ≥5 days earlier than the minimum age or minimum interval should not be counted as valid and should be repeated as age appropriate. **The repeat dose should be spaced after the invalid dose by the recommended minimum interval.** For further details, see Table 3-2, Recommended and minimum ages and intervals between vaccine doses, in *General Best Practice Guidelines for Immunization* at www.cdc.gov/vaccines/hcp/acip-recs/general-recs/timing.html.
- Information on travel vaccination requirements and recommendations is available at www.cdc.gov/travel/.
- For vaccination of persons with immunodeficiencies, see Table 8-1, Vaccination of persons with primary and secondary immunodeficiencies, in *General Best Practice Guidelines for Immunization* at www.cdc.gov/vaccines/hcp/acip-recs/general-recs/immunocompetence.html, and Immunization in Special Clinical Circumstances (In: Kimberlin DW, Barnett ED, Lynfield Ruth, Sawyer MH, eds. *Red Book: 2021–2024 Report of the Committee on Infectious Diseases*. 32nd ed. Itasca, IL: American Academy of Pediatrics; 2021:72–86).
- For information about vaccination in the setting of a vaccine-preventable disease outbreak, contact your state or local health department.
- The National Vaccine Injury Compensation Program (VICP) is a no-fault alternative to the traditional legal system for resolving vaccine injury claims. All vaccines included in the child and adolescent vaccine schedule are covered by VICP except dengue, PPSV23, and COVID-19 vaccines. COVID-19 vaccines that are authorized or approved by the FDA are covered by the Countermeasures Injury Compensation Program (CICP). For more information, see www.hrsa.gov/vaccinecompensation or www.hrsa.gov/cicp.

COVID-19 vaccination (minimum age: 6 months [Moderna and Pfizer-BioNTech COVID-19 vaccines], 12 years [Novavax COVID-19 Vaccine])

Routine vaccination

- **Primary series:**
  - **Age 6 months–4 years:** 2-dose series at 0, 4-8 weeks (Moderna) or 3-dose series at 0, 3-8, 11-16 weeks (Pfizer-BioNTech)
  - **Age 5–11 years:** 2-dose series at 0, 4-8 weeks (Moderna) or 2-dose series at 0, 3-8 weeks (Pfizer-BioNTech)
  - **Age 12–18 years:** 2-dose series at 0, 4-8 weeks (Moderna) or 2-dose series at 0, 3-8 weeks (Novavax, Pfizer-BioNTech)
- For **booster dose recommendations** see www.cdc.gov/vaccines/covid-19/clinical-considerations/interim-considerations-us.html

Special situations

Persons who are moderately or severely immunocompromised

- **Primary series**
  - **Age 6 months–4 years:** 3-dose series at 0, 4, 8 weeks (Moderna) or 3-dose series at 0, 3, 11 weeks (Pfizer-BioNTech)
  - **Age 5–11 years:** 3-dose series at 0, 4, 8 weeks (Moderna) or 3-dose series at 0, 3, 7 weeks (Pfizer-BioNTech)
  - **Age 12–18 years:** 3-dose series at 0, 4, 8 weeks (Moderna) or 2-dose series at 0, 3 weeks (Novavax) or 3-dose series at 0, 3, 7 weeks (Pfizer-BioNTech)
- **Booster dose:** see www.cdc.gov/vaccines/covid-19/clinical-considerations/interim-considerations-us.html
- **Pre-exposure prophylaxis** (monoclonal antibodies) may be considered to complement COVID-19 vaccination. See www.cdc.gov/vaccines/covid-19/clinical-considerations/interim-considerations-us.html#immunocompromised

For Janssen COVID-19 Vaccine recipients see COVID-19 schedule at www.cdc.gov/vaccines/covid-19/clinical-considerations/interim-considerations-us.html

Note: Administer an age-appropriate vaccine product for each dose. Current COVID-19 schedule and dosage formulation available at www.cdc.gov/vaccines/covid-19/downloads/COVID-19-immunization-schedule-ages-6months-older.pdf. For more information on Emergency Use Authorization (EUA) indications for COVID-19 vaccines, see www.fda.gov/emergency-preparedness-and-response/coronavirus-disease-2019-covid-19/covid-19-vaccines.

Dengue vaccination (minimum age: 9 years)

Routine vaccination

- Age 9–16 years living in areas with endemic dengue **AND** have laboratory confirmation of previous dengue infection
  - 3-dose series administered at 0, 6, and 12 months
- Endemic areas include Puerto Rico, American Samoa, US Virgin Islands, Federated States of Micronesia, Republic of Marshall Islands, and the Republic of Palau. For updated guidance on dengue endemic areas and pre-vaccination laboratory testing see www.cdc.gov/mmwr/volumes/70/rr/rr7006a1.htm?s_cid=rr7006a1_w and www.cdc.gov/dengue/vaccine/hcp/index.html
- Dengue vaccine should not be administered to children traveling to or visiting endemic dengue areas.

Diphtheria, tetanus, and pertussis (DTaP) vaccination (minimum age: 6 weeks [4 years for Kinrix® or Quadracel®])

Routine vaccination

- 5-dose series at age 2, 4, 6, 15–18 months, 4–6 years
  - **Prospectively:** Dose 4 may be administered as early as age 12 months if at least 6 months have elapsed since dose 3.
  - **Retrospectively:** A 4th dose that was inadvertently administered as early as age 12 months may be counted if at least 4 months have elapsed since dose 3.

Catch-up vaccination

- Dose 5 is not necessary if dose 4 was administered at age 4 years or older and at least 6 months after dose 3.
- For other catch-up guidance, see Table 2.

Special situations

- **Wound management** in children less than age 7 years with history of 3 or more doses of tetanus-toxoid-containing vaccine: For all wounds except clean and minor wounds, administer DTaP if more than 5 years since last dose of tetanus-toxoid-containing vaccine. For detailed information, see www.cdc.gov/mmwr/volumes/67/rr/rr6702a1.htm.

Recommended Child and Adolescent Immunization Schedule, United States, 2023 (cdc.gov)

Appendix — Recommended Child and Adolescent Immunization Schedule for ages 18 years or younger, United States, 2023

Vaccine	Contraindicated or Not Recommended[1]
Dengue (DEN4CYD)	• Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine • Severe immunodeficiency (e.g., hematologic and solid tumors, receipt of che immunodeficiency, long-term immunosuppressive therapy or patients with H immunocompromised) • Lack of laboratory confirmation of a previous Dengue infection
Diphtheria, tetanus, pertussis (DTaP) Tetanus, diphtheria (DT)	• Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine • For DTaP only: Encephalopathy (e.g., coma, decreased level of consciousness, to another identifiable cause within 7 days of administration of previous dose
Haemophilus influenzae type b (Hib)	• Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine • For Hiberix, ActHib, and PedvaxHIB only: History of severe allergic reaction to • Less than age 6 weeks
Hepatitis A (HepA)	• Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine
Hepatitis B (HepB)	• Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine • *Pregnancy: Heplisav-B and PreHevbrio are not recommended due to lack of safet hepatitis B vaccines if HepB is indicated*[4].
Hepatitis A–Hepatitis B vaccine [HepA-HepB, (Twinrix®)]	• Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component[3] including neomycin and yeast
Human papillomavirus (HPV)	• Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine • *Pregnancy: HPV vaccination not recommended.*
Measles, mumps, rubella (MMR) Measles, mumps, rubella, and varicella (MMRV)	• Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine • Severe immunodeficiency (e.g., hematologic and solid tumors, receipt of che congenital immunodeficiency, long-term immunosuppressive therapy or pat HIV infection who are severely immunocompromised) • Pregnancy • Family history of altered immunocompetence, unless verified clinically or by laboratory testing as immunocompetent
Meningococcal ACWY (MenACWY) [MenACWY-CRM (Menveo®); MenACWY-D (Menactra®); MenACWY-TT (MenQuadfi®)]	• Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine • For MenACWY-D and Men ACWY-CRM only: severe allergic reaction to any di or CRM197–containing vaccine • For MenACWY-TT only: severe allergic reaction to a tetanus toxoid-containing
Meningococcal B (MenB) [MenB-4C (Bexsero®); MenB-FHbp (Trumenba®)]	• Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine
Pneumococcal conjugate (PCV)	• Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine • Severe allergic reaction (e.g., anaphylaxis) to any diphtheria-toxoid-containing
Pneumococcal polysaccharide (PPSV23)	• Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine
Poliovirus vaccine, inactivated (IPV)	• Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine
Rotavirus (RV) [RV1 (Rotarix®), RV5 (RotaTeq®)]	• Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine • Severe combined immunodeficiency (SCID) • History of intussusception
Tetanus, diphtheria, and acellular pertussis (Tdap) Tetanus, diphtheria (Td)	• Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine • For Tdap only: Encephalopathy (e.g., coma, decreased level of consciousness, to another identifiable cause within 7 days of administration of previous dose
Varicella (VAR)	• Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine • Severe immunodeficiency (e.g., hematologic and solid tumors, receipt of che congenital immunodeficiency, long-term immunosuppressive therapy or pat HIV infection who are severely immunocompromised) • Pregnancy • Family history of altered immunocompetence, unless verified clinically or by laboratory testing as immunocompetent

1. When a contraindication is present, a vaccine should NOT be administered. Kroger A, Bahta L, Hunter P. ACIP
2. When a precaution is present, vaccination should generally be deferred but might be indicated if the benef Guidelines for Immunization. www.cdc.gov/vaccines/hcp/acip-recs/general-recs/contraindications.html
3. Vaccination providers should check FDA-approved prescribing information for the most complete and upd www.fda.gov/vaccines-blood-biologics/approved-products/vaccines-licensed-use-united-states.
4. For information on the pregnancy exposure registries for persons who were inadvertently vaccinated with

Appendix — Recommended Child and Adolescent Immunization Schedule for ages 18 years or younger, United States, 2023

Guide to Contraindications and Precautions to Commonly Used Vaccines

Adapted from Table 4-1 in Advisory Committee on Immunization Practices (ACIP) General Best Practice Guidelines for Immunization: Contraindication and Precautions available at www.cdc.gov/vaccines/hcp/acip-recs/general-recs/contraindications.html and ACIP's Recommendations for the Prevention and Control of 2022-23 seasonal influenza with Vaccines available at www.cdc.gov/mmwr/volumes/71/rr/rr7101a1.htm.

For COVID-19 vaccine contraindications and precautions see www.cdc.gov/vaccines/covid-19/clinical-considerations/interim-considerations-us.html#contraindications

Vaccine	Contraindicated or Not Recommended[1]	Precautions[2]
Influenza, egg-based, inactivated injectable (IIV4)	• Severe allergic reaction (e.g., anaphylaxis) after previous dose of any influenza vaccine (i.e., any egg-based IIV, ccIIV, RIV, or LAIV of any valency) • Severe allergic reaction (e.g., anaphylaxis) to any vaccine component[3] (excluding egg)	• Guillain-Barré syndrome (GBS) within 6 weeks after a previous dose of any type of influenza vaccine • Moderate or severe acute illness with or without fever
Influenza, cell culture-based inactivated injectable [(ccIIV4), Flucelvax® Quadrivalent]	• Severe allergic reaction (e.g., anaphylaxis) to any ccIIV of any valency, or to any component[3] of ccIIV4	• Guillain-Barré syndrome (GBS) within 6 weeks after a previous dose of any type of influenza vaccine • Persons with a history of severe allergic reaction (e.g., anaphylaxis) after a previous dose of any egg-based IIV, RIV, or LAIV of any valency. If using ccIV4, administer in medical setting under supervision of health care provider who can recognize and manage severe allergic reactions. May consult an allergist. • Moderate or severe acute illness with or without fever
Influenza, recombinant injectable [(RIV4), Flublok® Quadrivalent]	• Severe allergic reaction (e.g., anaphylaxis) to any RIV of any valency, or to any component[3] of RIV4	• Guillain-Barré syndrome (GBS) within 6 weeks after a previous dose of any type of influenza vaccine • Persons with a history of severe allergic reaction (e.g., anaphylaxis) after a previous dose of any egg-based IIV, ccIIV, or LAIV of any valency. If using RIV4, administer in medical setting under supervision of health care provider who can recognize and manage severe allergic reactions. May consult an allergist. • Moderate or severe acute illness with or without fever
Influenza, live attenuated [LAIV4, Flumist® Quadrivalent]	• Severe allergic reaction (e.g., anaphylaxis) after previous dose of any influenza vaccine (i.e., any egg-based IIV, ccIIV, RIV, or LAIV of any valency) • Severe allergic reaction (e.g., anaphylaxis) to any vaccine component[3] (excluding egg) • Children age 2 –4 years with a history of asthma or wheezing • Anatomic or functional asplenia • Immunocompromised due to any cause including, but not limited to, medications and HIV infection • Close contacts or caregivers of severely immunosuppressed persons who require a protected environment • Pregnancy • Cochlear implant • Active communication between the cerebrospinal fluid (CSF) and the oropharynx, nasopharynx, nose, ear or any other cranial CSF leak • Children and adolescents receiving aspirin or salicylate-containing medications • Received influenza antiviral medications oseltamivir or zanamivir within the previous 48 hours, peramivir within the previous 5 days, or baloxavir within the previous 17 days	• Guillain-Barré syndrome (GBS) within 6 weeks after a previous dose of any type of influenza vaccine • Asthma in persons aged 5 years old or older • Persons with underlying medical conditions (other than those listed under contraindications) that might predispose to complications after wild-type influenza virus infection [e.g., chronic pulmonary, cardiovascular (except isolated hypertension), renal, hepatic, neurologic, hematologic, or metabolic disorders (including diabetes mellitus)] • Moderate or severe acute illness with or without fever

1. When a contraindication is present, a vaccine should NOT be administered. Kroger A, Bahta L, Hunter P. ACIP General Best Practice Guidelines for Immunization. www.cdc.gov/vaccines/hcp/acip-recs/general-recs/contraindications.html
2. When a precaution is present, vaccination should generally be deferred but might be indicated if the benefit of protection from the vaccine outweighs the risk for an adverse reaction. Kroger A, Bahta L, Hunter P. ACIP General Best Practice Guidelines for Immunization. www.cdc.gov/vaccines/hcp/acip-recs/general-recs/contraindications.html
3. Vaccination providers should check FDA-approved prescribing information for the most complete and updated information, including contraindications, warnings, and precautions. Package inserts for U.S.-licensed vaccines are available at www.fda.gov/vaccines-blood-biologics/approved-products/vaccines-licensed-use-united-states

Recommended Child and Adolescent Immunization Schedule, United States, 2023 (cdc.gov)

Child and Adolescent Immunization Schedule by Age

Recommendations for Ages 18 Years or Younger, United States, 2023

Print

See Addendum for new or update

View addendum

Using the schedule

To make vaccination recommendations,

1. Determine needed vaccines **based o**
2. Determine appropriate intervals for
3. Assess for **medical conditions and ot**
4. Review **special situations** (Vaccinatio
5. Review **contraindications and precau**
6. See **Addendum** for new or updated A

Addendum – Child and Adolescent Recommended Immunization Schedule for ages 18 years or younger, United States, 2023

Vaccines and Other Immunizing Agents	Recommendations	Effective Date of Recommendation*
Respiratory syncytial virus		
COVID-19 (Moderna, Pfize		

Addendum Recommended Child and Adolescent Immunization Schedule for ages 18 years or younger, United States, 2023

In addition to the recommendations presented in the previous sections of this Immunization Schedule, ACIP has approved the following recommendations by majority vote since October 20, 2022. The following recommendations have been adopted by the CDC Director and are now official. Links are provided if these recommendations have been published in *Morbidity and Mortality Weekly Report (MMWR)*.

Vaccines and Other Immunizing Agents	Recommendation	Effective Date of Recommendation*
COVID-19 (Moderna, Pfizer-BioNTech)	• All persons ≥6 months of age should receive 2023–2024 (monovalent, XBB containing) COVID-19 vaccines as authorized under EUA or approved by BLA. • For detailed information, see: www.cdc.gov/covidschedule	September 12, 2023
Respiratory syncytial virus [RSV-mAb (Nirsevimab)]	• All infants younger than 8 months and born shortly before or during the RSV season should receive 1 dose of nirsevimab within 1 week of birth either in hospital or outpatient setting • Infants younger than age 8 months not born during RSV season and now entering their first RSV season should receive 1 dose of nirsevimab shortly before the start of RSV season • Infants aged 8–19 months with chronic lung disease of prematurity requiring medical support (e.g., chronic corticosteroid therapy, diuretic therapy, or supplemental oxygen) any time during the 6-month period before start of the second RSV season; severe immunocompromise; cystic fibrosis with weight for length <10th percentile; or with manifestation of severe lung disease (e.g., previous hospitalization for pulmonary exacerbation in the first year of life or abnormalities on chest imaging that persist when stable) should receive 1 dose of nirsevimab shortly before start of second RSV season • Infants 8–19 months who are American Indian or Alaska Native should receive 1 dose of nirsevimab before start of second RSV season • Infants who are age-eligible and undergoing cardiac surgery with cardiopulmonary bypass should receive 1 additional dose of nirsevimab after surgery • For detailed information, see: www.cdc.gov/mmwr/volumes/72/wr/mm7234a4.htm?s_cid=mm7234a4_w	August 3, 2023
Poliovirus (IPV)	• Adolescents age 18 years who are known or suspected to be unvaccinated or incompletely vaccinated against polio should complete a primary vaccination series with inactivated polio vaccine (IPV). • Adolescents age 18 years who have received a primary series of trivalent oral polio vaccine (tOPV) or IPV in any combination and who are at increased risk of poliovirus exposure may receive another dose of IPV. Available data do not indicate the need for more than a single lifetime booster dose with IPV for adults.	June 27, 2023
Influenza (IIV4, ccIV4, RIV4, LAIV4)	• All persons ages ≥6 months with egg allergy should receive influenza vaccine. Any influenza vaccine (egg based or non-egg based) that is otherwise appropriate for the recipient's age and health status can be used. • Affirm the updated *MMWR* Recommendations and Reports, "Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices—United States, 2023-24 Influenza Season" www.cdc.gov/mmwr/volumes/72/rr/rr7202a1.htm	June 27, 2023
Pneumococcal (PCV15, PCV20)	• Use of either pneumococcal conjugate vaccines (PCV) PCV15 or PCV20 is recommended for all children aged 2–23 months according to currently recommended PCV dosing and schedules. • For children with an incomplete PCV vaccination status, use of either PCV15 or PCV20 according to currently recommended PCV dosing and schedules is recommended for: – Healthy children aged 24–59 months – Children with specified health conditions(2) aged 24 through 71 months • For children aged 2–18 years with any risk condition who have received all recommended doses of PCV before age 6 years – Using ≥1 dose(s) of PCV20: No additional doses of any pneumococcal vaccine are indicated. This recommendation may be updated as additional data become available. – Using PCV13 or PCV15 (no PCV20): A dose of PCV20 or PPSV23 using previously recommended dosing and schedules is recommended. • For children aged 6–18 years with any risk condition who have not received any dose of PCV13, PCV15, or PCV20, a single dose of PCV15 or PCV20 is recommended. When PCV15 is used, it should be followed by a dose of PPSV23 at least 8 weeks later if not previously given.	June 27, 2023

*The effective date is the date when the CDC director adopted the recommendation and when the ACIP recommendation became official

Birth-18 Years Immunization Schedule – Healthcare Providers | CDC

General Best Practice Guidelines for Immunization

Updated August 1, 2023

Best Practices Guidance
Kroger A, Bahta L, Long S, Sanchez P

Introduction
Purpose and topics covered in this report…

History
History of development of: Timing and Spacing, Contraindications and Precautions, Preventing and Managing Adverse Reactions…

Timing and Spacing of Immunobiologics
Vaccine scheduling, supply and lapsed schedule, spacing of doses, simultaneous and nonsimultaneous administration, licensed combination vaccines, interchangeability of formulations, extra doses, conjugate vaccines…

Contraindications and Precautions
General principles, standards of valid contraindications and precautions, and conditions incorrectly perceived as contraindications…

Preventing and Managing Adverse Reactions
Benefit and risk communication, reporting adverse reactions, National Vaccine Injury Compensation Program…

Vaccine Administration
Infection control and sterile technique, route of administration, multiple and jet injections. alleviating discomfort and pain, clinical implications of nonstandard practices…

TABLE 3-2. Recommended and minimum ages and intervals between vaccine doses

Vaccine and dose number	Recommended age for this dose	Minimum age for this dose	Recommended interval to next dose	Minimum interval to next dose
DTaP-1[e]	2 months	6 weeks	8 weeks	4 weeks
DTaP-2	4 months	10 weeks	8 weeks	4 weeks
DTaP-3	6 months	14 weeks	6-12 months[f]	6 months[f]
DTaP-4	15-18 months	15 months[f]	3 years	6 months
DTaP-5[g]	4-6 years	4 years	—	—
HepA-1[e]	12-23 months	12 months	6-18 months	6 months
HepA-2	≥18 months	18 months	—	—
HepB-1[h]	Birth	Birth	4 weeks-4 months	4 weeks
HepB-2	1-2 months	4 weeks	8 weeks-17 months	8 weeks
HepB-3[i]	6-18 months	24 weeks	—	—
Hib-1[j]	2 months	6 weeks	8 weeks	4 weeks
Hib-2	4 months	10 weeks	8 weeks	4 weeks

ACIP General Best Practice Guidelines for Immunization | CDC

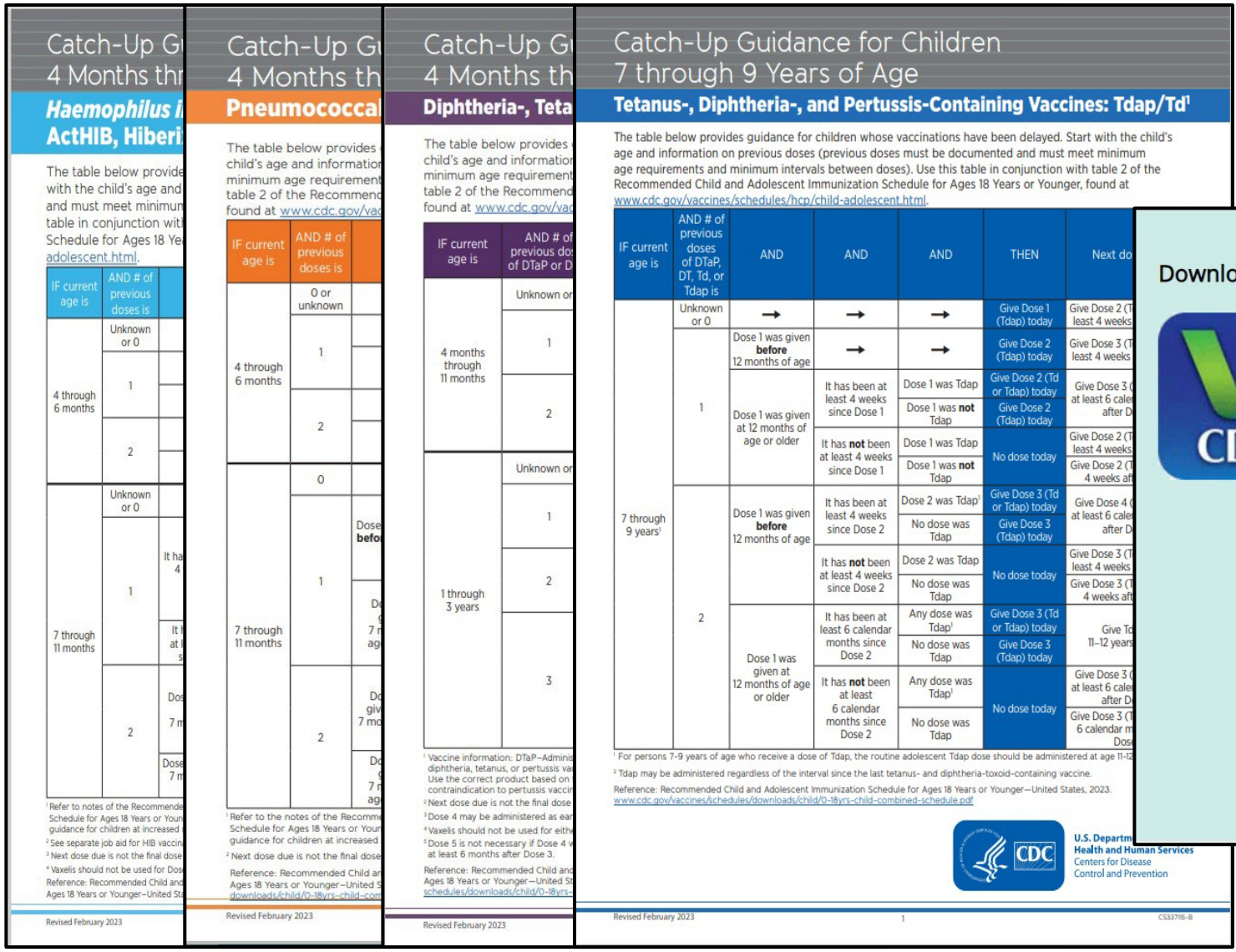
Table 2 Recommended Catch-up Immunization Schedule for Children and Adolescents Who Start Late or Who Are More than 1 Month Behind, United States, 2023

The table below provides catch-up schedules and minimum intervals between doses for children whose vaccinations have been delayed. A vaccine series does not need to be restarted, regardless of the time that has elapsed between doses. Use the section appropriate for the child's age. **Always use this table in conjunction with Table 1 and the Notes that follow.**

Vaccine	Minimum Age for Dose 1	Minimum Interval Between Doses			
		Dose 1 to Dose 2	Dose 2 to Dose 3	Dose 3 to Dose 4	Dose 4 to Dose 5
Children age 4 months through 6 years					
Hepatitis B	Birth	**4 weeks**	**8 weeks *and* at least 16 weeks after first dose** minimum age for the final dose is 24 weeks		
Rotavirus	6 weeks Maximum age for first dose is 14 weeks, 6 days.	**4 weeks**	**4 weeks** maximum age for final dose is 8 months, 0 days		
Diphtheria, tetanus, and acellular pertussis	6 weeks	**4 weeks**	**4 weeks**	**6 months**	**6 months**
Haemophilus influenzae type b	6 weeks	**No further doses needed** if first dose was administered at age 15 months or older. **4 weeks** if first dose was administered before the 1st birthday. **8 weeks (as final dose)** if first dose was administered at age 12 through 14 months.	**No further doses needed** if previous dose was administered at age 15 months or older **4 weeks** if current age is younger than 12 months ***and*** first dose was administered at younger than age 7 months ***and*** at least 1 previous dose was PRP-T (ActHib®, Pentacel®, Hiberix®), Vaxelis® or unknown **8 weeks *and* age 12 through 59 months (as final dose)** if current age is younger than 12 months ***and*** first dose was administered at age 7 through 11 months; OR if current age is 12 through 59 months ***and*** first dose was administered before the 1st birthday ***and*** second dose was administered at younger than 15 months; OR if both doses were PedvaxHIB® and were administered before the 1st birthday	**8 weeks (as final dose)** This dose only necessary for children age 12 through 59 months who received 3 doses before the 1st birthday.	
Pneumococcal conjugate	6 weeks	**No further doses needed** for healthy children if first dose was administered at age 24 months or older **4 weeks** if first dose was administered before the 1st birthday **8 weeks (as final dose for healthy children)** if first dose was administered at the 1st birthday or after	**No further doses needed** for healthy children if previous dose was administered at age 24 months or older **4 weeks** if current age is younger than 12 months and previous dose was administered at <7 months old **8 weeks (as final dose for healthy children)** if previous dose was administered between 7–11 months (wait until at least 12 months old); OR if current age is 12 months or older and at least 1 dose was administered before age 12 months	**8 weeks (as final dose)** this dose is only necessary for children aged 12 through 59 months regardless of risk, or age 60 through 71 months with any risk, who received 3 doses before age 12 months.	
Inactivated poliovirus	6 weeks	**4 weeks**	**4 weeks** if current age is <4 years **6 months (as final dose)** if current age is 4 years or older	**6 months (minimum age 4 years for final dose)**	
Measles, mumps, rubella	12 months	**4 weeks**			
Varicella	12 months	**3 months**			
Hepatitis A	12 months	**6 months**			
Meningococcal ACWY	2 months MenACWY-CRM 9 months MenACWY-D 2 years MenACWY-TT	**8 weeks**	See Notes	See Notes	
Children and adolescents age 7 through 18 years					
Meningococcal ACWY	Not applicable (N/A)	**8 weeks**			
Tetanus, diphtheria; tetanus, diphtheria, and acellular pertussis	7 years	**4 weeks**	**4 weeks** if first dose of DTaP/DT was administered before the 1st birthday **6 months (as final dose)** if first dose of DTaP/DT or Tdap/Td was administered at or after the 1st birthday	**6 months** if first dose of DTaP/DT was administered before the 1st birthday	
Human papillomavirus	9 years	**Routine dosing intervals are recommended.**			
Hepatitis A	N/A	**6 months**			
Hepatitis B	N/A	**4 weeks**	**8 weeks *and* at least 16 weeks after first dose**		
Inactivated poliovirus	N/A	**4 weeks**	**6 months** A fourth dose is not necessary if the third dose was administered at age 4 years or older and at least 6 months after the previous dose.	A fourth dose of IPV is indicated if all previous doses were administered at <4 years or if the third dose was administered <6 months after the second dose.	
Measles, mumps, rubella	N/A	**4 weeks**			
Varicella	N/A	**3 months** if younger than age 13 years. **4 weeks** if age 13 years or older			
Dengue	9 years	**6 months**	6 months		

Recommended Child and Adolescent Immunization Schedule, United States, 2023 (cdc.gov)

Other Catch-Up Resources



www.cdc.gov/vaccines/schedules/hcp/imz/catchup.html#guidance

COVID-19 Vaccine Clinical Considerations

Interim Clinical Considerations for Use of COVID-19 Vaccines in the United States

Print

Summary of recent changes (last updated October 24, 2023):

- Age transitions: Updated guidance for children who transition during the initial CO 4 years to age 5 years and children who are moderately or severely immunocompr years to age 12 years to receive the age-appropriate dosage based on their age on
- Interchangeability of COVID-19 vaccines: Clarification of circumstances in which ad doses from different manufacturers may be considered when doses from the sam recommended.

Reference Materials

- COVID-19 Vaccination Recommendations Infographic (Updated 10/13/2023)
- COVID-19 Vaccination Recommendations Infographic (Immunocompromised) (Updated 10/13/2023)

Ages 6 months–4 years

COVID-19 vaccination h prior to updated (2023 Formula) mRNA vacc		Number of updated		Vaccine vial	
Unvaccinated					
1 dose any Moderna					
2 or more doses any M					
1 dose any Pfizer-BioNT					
2 doses any Pfizer-BioN					
3 or more doses any Pf BioNTech					

Ages 5–11 years‡

COVID-19 vaccination history prior to updated (2023–2024 Formula) mRNA vaccine*	Updated (2023–2024 Formula) mRNA vaccine	Number of updated (2023–2024 Formula) mRNA doses indicated	Dosage (mL/ug)	Vaccine vial cap and label colors	Interval between doses
Unvaccinated	Moderna	1	0.25 mL/25 ug	Dark blue cap; green label	—
	Pfizer-BioNTech	1	0.3 mL/10 ug	Blue cap; blue label	—
1 or more doses any mRNA	Moderna OR	1	0.25 mL/25 ug	Dark blue cap; green label	At least 8 weeks after last dose
	Pfizer-BioNTech	1	0.3 mL/10 ug	Blue cap; blue label	At least 8 weeks after last dose

Interim Clinical Considerations for Use of COVID-19 Vaccines | CDC

Pediatric Case Studies

Case Study 1: Noah

DOB: 6-2-23

Age: 5 months

- Healthy 5-month-old
- Weight today: 10 lbs. 10 oz.
- Received first HepB in the hospital on 6-2-23
- Has not received any other vaccines
- No contraindications or precautions to any vaccines
- Does not have any high-risk indications

NOAH'S MCIR RECORD:

Immunizations							Oth
Series	Dose 1	Dose 2	Dose 3	Dose 4	Dose 5	Dose 6+	
DTP/DTaP/ DT/Td/Tdap							
Polio							
MMR							
Hib							
Hepatitis B	06/02/2023 Hep B (ped/adol)						
Varicella							
Pneumococcal Conjugate							
Hepatitis A							
Seasonal Influenza							
SARS-CoV-2							
RSV							

Case Study #1: Noah

Question #1:

Which vaccines should Noah receive today?

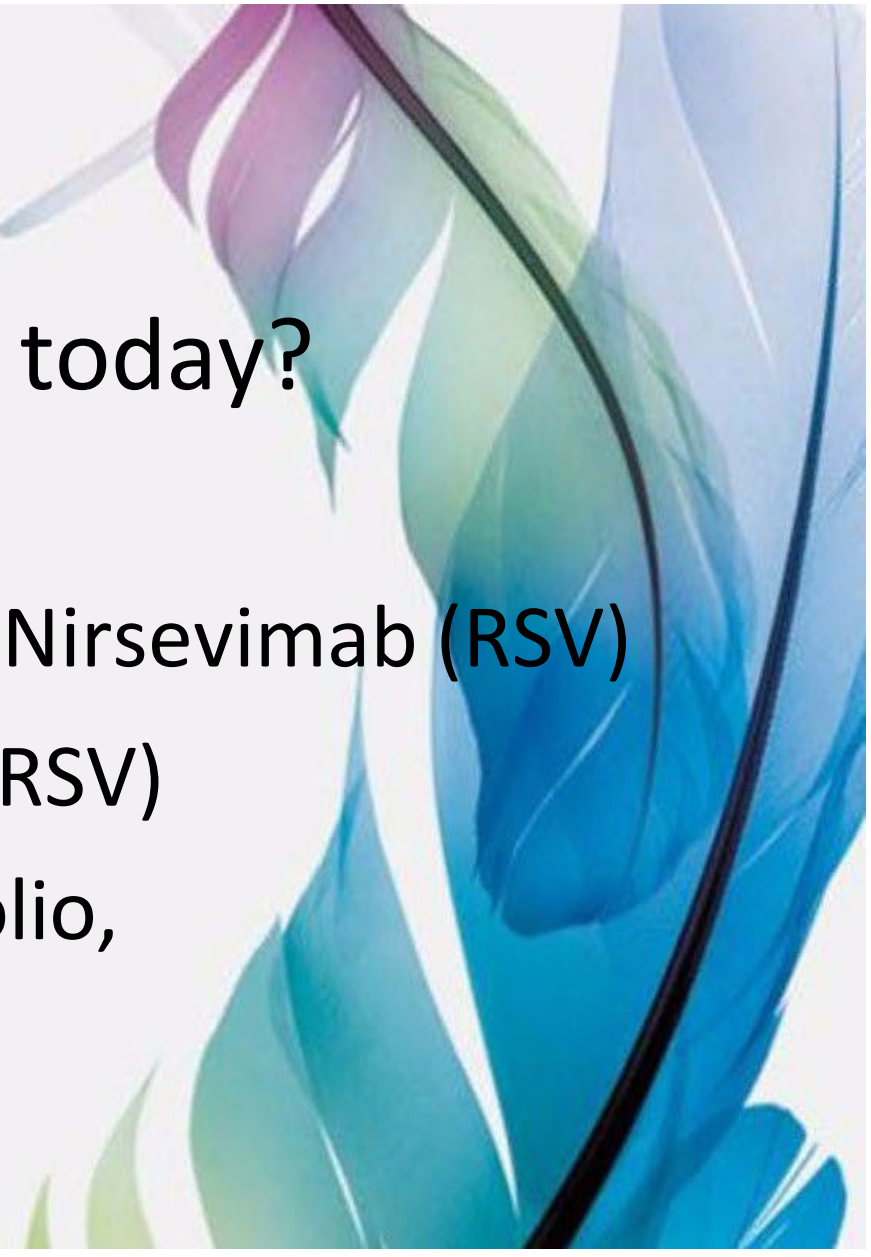
A. HepB, Rotavirus (RV), DTaP, Hib, Polio

B. HepB, DTaP, Hib, Pneumococcal, Polio, Nirsevimab (RSV)

C. HepB, RV, Pneumococcal, Nirsevimab (RSV)

D. HepB, RV, DTaP, Hib, Pneumococcal, Polio, Nirsevimab(RSV)

E. None of the above

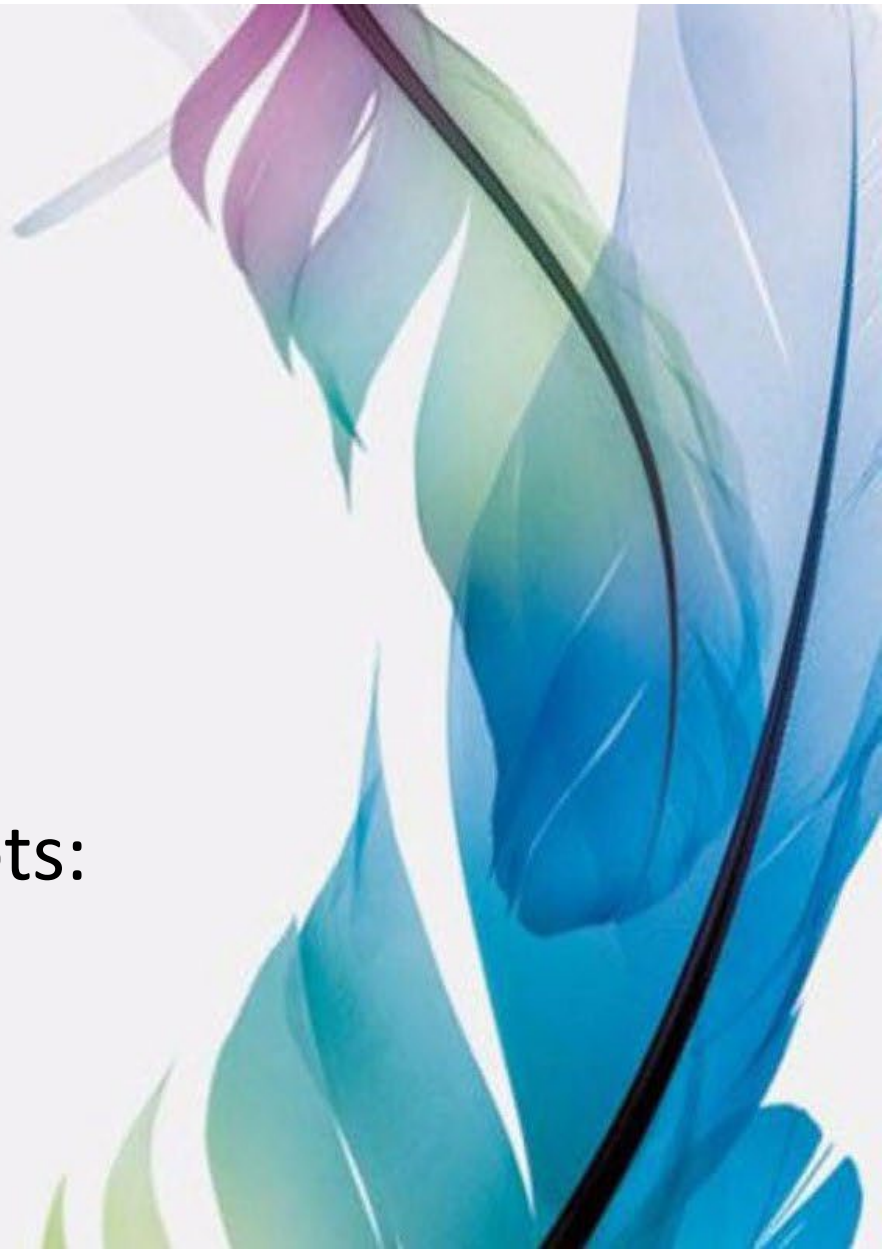


Question #1: Answer: B

- Hep B
- DTaP
- Hib
- Pneumococcal
- Polio
- Nirsevimab (RSV)

*Using combination vaccines equals fewer shots:

- Pediarix (DTaP/IPV/HepB) **OR**
- Pentacel (DTaP/IPV/Hib) **OR**
- Vaxelis (DTaP/IPV/Hib/HepB)



ACIP Timing and Spacing Guidelines for Immunization | CDC

Child and Adolescent Immunization Schedule by Age

Recommendations for Ages 18 Years or Younger, United States, 202

Print

See Addendum for new or updated ACIP vaccine recommendations.

Addendum – Child and Adolescent R

Schedule for ages 18 years or young

Vaccines and Other Immunizing Agents	Recommendations
Respiratory syncytial virus [RSV-mAb (Nirsevimab)]	• All infant and born the RSV s dose of r of birth e outpatie • Infants younger than age 8 months not born during RSV season and now entering their first RSV season should receive 1 dose of nirsevimab shortly before the start of RSV season

Healthcare Providers: RSV Prevention Information

RSV Immunization for Infants and Young Children

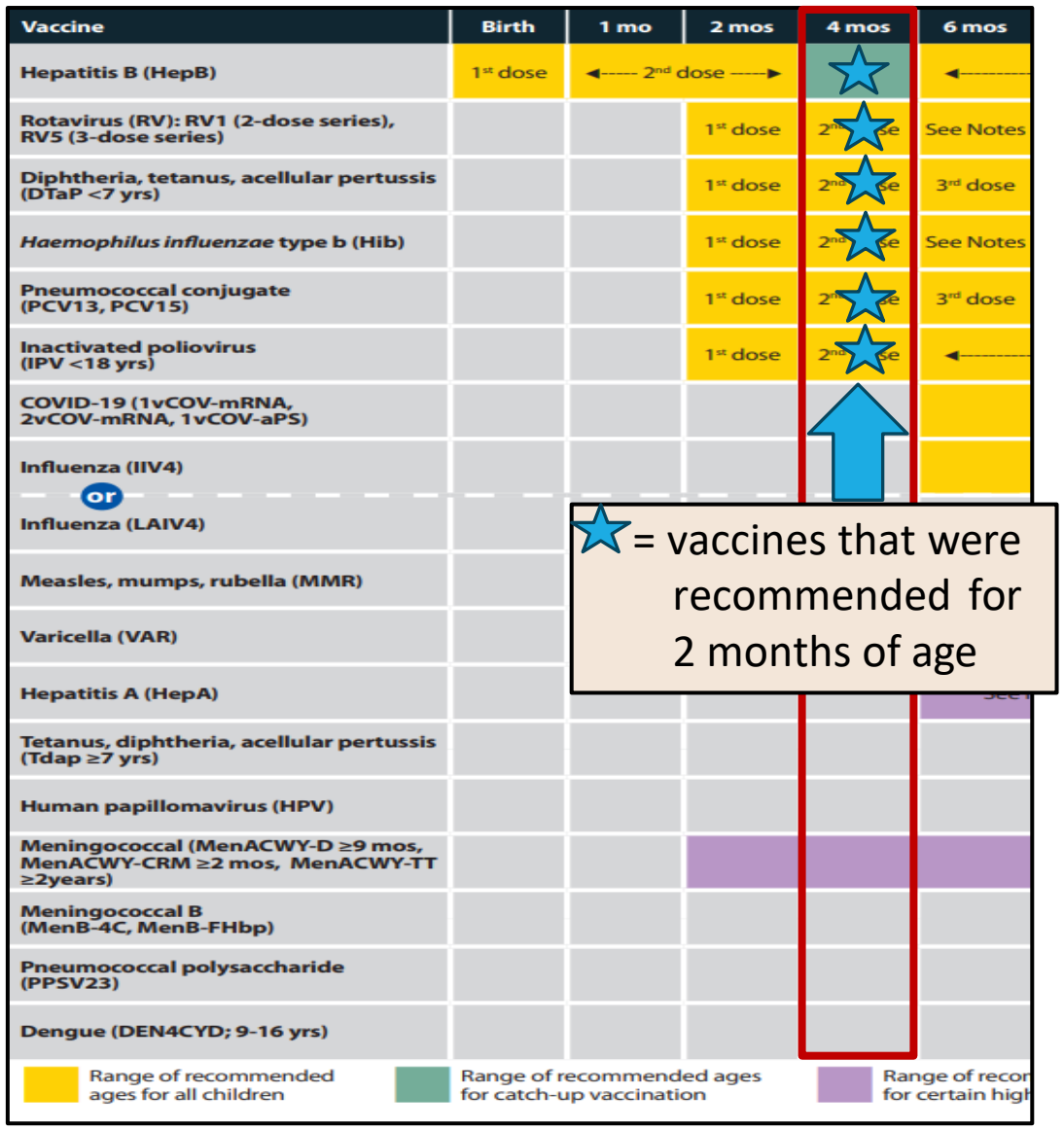
Print

On October 23, 2023, CDC released a health advisory notice to communicate interim recommendations regarding the limited supply of nirsevimab, the new preventive antibody to protect infants against severe RSV.

Read more: Limited Availability of Nirsevimab in the United States—Interim CDC Recommendations

Birth-18 Years Immunization Schedule – Healthcare Providers | CDC

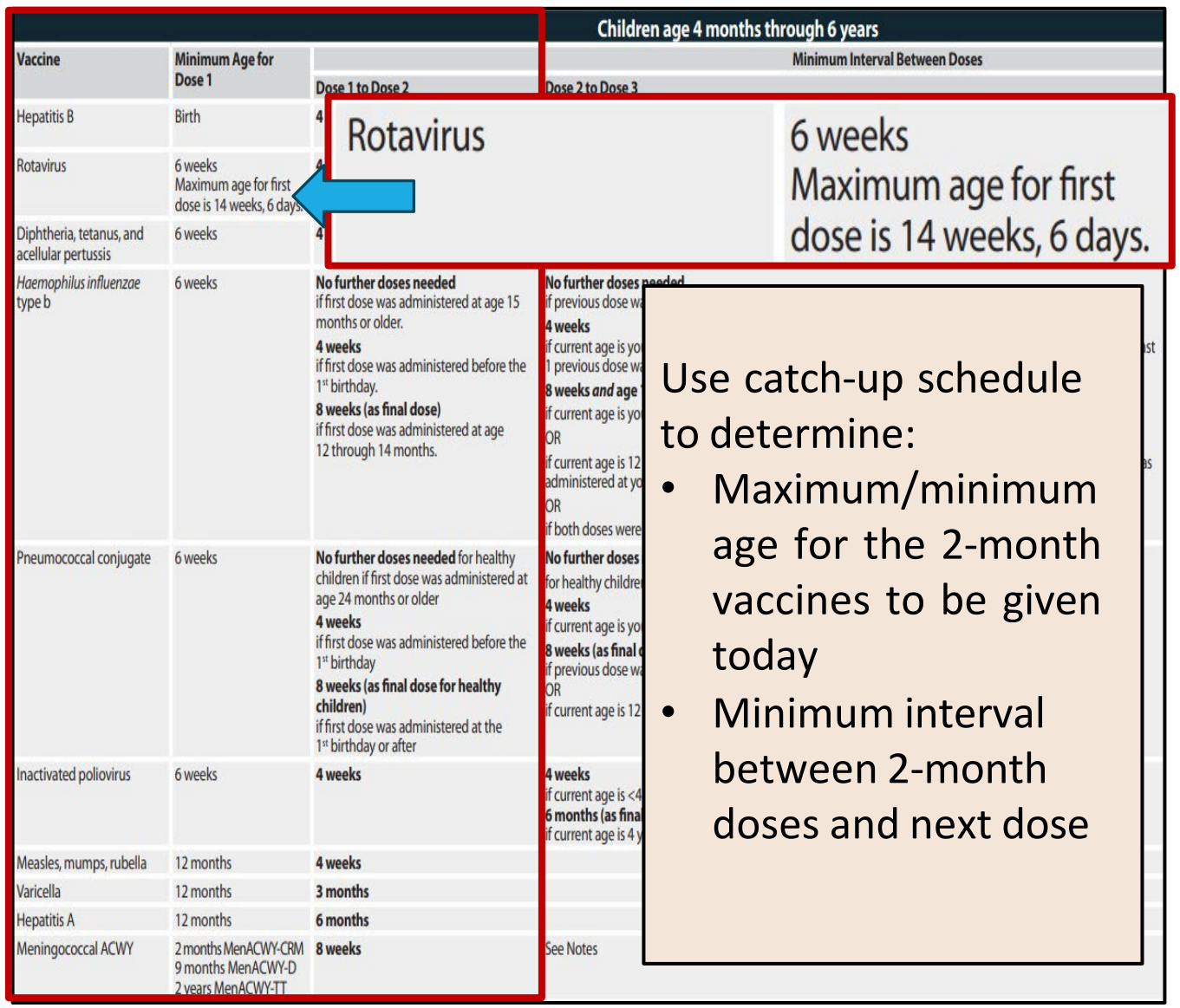
Case Study: Noah



Vaccine	Birth	1 mo	2 mos	4 mos	6 mos
Hepatitis B (HepB)	1st dose	◄---- 2nd dose ----►			◄----
Rotavirus (RV): RV1 (2-dose series), RV5 (3-dose series)			1st dose	2nd dose	See Notes
Diphtheria, tetanus, acellular pertussis (DTaP <7 yrs)			1st dose	2nd dose	3rd dose
Haemophilus influenzae type b (Hib)			1st dose	2nd dose	See Notes
Pneumococcal conjugate (PCV13, PCV15)			1st dose	2nd dose	3rd dose
Inactivated poliovirus (IPV <18 yrs)			1st dose	2nd dose	◄----
COVID-19 (1vCOV-mRNA, 2vCOV-mRNA, 1vCOV-aPS)					
Influenza (IIV4)					
or					
Influenza (LAIV4)					
Measles, mumps, rubella (MMR)					
Varicella (VAR)					
Hepatitis A (HepA)					
Tetanus, diphtheria, acellular pertussis (Tdap ≥7 yrs)					
Human papillomavirus (HPV)					
Meningococcal (MenACWY-D ≥9 mos, MenACWY-CRM ≥2 mos, MenACWY-TT ≥2years)					
Meningococcal B (MenB-4C, MenB-FHbp)					
Pneumococcal polysaccharide (PPSV23)					
Dengue (DEN4CYD; 9-16 yrs)					

Range of recommended ages for all children | Range of recommended ages for catch-up vaccination | Range of recor for certain high

= vaccines that were recommended for 2 months of age



Children age 4 months through 6 years

Vaccine	Minimum Age for Dose 1	Minimum Interval Between Doses: Dose 1 to Dose 2	Minimum Interval Between Doses: Dose 2 to Dose 3
Hepatitis B	Birth	4	
Rotavirus	6 weeks Maximum age for first dose is 14 weeks, 6 days.	4	
Diphtheria, tetanus, and acellular pertussis	6 weeks	4	
Haemophilus influenzae type b	6 weeks	**No further doses needed** if first dose was administered at age 15 months or older. **4 weeks** if first dose was administered before the 1st birthday. **8 weeks (as final dose)** if first dose was administered at age 12 through 14 months.	**No further doses needed** if previous dose wa **4 weeks** if current age is yo 1 previous dose wa **8 weeks *and* age** if current age is yo OR if current age is 12 administered at yo OR if both doses were
Pneumococcal conjugate	6 weeks	**No further doses needed** for healthy children if first dose was administered at age 24 months or older **4 weeks** if first dose was administered before the 1st birthday **8 weeks (as final dose for healthy children)** if first dose was administered at the 1st birthday or after	**No further doses** for healthy childre **4 weeks** if current age is yo **8 weeks (as final** if previous dose wa OR if current age is 12
Inactivated poliovirus	6 weeks	**4 weeks**	**4 weeks** if current age is <4 **6 months (as fina** if current age is 4 y
Measles, mumps, rubella	12 months	**4 weeks**	
Varicella	12 months	**3 months**	
Hepatitis A	12 months	**6 months**	
Meningococcal ACWY	2 months MenACWY-CRM 9 months MenACWY-D 2 years MenACWY-TT	**8 weeks**	See Notes

Rotavirus | 6 weeks Maximum age for first dose is 14 weeks, 6 days.

Use catch-up schedule to determine:

- Maximum/minimum age for the 2-month vaccines to be given today
- Minimum interval between 2-month doses and next dose

[Recommended Child and Adolescent Immunization Schedule, United States, 2023 (cdc.gov)]

Case Study: Noah

Question #2:

When does Noah need to return and what vaccines will he need at that time?

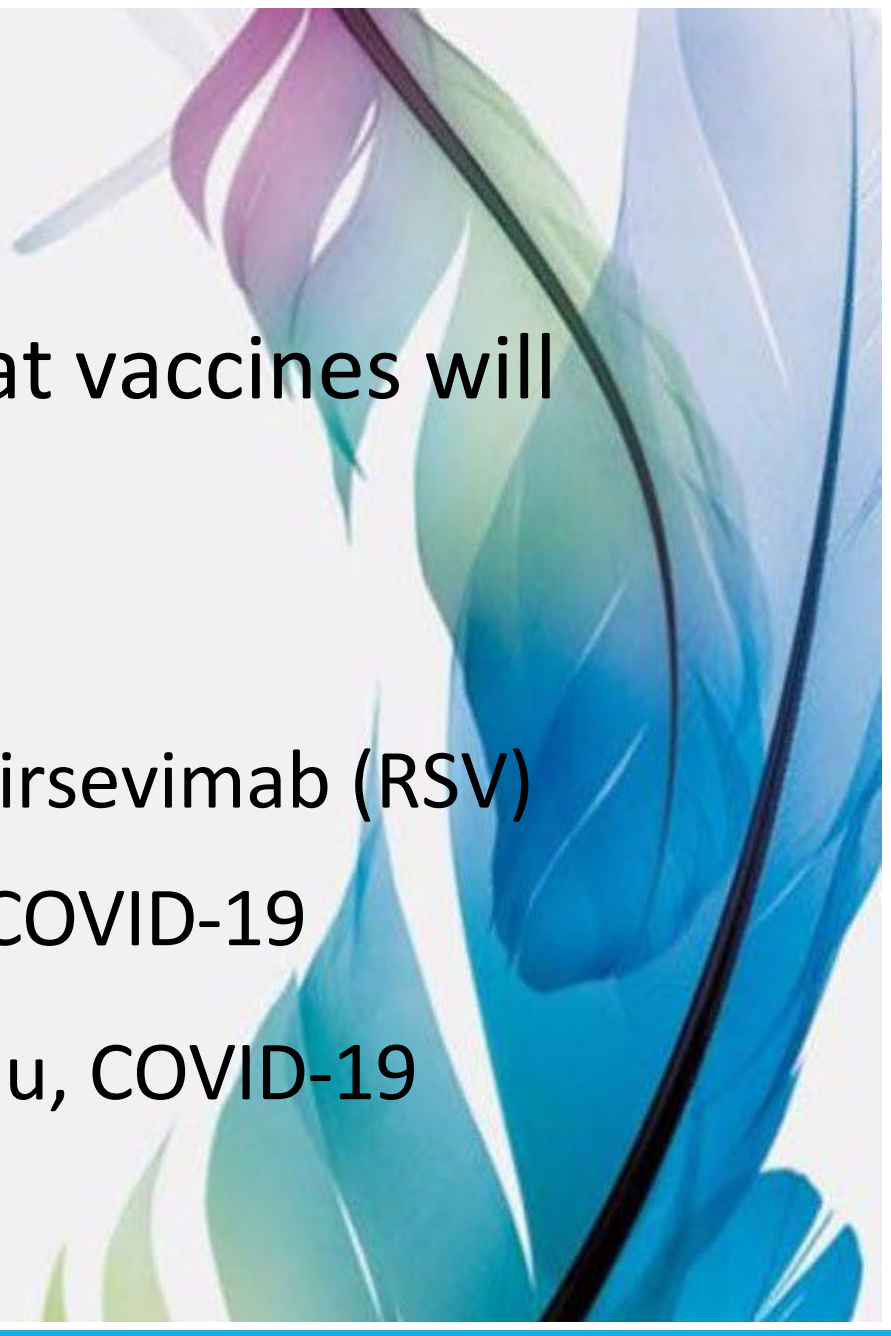
A. 2-3 months: Hep B, DTaP, IPV, Flu

B. 1 month: DTaP, Hib, IPV, Pneumococcal, Nirsevimab (RSV)

C. 2 months: DTaP, Hib, Pneumococcal, IPV, COVID-19

D. 1 month: DTaP, Hib, Pneumococcal, IPV, Flu, COVID-19

E. None of the above



Question #2: Answer: D- 1 month

- DTaP
- Hib
- Pneumococcal
- IPV
- Flu
- COVID-19

*Using combination vaccines equals fewer shots

- Pediarix (DTaP, IPV, Hep B) **OR**
- Pentacel (DTaP, IPV, Hib) **OR**
- Vaxelis (DTaP/IPV/Hib/Hep B)

Ped-Flu-Dose-Volume-23-24_FINAL.pdf (michigan.gov)

NOAH'S MCIR RECORD:

Immunizations						Other
Series	Dose 1	Dose 2	Dose 3	Dose 4	Dose 5	Dose 6+
DTP/DTaP/ DT/Td/Tdap	11/03/2023 DTaP-Hep B-IPV (Pediarix) 5mos 1dy					
Polio	11/03/2023 DTaP-Hep B-IPV (Pediarix) 5mos 1dy					
MMR						
Hib	11/03/2023 Hib (historical) 5mos 1dy					
Hepatitis B	06/02/2023 Hep B (ped/adol)	11/03/2023 DTaP-Hep B-IPV (Pediarix) 5mos 1dy				
Varicella						
Pneumococcal Conjugate	11/03/2023 PCV15 (VAXNEUVANCE) 5mos 1dy					
Hepatitis A						
Seasonal Influenza						
SARS-CoV-2						
RSV	11/03/2023 RSV Nirsevimab(Beyfortus)0.5ml 5mos 1dy					

Vaccine	Birth	1 mo	2 mos	4 mos	6 mos
Hepatitis B (HepB)	1st dose	◄----- 2nd dose -----►			◄----------
Rotavirus (RV): RV1 (2-dose series), RV5 (3-dose series)			1st dose	2nd dose	See Notes
Diphtheria, tetanus, acellular pertussis (DTaP <7 yrs)			1st dose	2nd dose	★
Haemophilus influenzae type b (Hib)			1st dose	2nd dose	★
Pneumococcal conjugate (PCV13, PCV15)			1st dose	2nd dose	★
Inactivated poliovirus (IPV <18 yrs)			1st dose	2nd dose	★
COVID-19 (1vCOV-mRNA, 2vCOV-mRNA, 1vCOV-aPS)					★
Influenza (IIV4)					★
or					
Influenza (LAIV4)					
Measles, mumps, rubella (MMR)					See N
Varicella (VAR)					
Hepatitis A (HepA)					See N
Tetanus, diphtheria, acellular pertussis (Tdap ≥7 yrs)					
Human papillomavirus (HPV)					
Meningococcal (MenACWY-D ≥9 mos, MenACWY-CRM ≥2 mos, MenACWY-TT ≥2years)					
Meningococcal B (MenB-4C, MenB-FHbp)					
Pneumococcal polysaccharide (PPSV23)					
Dengue (DEN4CYD; 9-16 yrs)					

Range of recommended ages for all children

Range of recommended ages for catch-up vaccination

Range of recon for certain high

Children age 4 months through 6 years

Vaccine	Minimum Age for Dose 1	Minimum Interval Between Doses: Dose 1 to Dose 2	Minimum Interval Between Doses: Dose 2 to Dose 3
Hepatitis B			
Rotavirus	6 weeks Maximum age for first dose is 14 weeks, 6 days.	**4 weeks**	
Diphtheria, tetanus, and acellular pertussis	6 weeks	**4 weeks**	**4 weeks**
Haemophilus influenzae type b	6 weeks	**No further doses needed** if first dose was administered at age 15 months or older. **4 weeks** if first dose was administered before the 1st birthday. **8 weeks (as final dose)** if first dose was administered at age 12 through 14 months.	**No further doses needed** if previous dose was administered at age 15 months or older **4 weeks** if current age is younger than 12 months ***and*** first dose was administered at younger than age 7 months ***and*** at least 1 previous dose was PRP-T (ActHib®, Pentacel®, Hiberix®), Vaxelis® or unknown **8 weeks *and* age 12 through 59 months (as final dose)** if current age is younger than 12 months ***and*** first dose was administered at age 7 through 11 months; OR if current age is 12 through 59 months ***and*** first dose was administered before the 1st birthday ***and*** second dose was administered at younger than 15 months; OR if both doses were PedvaxHIB® and were administered before the 1st birthday
Pneumococcal conjugate	6 weeks	**No further doses needed** for healthy children if first dose was administered at age 24 months or older **4 weeks** if first dose was administered before the 1st birthday **8 weeks (as final dose for healthy children)** if first dose was administered at the 1st birthday or after	**No further doses needed** for healthy children if previous dose was administered at age 24 months or older **4 weeks** if current age is younger than 12 months and previous dose was administered at <7 months old **8 weeks (as final dose for healthy children)** if previous dose was administered between 7–11 months (wait until at least 12 months old); OR if current age is 12 months or older and at least 1 dose was administered before age 12 months
Inactivated poliovirus	6 weeks	**4 weeks**	**4 weeks** if current age is <4 years **6 months (as final dose)** if current age is 4 years or older

Dose 2 to Dose 3

8 weeks *and* at least 16 weeks after first dose
minimum age for the final dose is 24 weeks

Influenza vaccination
(minimum age: 6 months [IIV], 2 years [LAIV4], 18 years [recombinant influenza vaccine, RIV4])

Routine vaccination

- Use any influenza vaccine appropriate for age and health status annually:
  - 2 doses, separated by at least 4 weeks, for **children age 6 months–8 years** who have received fewer than 2 influenza vaccine doses before July 1, 2022, or whose influenza vaccination history is unknown (administer dose 2 even if the child turns 9 between receipt of dose 1 and dose 2)
  - 1 dose for **children age 6 months–8 years** who have received at least 2 influenza vaccine doses before July 1, 2022
  - 1 dose for **all persons age 9 years or older**

Ages 6 months-4 years

COVID-19 vaccination history prior to updated (2023–2024 Formula) mRNA vaccine*	Updated (2023–2024 Formula) mRNA vaccine	Number of updated (2023–2024 Formula) mRNA vaccine doses indicated	Dosage (mL/ug)	Vaccine vial cap and label colors	Interval between doses
Unvaccinated	Moderna	2	0.25 mL/25 ug	Dark blue cap; green label	Dose 1 and Dose 2: 4–8 weeks†
	Pfizer-BioNTech	3	0.3 mL/3 ug	Yellow cap; yellow label	Dose 1 and Dose 2: 3–8 weeks† Dose 2 and Dose 3: At least 8 weeks

2023-24 Seasonal Influenza Vaccine Dose Volumes for Children

Everyone aged 6 months and older should receive flu vaccine every year.

Flu vaccine dose volume is based on the person's **age and the flu vaccine product** that is used.[1] Among vaccine errors reported between June 2020 and December 2021, wrong vaccine (24%) and wrong age (13%) were listed as numbers 1 and 3 of the most frequent types of vaccine events other than those related to COVID-19 vaccines. Wrong age and associated wrong dose errors occurred frequently between age-related formulations of influenza vaccines (31%).[2] It is important to prevent flu vaccine administration errors to ensure children are adequately protected against flu.

For children aged **6 through 35 months**, flu vaccine dose volume is **dependent on the product that is administered**. There are multiple licensed inactivated influenza vaccines, quadrivalent (IIV4) available for children aged 6 through 35 months: Afluria® Quadrivalent, FluLaval® Quadrivalent, Fluarix® Quadrivalent, and Fluzone® Quadrivalent. The cell cultured-based inactivated influenza vaccine (ccIIV4) is available for persons aged 6 months and older (Flucelvax® Quadrivalent).

If You're Using This Vaccine (IIV4)…[1]	Dose Volume for Ages 6-35 Months
Afluria (Seqirus)	**0.25 mL per dose**
Fluarix or FluLaval (GSK)	**0.5 mL per dose**
Fluzone (Sanofi Pasteur)	**0.25 mL OR 0.5 mL per dose** *No preference is expressed for either dose volume.
If You're Using This Vaccine (ccIIV4)…[1]	**Dose Volume for Ages 6-35 Months**
Flucelvax (Seqirus)	**0.5mL per dose**

Refer to the Flu Vaccine Presentation Chart[1] for available presentations of each of these vaccines.

ildren aged 3 years and older, dose volume for standard-dose IIV is 0.5 mL regardless of the flu e product being administered.

ses of 2023-24 flu vaccine are needed[3], the same vaccine product **does not** need to be used for both Use any age-appropriate flu vaccine that is available that day, ensuring you use the correct dose e for the product you are administering.

miss an opportunity to vaccinate! Dose volume is based on the child's age on the day of vaccine istration. For example:

If a child is aged **2 years and 11 months** for dose 1, use the above table to determine dose volume based on the **IIV/ccIIV product used**.
When the child returns 4 weeks later for dose 2 and is **now aged 3 years**, the dose volume is **0.5 mL** regardless of the IIV/ccIIV product used.

, the needed volume for a child aged 6 through 35 months may be administered from a prefilled syringe ining the appropriate volume (as supplied by the manufacturer), a single-dose vial, or a multi-dose vial.

r Guidance on Fluzone Quadrivalent:

NOTE: Fluzone Quadrivalent is approved for children aged 6 through 35 months at either 0.25 mL or 0.5 mL per dose.
The 0.25-mL prefilled syringe of Fluzone Quadrivalent is no longer available. If a prefilled syringe of Fluzone Quadrivalent is used for a child in this age group, the dose volume will be 0.5 mL per dose.

Volumes for Children

for only 1 dose. If 0.25 mL is used
25 mL remaining in the single-dose vial

tration errors[4, 5]:

al/Fluarix rather than the

0.25 mL dose of the product that was t discovered until the following day, 0.5 mL of FluLaval, Fluarix, or Revaccinating the day after the initial ble.

i-dose vial rather than the

d as valid. Notify the parent/guardian accine administration errors. If the ter an age-appropriate IIV dose (use ears and older may receive LAIV4

ther than the recommended 0.5 mL

0.25 mL dose of Afluria to correct this should revaccinate the 5-year-old day after the initial substandard dose healthy children aged 2 years and

ichigan.gov/flu/resources/resources-for-

ources/ismp-national-vaccine-errors-

w.michigan.gov/flu/resources/resources-

ing System (VAERS): https://vaers.hhs.gov. so the status of the error can be

endations of the Advisory Committee on ndations and Reports / August 25, 2023 / html

, www.cdc.gov/vaccines, or

errors, visit Immunize.org's Ask the

Interim Clinical Considerations for Use of COVID-19 Vaccines | CDC

Resources for Health Professionals (michigan.gov)

Case Study 2: Winnie

DOB: 5-9-12

Age: 11 years

- Healthy 11-year-old
- Has egg allergy:
  - Hives
  - Nasal congestion
  - Vomiting
- No contraindications or precautions to any vaccines
- Does not have any high-risk indications

WINNIE'S MCIR RECORD:

Immunizations						Other
Series	Dose 1	Dose 2	Dose 3	Dose 4	Dose 5	Dose 6+
DTP/DTaP/ DT/Td/Tdap	07/10/2012 DTaP-Hep B-IPV (Pediarix) 2mos 1dy	09/11/2012 DTaP-Hep B-IPV (Pediarix) 4mos 2dys	11/12/2012 DTaP-Hep B-IPV (Pediarix) 6mos 3dys	09/09/2013 DTaP (pediatric) 1yr 4mos	08/05/2019 Tdap (adol/adult) 7yrs 2mos	
Polio	07/10/2012 DTaP-Hep B-IPV (Pediarix) 2mos 1dy	09/11/2012 DTaP-Hep B-IPV (Pediarix) 4mos 2dys	11/12/2012 DTaP-Hep B-IPV (Pediarix) 6mos 3dys	08/05/2019 IPV (polio) 7yrs 2mos		
MMR	05/13/2013 MMR 1yr	08/05/2019 MMRV (ProQuad) 7yrs 2mos				
Hepatitis B	05/10/2012 Hep B (ped/adol) 1dy	07/10/2012 DTaP-Hep B-IPV (Pediarix) 2mos 1dy	11/12/2012 DTaP-Hep B-IPV (Pediarix) 6mos 3dys			
Varicella	05/13/2013 Varicella (Varivax) 1yr	08/05/2019 MMRV (ProQuad) 7yrs 2mos				
HPV						
Hepatitis A	05/13/2013 Hep A (ped/adol) 1yr	12/09/2013 Hep A (ped/adol) 1yr 7mos				
Seasonal Influenza	11/12/2012 Influenza (Historical) 6mos 3dys	12/17/2012 Influenza (Historical) 7mos 8dys	09/13/2013 Influenza (Historical) 1yr 4mos	10/10/2014 Influenza (Historical) 2yrs 5mos	10/13/2015 Influenza (Historical) 3yrs 5mos	
Meningococcal Conjugate						
SARS-CoV-2						

Case Study #2: Winnie

Question #1:

Which vaccines should Winnie receive today?

A. Tdap, HPV, MenACWY, Flu, and COVID-19

B. HPV, MenB, MenACWY, and Tdap

C. MenB, COVID-19, and HPV

D. Td, MenACWY, Flu, and COVID-19

E. None of the above

Question #1: Answer: A

- Tdap
- HPV
- MenACWY
- Flu
- COVID-19

Table 1

See Addendum for new or updated ACIP vaccine recommendations

Recommended Child and Adolescent Immunization Schedule for ages 18 years or younger, United States, 2023

These recommendations must be read with the notes that follow. For those who fall behind or start late, provide catch-up vaccination at the earliest opportunity as indicated by the green bars.
To determine minimum intervals between doses, see the catch-up schedule (Table 2).

Vaccine	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 yrs	17–18 yrs
Hepatitis B (HepB)	1st dose	◄— 2nd dose —►			◄— 3rd dose —►												
Rotavirus (RV): RV1 (2-dose series), RV5 (3-dose series)			1st dose	2nd dose	See Notes												
Diphtheria, tetanus, acellular pertussis (DTaP <7 yrs)			1st dose	2nd dose	3rd dose			◄— 4th dose —►				5th dose					
Haemophilus influenzae type b (Hib)			1st dose	2nd dose	See Notes		◄— 3rd or 4th dose, See Notes —►										
Pneumococcal conjugate (PCV13, PCV15)			1st dose	2nd dose	3rd dose		◄— 4th dose —►										
Inactivated poliovirus (IPV <18 yrs)			1st dose	2nd dose	◄— 3rd dose —►							4th dose					See Notes
COVID-19 (1vCOV-mRNA, 2vCOV-mRNA, 1vCOV-aPS)					2- or 3- dose primary series and booster (See Notes)												
Influenza (IIV4)					Annual vaccination 1 or 2 doses									Annual vaccination 1 dose only			
or																	
Influenza (LAIV4)											Annual vaccination 1 or 2 doses			Annual vaccination 1 dose only			
Measles, mumps, rubella (MMR)					See Notes		◄— 1st dose —►					2nd dose					
Varicella (VAR)							◄— 1st dose —►					2nd dose					
Hepatitis A (HepA)					See Notes		2-dose series, See Notes										
Tetanus, diphtheria, acellular pertussis (Tdap ≥7 yrs)																	
Human papillomavirus (HPV)																	
Meningococcal (MenACWY-D ≥9 mos, MenACWY-CRM ≥2 mos, MenACWY-TT ≥2years)			See Notes												2nd dose		
Meningococcal B (MenB-4C, MenB-FHbp)														See Notes			
Pneumococcal polysaccharide (PPSV23)														See Notes			
Dengue (DEN4CYD; 9-16 yrs)														Seropositive in endemic dengue areas (See Notes)			

Range of recommended ages for all children
Range of recommended ages for catch-up vaccination
Range of recommended ages for certain high-risk groups
Recommended vaccination can begin in this age group
Recommended vaccination based on shared clinical decision-making
No recommendation/ not applicable

0-18yrs-child-combined-schedule.pdf (cdc.gov)

Notes

Meningococcal serogroup A,C,W,Y vaccination
(minimum age: 2 months [MenACWY-CRM, Menveo], 9 months [MenACWY-D, Menactra], 2 years [MenACWY-TT, MenQuadfi])

Routine vaccination
- 2-dose series at age 11–12 years; 16 years

Tetanus, diphtheria, and pertussis (Tdap) vaccination
(minimum age: 11 years for routine vaccination, 7 years for catch-up vaccination)

Routine vaccination
- **Adolescents age 11–12 years:** 1 dose Tdap
- **Pregnancy:** 1 dose Tdap during each pregnancy, preferably in early part of gestational weeks 27–36.
- Tdap may be administered regardless of the interval since the last tetanus- and diphtheria-toxoid-containing vaccine.

Catch-up vaccination
- **Adolescents age 13–18 years who have not received Tdap:** 1 dose Tdap, then Td or Tdap booster every 10 years
- **Persons age 7–18 years not fully vaccinated* with DTaP:** 1 dose Tdap as part of the catch-up series (preferably the first dose); if additional doses are needed, use Td or Tdap.
- **Tdap administered at age 7–10 years:**
  - **Children age 7–9 years** who receive Tdap should receive the routine Tdap dose at age 11–12 years.
  - **Children age 10 years** who receive Tdap do not need the routine Tdap dose at age 11–12 years.

Meningococcal serogroup B vaccination
(minimum age: 10 years [MenB-4C, Bexsero®; MenB-FHbp, Trumenba®])

Shared clinical decision-making
- **Adolescents not at increased risk** age 16–23 years (preferred age 16–18 years) based on shared clinical decision-making:
  - **Bexsero®:** 2-dose series at least 1 month apart
  - **Trumenba®:** 2-dose series at least 6 months apart (if dose 2 is administered earlier than 6 months, administer a 3rd dose at least 4 months after dose 2)

Special situations

Anatomic or functional asplenia (including sickle cell disease), persistent complement component deficiency, complement inhibitor (e.g., eculizumab, ravulizumab) use:

- **Be**
- **Tr**

Not

For

under "Special situations" and in an outbreak setting and additional meningococcal vaccination information, see www.cdc.gov/mmwr/volumes/69/rr/rr6909a1.htm.

MenB is shared clinical decision-making for adolescents aged 16 through 23 years that are not at increased risk. For High-Risk patients see Immunization Schedule footnotes.

0-18yrs-child-combined-schedule.pdf (cdc.gov)

Routine Recommendations for Meningococcal Vaccines[1]

Vaccine Type	Brand Names	Routine Recommendation for People Who Are Not in a Risk Group[1,2,3]	General Guidelines
MenACWY[2]	Menactra® MenQuadfi® Menveo®	One dose at age 11-12 years; booster dose at age 16 years	• 1 dose **required**[4] at 11 years of age or older upon entry into 7th grade or higher • Products are interchangeable if age appropriate, but same vaccine is recommended for complete series • Intramuscular injection
MenB[3]	Bexsero® Trumenba®	Shared clinical decision making for persons 16 years through 23 years without high-risk conditions: • Bexsero: 2 dose series at least 1 month apart **OR** • Trumenba: 2 dose series at least 6 months apart	• Products are **not** inter-changeable • Intramuscular injection • MenB vaccine is **not** routinely recommended at 11-12 years of age

[1] For Child and Adolescent Immunization Schedule by Age at: www.cdc.gov/vaccines/schedules/hcp/imz/child-adolescent.html

[2] For more information regarding Meningococcal Conjugate Vaccine (MenACWY), including guidance for catch-up and for persons who are at high-risk, refer to the Meningococcal Conjugate Quick Look at: www.michigan.gov/vaccinequicklooks and Immunize.org's handout titled, "Meningococcal ACWY vaccine recommendations by Age and Risk Factor" at: www.immunize.org/catg.d/p2018.pdf

[3] For more information regarding Meningococcal Serogroup B (MenB), including guidance for catch-up and for persons who are at high-risk, refer to the Meningococcal Serogroup B Quick Look at: www.michigan.gov/vaccinequicklooks and Immunize.org's handout titled, "Meningococcal B Vaccine Recommendations by Age and Risk Factor" at: www.immunize.org/catg.d/p2035.pdf

[4] For vaccines required for school entry in Michigan, refer to "Vaccines Required for School Entry in Michigan" at: https://mcir.org/wp-content/uploads/2021/08/SchoolEntryReqVaccinesParentsMI_5.3.2021approvedfinalpublish.pdf

Routine-Recommendations-for-Meningococcal-Vaccines_5-25-23_FINAL.pdf (michigan.gov)

Ages 5–11 years‡

COVID-19 vaccination history prior to updated (2023–2024 Formula) mRNA vaccine*	Updated (2023–2024 Formula) mRNA vaccine	Number of updated (2023–2024 Formula) mRNA doses indicate
Unvaccinated	Moderna	1
	Pfizer-BioNTech	1
1 or more doses any mRNA	Moderna OR	1
	Pfizer-BioNTech	1

[Interim Clinical Considerations for Use of COVID-19 Vaccines | CDC]

Points to consider for the 2023-24 Influenza Season

- For a complete list of contraindications and precautions for influenza vaccines review the Quick Looks for:
  - **Egg-ba**
    - Q
    - Q
  - **ccIIV4:**
  - **RIV4:** C
- Influenza va
  - Inactiv
  - Recom
  - Live At
  - Cell Cu
- **Severe aller component**
- With the exc growing viru
- Tolerance to
- For clinics th for maintain how to use i
  - Emerge airway
  - Refer t at http
- For persons doses of infl flu product
- No post-vac persons; hov minutes afte syncope occ

Prevention and Contr Immunization Practic 25, 2023 / 72(2);1–25 regarding flu vaccinat

Mich

2023-24 Influenza Vaccination for Persons Who Report Egg Allergy

For the 2023-24 influenza season, the Advisory Committee on Immunization Practices (ACIP) recommends the following:

1. All persons aged 6 months and older with egg allergy should receive influenza vaccine
   - Any influenza vaccine (egg based or nonegg based) that is otherwise appropriate for the recipient's age and health status can be used (i.e., any IIV4, RIV4, or LAIV4)
2. Egg allergy in and of itself necessitates no additional safety measures for influenza vaccination beyond those recommended for any recipient of any vaccine, regardless of severity of previous reaction to egg
3. Severe and life-threatening reactions to vaccines can rarely occur with any vaccine and in any vaccine recipient, regardless of allergy history. **All** vaccines should be administered in settings in which personnel and equipment needed for rapid recognition and treatment of acute hypersensitivity reactions are available
   - All vaccination providers should be familiar with their office emergency plan and be certified in cardiopulmonary resuscitation (CPR)

Remember:

It is important to screen and review the contraindications and precautions for any vaccine. With flu vaccine it is important to know the type of flu vaccine being administered to assess for vaccine specific contraindications and precautions

- For further information on contraindications and precautions review the Quick Looks for Influenza Vaccines (IIV4, LAIV4, ccIIV4, and RIV4) at: www.Michigan.gov/vaccinequicklooks

Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices — United States, 2023–24 Influenza Season Recommendations and Reports / August 25, 2023 / 72(2);1–25, located at www.cdc.gov/vaccines/hcp/acip-recs/index.html. For further information regarding flu vaccination, refer to www.Michigan.gov/flu, www.cdc.gov/vaccines, or www.cdc.gov/mmwr.

[Resources for Health Professionals (michigan.gov)]

Case Study #2: Winnie
Question #2:

When does Winnie need to return and what vaccines will she need at that time?

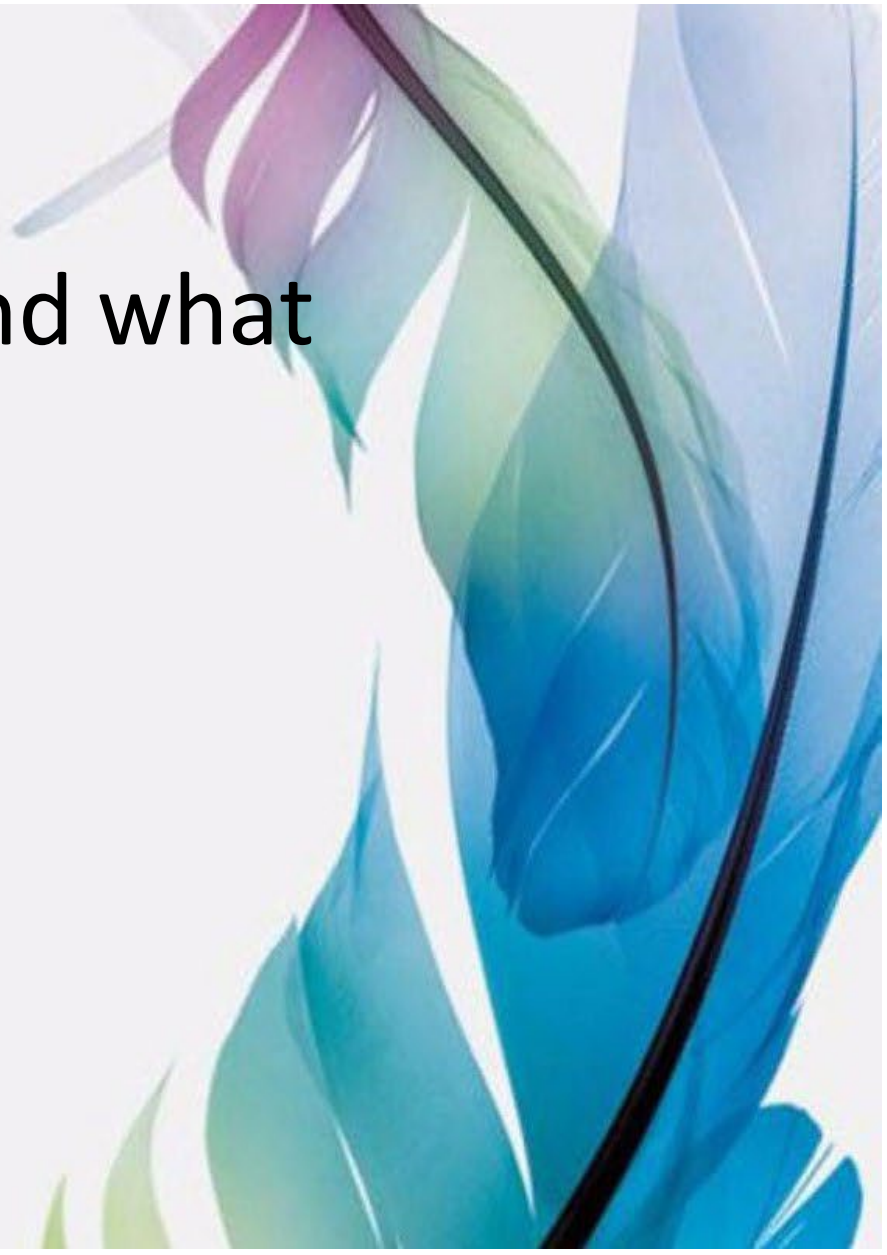
A. 1 month: MenACWY, HPV, and Flu

B. 1 month: MenB, and HPV

C. 6 months: HPV

D. 4-8 weeks: HPV, and COVID-19

E. None of the above



Answer: C

- 6 months: HPV

WINNIE'S MCIR RECORD:

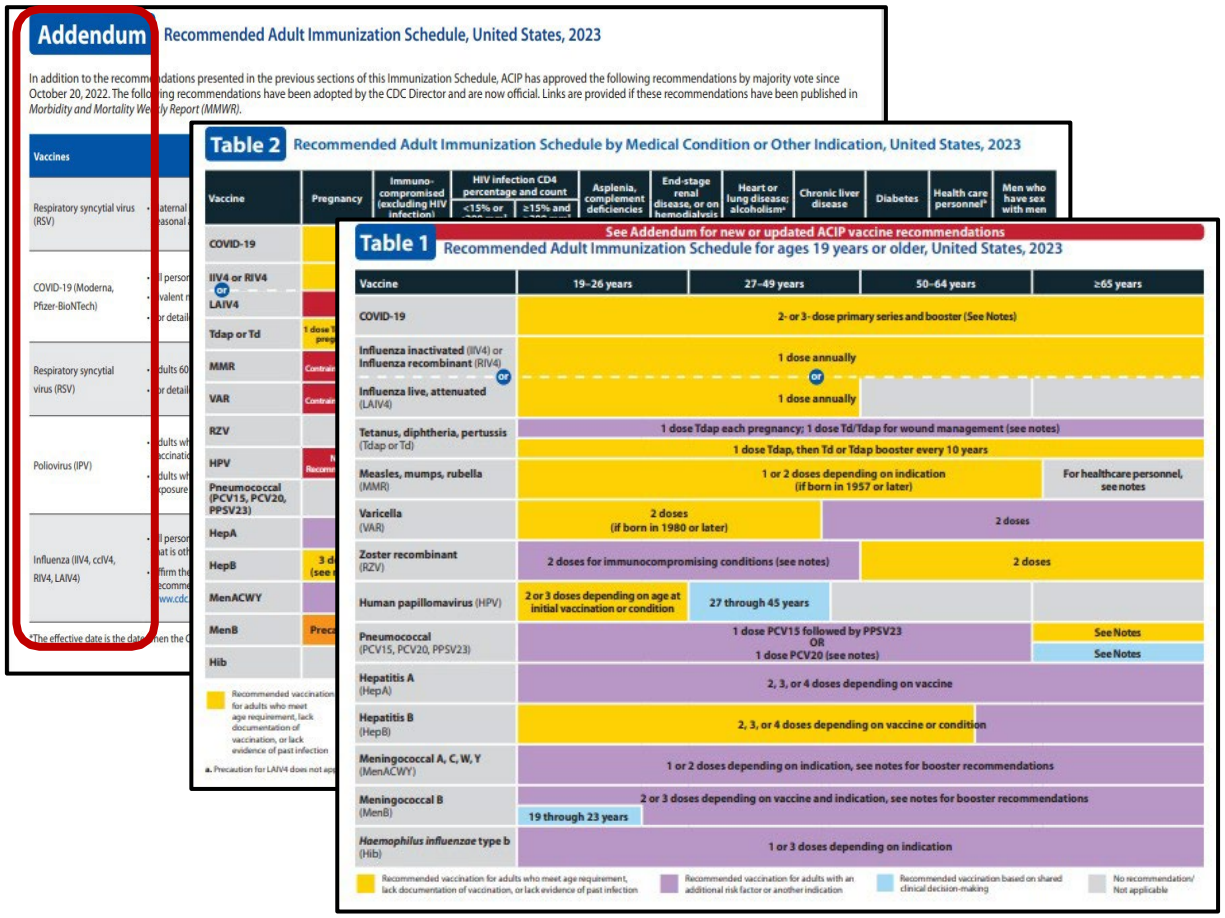
	Immunizations						Other
Series	**Dose 1**	**Dose 2**	**Dose 3**	**Dose 4**	**Dose 5**	**Dose 6+**	
DTP/DTaP/ DT/Td/Tdap	07/10/2012 DTaP-Hep B-IPV (Pediarix) 2mos 1dy	09/11/2012 DTaP-Hep B-IPV (Pediarix) 4mos 2dys	11/12/2012 DTaP-Hep B-IPV (Pediarix) 6mos 3dys	09/09/2013 DTaP (pediatric) 1yr 4mos	08/05/2019 Tdap (adol/adult) 7yrs 2mos	09/26/2023 Tdap (adol/adult) 11yrs 4mos	
Polio	07/10/2012 DTaP-Hep B-IPV (Pediarix) 2mos 1dy	09/11/2012 DTaP-Hep B-IPV (Pediarix) 4mos 2dys	11/12/2012 DTaP-Hep B-IPV (Pediarix) 6mos 3dys	08/05/2019 IPV (polio) 7yrs 2mos			
MMR	05/13/2013 MMR 1yr	08/05/2019 MMRV (ProQuad) 7yrs 2mos					
Hepatitis B	05/10/2012 Hep B (ped/adol) 1dy	07/10/2012 DTaP-Hep B-IPV (Pediarix) 2mos 1dy	11/12/2012 DTaP-Hep B-IPV (Pediarix) 6mos 3dys				
Varicella	05/13/2013 Varicella (Varivax) 1yr	08/05/2019 MMRV (ProQuad) 7yrs 2mos					
HPV	09/26/2023 HPV9 11yrs 4mos						
Hepatitis A	05/13/2013 Hep A (ped/adol) 1yr	12/09/2013 Hep A (ped/adol) 1yr 7mos					
Seasonal Influenza	11/12/2012 Influenza (Historical) 6mos 3dys	12/17/2012 Influenza (Historical) 7mos 8dys	09/13/2013 Influenza (Historical) 1yr 4mos	10/10/2014 Influenza (Historical) 2yrs 5mos	10/13/2015 Influenza (Historical) 3yrs 5mos	09/26/2023 Influenza IIV4 (P-Free Inj) 11yrs 4mos	
Meningococcal Conjugate	09/26/2023 MCV4 (Menactra or Menveo) 11yrs 4mos						
SARS-CoV-2	09/26/2023 COVID-19 PFR-BNT (23-24) 10mcg 11yrs 4mos						

WINNIE'S MCIR RECORD:

Series	Immunizations Dose 1	Dose 2	Dose 3	Dose 4	Other Dose 5	Dose 6+	Status
DTP/DTaP/ DT/Td/Tdap	07/10/2012 DTaP-Hep B-IPV (Pediarix) 2mos 1dy	09/11/2012 DTaP-Hep B-IPV (Pediarix) 4mos 2dys	11/12/2012 DTaP-Hep B-IPV (Pediarix) 6mos 3dys	09/09/2013 DTaP (pediatric) 1yr 4mos	08/05/2019 Tdap (adol/adult) 7yrs 2mos	09/26/2023 Tdap (adol/adult) 11yrs 4mos	Up-To-Date Next Due 09/26/2033
Polio	07/10/2012 DTaP-Hep B-IPV (Pediarix) 2mos 1dy	09/11/2012 DTaP-Hep B-IPV (Pediarix) 4mos 2dys	11/12/2012 DTaP-Hep B-IPV (Pediarix) 6mos 3dys	08/05/2019 IPV (polio) 7yrs 2mos			Series Complete
MMR	05/13/2013 MMR 1yr	08/05/2019 MMRV (ProQuad) 7yrs 2mos					Series Complete
Hepatitis B	05/10/2012 Hep B (ped/adol) 1dy	07/10/2012 DTaP-Hep B-IPV (Pediarix) 2mos 1dy	11/12/2012 DTaP-Hep B-IPV (Pediarix) 6mos 3dys				Series Complete
Varicella	05/13/2013 Varicella (Varivax) 1yr	08/05/2019 MMRV (ProQuad) 7yrs 2mos					Series Complete
HPV	09/26/2023 HPV9 11yrs 4mos						Up-To-Date Next Due 03/26/2024
Hepatitis A	05/13/2013 Hep A (ped/adol) 1yr	12/09/2013 Hep A (ped/adol) 1yr 7mos					Series Complete
Seasonal Influenza	11/12/2012 Influenza (Historical) 6mos 3dys	12/17/2012 Influenza (Historical) 7mos 8dys	09/13/2013 Influenza (Historical) 1yr 4mos	10/10/2014 Influenza (Historical) 2yrs 5mos	10/13/2015 Influenza (Historical) 3yrs 5mos	09/26/2023 Influenza IIV4 (P-Free Inj) 11yrs 4mos	Season Complete
Meningococcal Conjugate	09/26/2023 MCV4 (Menactra or Menveo) 11yrs 4mos						Up-To-Date Next Due 05/09/2028
SARS-CoV-2	09/26/2023 COVID-19 PFR-BNT (23-24) 10mcg 11yrs 4mos						Up-To-Date

Know Your Adult Resources and Where to Find Them

2023 Recommended Immunization Schedule For Adults



- Adult vaccination is based primarily on risk conditions
- Schedule notes include information on risk groups, minimum and recommended intervals
- Addendum includes new or updated ACIP vaccine recommendations

2023 (CDC) Adult Immunization Schedule

Table 1 Recommended Adult Immunization Schedule by Age Group, United States, 2023

Vaccine	19–26 years	27–49 years	50–64 years	≥65 years
COVID-19	2- or 3- dose primary series and booster (See Notes)			
Influenza inactivated (IIV4) or Influenza recombinant (RIV4) or Influenza live, attenuated (LAIV4)	1 dose annually			
Tetanus, diphtheria, pertussis (Tdap or Td)			gement (see notes)	
Measles, mumps, rubella (MMR)				For healthcare personnel, see notes
Varicella (VAR)			2 doses	
Zoster recombinant (RZV)	2 dos		2 doses	
Human papillomavirus (HPV)	2 or 3 dose initial va			
Pneumococcal (PCV15, PCV20, PPSV23)				See Notes / See Notes
Hepatitis A (HepA)				
Hepatitis B (HepB)	2, 3, or 4 doses depending on vaccine or condition			
Meningococcal A, C, W, Y (MenACWY)	1 or 2 doses depending on indication, see notes for booster recommendations			
Meningococcal B (MenB)	2 or 3 doses depending on vaccine and indication, see notes for booster recommendations			
	19 through 23 years			
Haemophilus influenzae type b (Hib)	1 or 3 doses depending on indication			

= Recommended vaccination for adults who meet age requirement, lack documentation of vaccination, or lack evidence of past infection

= Recommended vaccination for adults with an additional risk factor or another indication

= Recommended vaccination based on shared clinical decision-making

= No recommendation/Not applicable

Recommended vaccination for adults who meet age requirement, lack documentation of vaccination, or lack evidence of past infection

Recommended vaccination for adults with an additional risk factor or another indication

Recommended vaccination based on shared clinical decision-making

No recommendation/ Not applicable

[Recommended Adult Immunization Schedule, United States, 2023 (cdc.gov)]

Table 2 Recommended Adult Immunization Schedule by Medical Condition or Other Indication, United States, 2023

Vaccine	Pregna					Chronic liver disease	Diabetes	Health care personnel[b]	Men who have sex with men
COVID-19									
IIV4 or RIV4									
or									
LAIV4						tion		1 dose annually	
Tdap or Td	1 dose Td pregna					10 years			
MMR	Contraindi					ng on indication			
VAR	Contraindi					2 doses			
RZV						at age ≥50 years			
HPV	Not Recomme					nding on age at initial vaccination or condition			
Pneumococcal (PCV15, PCV20, PPSV23)						PSV23 OR 1 dose PCV20 (see notes)			
HepA						oses depending on vaccine			
HepB	3 dos (see no					condition			
MenACWY									
MenB	Precau					booster recommendations			
Hib		recipients only							

= Recommended vaccination for adult who meet age requirement, lack documentation of vaccination, or lack evidence of past infection

= Recommended vaccination for adults with an additional risk factor or another indication

= Recommended vaccination based on share clinical decision-making

= Precaution-vaccination might be indicated if benefit of protection outweighs risk of adverse reaction

= Contraindicated or not recommended-vaccine should not be administered
*vaccinate after pregnancy

= No recommendation/not applicable

Recommended vaccination for adults who meet age requirement, lack documentation of vaccination, or lack evidence of past infection	Recommended vaccination for adults with an additional risk factor or another indication	Recommended vaccination based on shared clinical decision-making	Precaution–vaccination might be indicated if benefit of protection outweighs risk of adverse reaction	Contraindicated or not recommended–vaccine should not be administered. *Vaccinate after pregnancy.	No recommendation/ Not applicable

Notes

Recommended Adult Immunization Schedule, Unit

- **Age 60 years or older with** known risk factors for hepatitis B virus infection **should** complete a HepB vaccine series.
- **Age 60 years or older without** known risk factors for hepatitis B virus infection **may** complete a HepB vaccine series.
  - **Risk factors for hepatitis B virus infection include:**
    - **Chronic liver disease** (e.g., persons with hepatitis C, cirrhosis, fatty liver disease, alcoholic liver disease, autoimmune hepatitis, alanine aminotransferase [ALT] or aspartate aminotransferase [AST] level greater than twice upper limit of normal)
    - **HIV infection**
    - **Sexual exposure risk** (e.g., sex partners of hepatitis B surface antigen [HBsAg]-positive persons; sexually active persons not in mutually monogamous relationships; persons seeking evaluation or treatment for a sexually transmitted infection; men who have sex with men)
    - **Current or recent injection drug use**
    - **Percutaneous or mucosal risk for exposure to blood** (e.g., household contacts of HBsAg-positive persons; residents and staff of facilities for developmentally disabled persons; health care and public safety personnel with reasonably anticipated risk for exposure to blood or blood-contaminated body fluids; persons on maintenance dialysis, including in-center or home hemodialysis and peritoneal dialysis, and persons who are predialysis; patients with diabetes)
    - **Incarceration**
    - **Travel in countries with high or intermediate endemic hepatitis B**

Special situations

- **Patients on dialysis:** complete a 3- or 4-dose series
  - 3-dose series Recombivax HB at 0, 1, 6 months (note: use Dialysis Formulation 1 mL = 40 mcg)
  - 4-dose series Engerix-B at 0, 1, 2, and 6 months (note: use 2 mL dose instead of the normal adult dose of 1 mL)

Human papilloma

Routine vaccination

- **HPV vaccination recomme through age 26 years:** 2- o on age at initial vaccination
  - **Age 15 years or older at i** 3-dose series at 0, 1–2 mo intervals: dose 1 to dose 2: 12 weeks / dose 1 to dose administered too soon)
  - **Age 9–14 years at initial 1 dose or 2 doses less tha** 1 additional dose
  - **Age 9–14 years at initial 2 doses at least 5 months** series complete, no additi
- **Interrupted schedules:** If v interrupted, the series does
- **No additional dose recom vaccine series has been co recommended dosing inte**

Shared clinical decision-m

- **Some adults age 27–45 ye** clinical decision-making, 2-

Special situations

- **Age ranges recommended catch-up vaccination or sh making also apply in spec**
  - **Immunocompromising c infection**: 3-dose series, e vaccination at age 9 throu
  - **Pregnancy**: Pregnancy tes vaccination; HPV vaccinati until after pregnancy; no i inadvertently vaccinated v

See Addendum for new or updated ACIP vaccine recommendations

Notes

Recommended Adult Immunization Schedule for ages 19 years or older, United States, 2023

For vaccine recommendations for persons 18 years of age or younger, see the Recommended Child and Adolescent Immunization Schedule.

COVID-19 vaccination

Routine vaccination

- **Primary series:** 2-dose series at 0, 4-8 weeks (Moderna) or 2-dose series at 0, 3-8 weeks (Novavax, Pfizer-BioNTech)
- **Booster dose:** see www.cdc.gov/vaccines/covid-19/clinical-considerations/interim-considerations-us.html

Special situations

Persons who are moderately or severely immunocompromised

- **Primary series**
  - 3-dose series at 0, 4, 8 weeks (Moderna) or 3-dose series at 0, 3, 7 weeks (Pfizer-BioNTech)
  - 2-dose series at 0, 3 weeks (Novavax)
- **Booster dose:** see www.cdc.gov/vaccines/covid-19/clinical-considerations/interim-considerations-us.html
- **Pre-exposure prophylaxis (e.g., monoclonal antibodies)** may be considered to complement COVID-19 vaccination. See www.cdc.gov/vaccines/covid-19/clinical-considerations/interim-considerations-us.html#immunocompromised

For Janssen COVID-19 Vaccine recipients see COVID-19 schedule at www.cdc.gov/vaccines/covid-19/clinical-considerations/interim-considerations-us.html.

Note: Current COVID-19 schedule available at www.cdc.gov/vaccines/covid-19/downloads/COVID-19-immunization-schedule-ages-6months-older.pdf. For more information on Emergency Use Authorization (EUA) indications for COVID-19 vaccines, please visit www.fda.gov/emergency-preparedness-and-response/coronavirus-disease-2019-covid-19/covid-19-vaccines

Haemophilus influenzae type b vaccination

Special situations

- **Anatomical or functional asplenia (including sickle cell disease):** 1 dose if previously did not receive Hib; if elective splenectomy, 1 dose preferably at least 14 days before splenectomy
- **Hematopoietic stem cell transplant (HSCT):** 3-dose series 4 weeks apart starting 6–12 months after successful transplant, regardless of Hib vaccination history

Hepatitis A vaccination

Routine vaccination

- **Not at risk but want protection from hepatitis A** (identification of risk factor not required): 2-dose series HepA (Havrix 6–12 months apart or Vaqta 6–18 months apart [minimum interval: 6 months]) or 3-dose series HepA-HepB (Twinrix at 0, 1, 6 months [minimum intervals: dose 1 to dose 2: 4 weeks / dose 2 to dose 3: 5 months])

Special situations

- **At risk for hepatitis A virus infection:** 2-dose series HepA or 3-dose series HepA-HepB as above
  - **Chronic liver disease** (e.g., persons with hepatitis B, hepatitis C, cirrhosis, fatty liver disease, alcoholic liver disease, autoimmune hepatitis, alanine aminotransferase [ALT] or aspartate aminotransferase [AST] level greater than twice the upper limit of normal)
  - **HIV infection**
  - **Men who have sex with men**
  - **Injection or noninjection drug use**
  - **Persons experiencing homelessness**
  - **Work with hepatitis A virus** in research laboratory or with nonhuman primates with hepatitis A virus infection
  - **Travel in countries with high or intermediate endemic hepatitis A** (HepA-HepB [Twinrix] may be administered on an accelerated schedule of 3 doses at 0, 7, and 21–30 days, followed by a booster dose at 12 months)
  - **Close, personal contact with international adoptee** (e.g., household or regular babysitting) in first 60 days after arrival from country with high or intermediate endemic hepatitis A (administer dose 1 as soon as adoption is planned, at least 2 weeks before adoptee's arrival)
  - **Pregnancy** if at risk for infection or severe outcome from infection during pregnancy
  - **Settings for exposure,** including health care settings targeting services to injection or noninjection drug users or group homes and nonresidential day care facilities for developmentally disabled persons (individual risk factor screening not required)

Hepatitis B vaccination

Routine vaccination

- **Age 19 through 59 years: complete a 2- or 3- or 4-dose series**
  - 2-dose series only applies when 2 doses of Heplisav-B* are used at least 4 weeks apart
  - 3-dose series Engerix-B, PreHevbrio*, or Recombivax HB at 0, 1, 6 months [minimum intervals: dose 1 to dose 2: 4 weeks / dose 2 to dose 3: 8 weeks / dose 1 to dose 3: 16 weeks])
  - 3-dose series HepA-HepB (Twinrix at 0, 1, 6 months [minimum intervals: dose 1 to dose 2: 4 weeks / dose 2 to dose 3: 5 months])
  - 4-dose series HepA-HepB (Twinrix) accelerated schedule of 3 doses at 0, 7, and 21–30 days, followed by a booster dose at 12 months

***Note:** Heplisav-B and PreHevbrio are not recommended in pregnancy due to lack of safety data in pregnant persons.

Adult Immunization Schedule by Age

Recommendations for Ages 19 Years or Older, United States, 2023

Print

See Addendum for new or updat

View addendum

Using the schedule

To make vaccination recommendations

1. Determine needed vaccines **based o**
2. Assess for **medical conditions and o**
3. Review **special situations** (Vaccinatio
4. Review **contraindications and precau**
5. See **Addendum** for new or updated

Addendum – Adult Recommended Immunization Schedule for ages 19 years or older, United States, 2023

Vaccines	Recommendations	Effective Date of Recommendation*
Respiratory syncytial vi		
COVID-19 (Moderna, P		

Addendum Recommended Adult Immunization Schedule, United States, 2023

In addition to the recommendations presented in the previous sections of this Immunization Schedule, ACIP has approved the following recommendations by majority vote since October 20, 2022. The following recommendations have been adopted by the CDC Director and are now official. Links are provided if these recommendations have been published in *Morbidity and Mortality Weekly Report (MMWR)*.

Vaccines	Recommendations	Effective Date of Recommendation*
COVID-19 (Moderna, Pfizer-BioNTech)	• All persons ≥6 months of age should receive 2023–2024 (monovalent, XBB containing) COVID-19 vaccines as authorized under EUA or approved by BLA. • For detailed information, see: www.cdc.gov/covidschedule	September 12, 2023
Respiratory syncytial virus (RSV)	• Adults 60 years of age and older may receive a single dose of Respiratory Syncytial Virus (RSV) vaccine, using shared clinical decision-making. • For detailed information, see: www.cdc.gov/mmwr/volumes/72/wr/mm7229a4.htm?s_cid=mm7229a4_w	June 27, 2023
Poliovirus (IPV)	• Adults who are known or suspected to be unvaccinated or incompletely vaccinated against polio should complete a primary vaccination series with inactivated polio vaccine (IPV). • Adults who have received a primary series of trivalent oral polio vaccine (tOPV) or IPV in any combination and who are at increased risk of poliovirus exposure may receive another dose of IPV. Available data do not indicate the need for more than a single lifetime booster dose with IPV for adults.	June 27, 2023
Influenza (IIV4, ccIV4, RIV4, LAIV4)	• All persons ages ≥6 months with egg allergy should receive influenza vaccine. Any influenza vaccine (egg based or non-egg based) that is otherwise appropriate for the recipient's age and health status can be used. • Affirm the updated *MMWR* Recommendations and Reports, "Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices—United States, 2023-24 Influenza Season" www.cdc.gov/mmwr/volumes/72/rr/rr7202a1.htm	June 27, 2023

*The effective date is the date when the CDC director adopted the recommendation and when the ACIP recommendation became official

Adult Immunization Schedule – Healthcare Providers | CDC

General Best Practice Guidelines for Immunization

Updated August 1, 2023

Best Practices Guidance
Kroger A, Bahta L, Long S, Sanchez P

Introduction
Purpose and topics covered in this report…

History
History of development of: Timing and Spacing, Contraindications and Precautions, Preventing and Managing Adverse Reactions…

Timing and Spacing of Immunobiologics
Vaccine scheduling, supply and lapsed schedule, spacing of doses, simultaneous and nonsimultaneous administration, licensed combination vaccines, interchangeability of formulations, extra doses, conjugate vaccines…

Contraindications and Precautions
General principles, standards of valid contraindications and precautions, and conditions incorrectly perceived as contraindications…

Preventing and Managing Adverse Reactions
Benefit and risk communication, reporting adverse reactions, National Vaccine Injury Compensation Program…

Vaccine Administration
Infection control and sterile technique, route of administration, multiple and jet injections. alleviating discomfort and pain, clinical implications of nonstandard practices…

Altered Immunocompetence

General Best Practice Guidelines for Immunization

Print

Updated August 1, 2023

Printer friendly version [26 pages]

Updates

This section incorporates general content from the Infectious Diseases Society of America policy statement, 2013 IDSA Clinical Practice Guideline for Vaccination of the Immunocompromised Host (1), to which CDC provided input in November 2011. The evidence supporting this guidance is based on expert opinion and arrived at by consensus.

ACIP Altered Immunocompetence Guidelines for Immunizations | CDC

COVID-19 Vaccine Clinical Considerations

Interim Clinical Considerations for Use of COVID-19 Vaccines in the United States

Print

Summary of recent changes (last updated October 24, 2023):

- Age transitions: Updated guidance for children who transition during the initial COVID
  4 years to age 5 years and children who are moderately or severely immunocompro
  years to age 12 years to receive the age-appropriate dosage based on their age on th
- Interchangeability of COVID-19 vaccines: Clarification of circumstances in which admi
  doses from different manufacturers may be considered when doses from the same m
  recommended.

Reference Materials

- COVID-19 Vaccination Recommendations Infographic (Updated 10/13/2023)
- COVID-19 Vaccination Recommendations Infographic (Immunocompromised) (Updated 10/13/2023)

Ages 12 years and older

COVID-19 vaccination history prior to updated (2023–2024 Formula) mRNA vaccine*	Updated (2023–2024 Formula) mRNA vaccine	Number of updated (2023–2024 Formula) mRNA doses indicated	Dosage (mL/ug)	Vaccine vial cap and label colors§	Interval between doses
Unvaccinated	Moderna	1	0.5 mL/50 ug	Dark blue cap; blue label	—
	Pfizer-BioNTech	1	0.3 mL/30 ug	Gray cap; gray label	—
1 or more doses any mRNA	Moderna OR	1	0.5 mL/50 ug	Dark blue cap; blue label	At least 8 weeks after last dose
	Pfizer-BioNTech	1	0.3 mL/30 ug	Gray cap; gray label	At least 8 weeks after last dose
1 or more doses Novavax or Janssen, including in combination with any mRNA vaccine dose(s)	Moderna OR	1	0.5 mL/50 ug	Dark blue cap; blue label	At least 8 weeks after last dose
	Pfizer-BioNTech	1	0.3 mL/30 ug	Gray cap; gray label	At least 8 weeks after last dose

Interim Clinical Considerations for Use of COVID-19 Vaccines | CDC

Adult Case Study

Case Study #3: Buzz

DOB: 2-4-56

Age: 67 years:

- Buzz is a 67-year-old patient with diabetes
- Has a history of chickenpox disease
- Has a winter home in Mexico
- Does not work in healthcare
- He has insurance that covers his immunizations

BUZZ'S MCIR RECORD:

Series	Dose 1	Dose 2	Dose 3	Dose 4	Dose 5	Dose 6+
DTP/DTaP/ DT/Td/Tdap	06/10/1980 Td PF (adol/adult) 24yrs 4mos	08/11/1980 Td PF (adol/adult) 24yrs 6mos				
MMR	08/20/1961 MMR 5yrs 6mos					
Hepatitis B						
Hepatitis A						
Seasonal Influenza	08/10/2018 Influenza (Historical) 62yrs 6mos	10/07/2019 Influenza (Historical) 63yrs 8mos	10/15/2020 Influenza (Historical) 64yrs 8mos	11/01/2021 Influenza (Historical) 65yrs 8mos	10/21/2022 Influenza IIV4 High Dose (FluZone HD Quad) 66yrs 8mos	
Pneumococcal Adult	08/10/2018 PPSV23 (Pneumovax) 62yrs 6mos					
SARS-CoV-2	09/19/2022 COVID-19 PFR Bivalent 30mcg/0.3mL 66yrs 7mos					
Zoster	08/09/2019 Zoster ZVL (Zostavax) 63yrs 6mos					
RSV						

Other Administrations

Series	
Varicella	08/09/2019 Zoster ZVL (Zostavax) 63yrs 6mos

Dispensed Vaccines / Biologics

Vaccine/Biologic	Date	Ag
No Dispensed Vaccines or Biologics Found		

Non-Administered Doses/Positive Immunity

Series/Antigen	Date	Reason	Entered by
Varicella	04/02/1962	Immunity	MDHHS Nurse Educators

Case Study #3: Buzz
Question #1:

Which vaccines are recommended for Buzz to receive today?

A. Td, Hep A, Flu, COVID-19, Shingrix (Zoster), Respiratory Syncytial Virus (RSV)

B. Td, Hep A, Hep B, Flu, COVID-19

C. Tdap, Hep B, Hep A, Flu, Pneumococcal, COVID-19, Shingrix (Zoster), RSV

D. Tdap, Hep B, COVID-19, Flu, RSV

E. None of the above

Question #1: Answer: C

- Tdap
- Hep B
- Hep A
- Flu
- Pneumococcal
- COVID-19
- Shingrix (Zoster)
- RSV

Discussion of answer

- Tdap needed
- 2nd MMR not recommended
- Hep B: Age 60 years or older with known risk factors for hepatitis B virus infection should complete a Hep B vaccine series
- Hep A: Winter home in Mexico, is recommended to have protection
- Flu*: is yearly and CDC prefers for those 65 years and older to get:
  - HD-IIV4 **OR**
  - aIIV4 **OR**
  - RIV4

*If none of these are available, give any flu vaccine that is age and dose appropriate

- Pneumococcal:
  - One dose of PCV20 at least 1 year after the last PPSV23 dose, **OR**
  - One dose of PCV15 at least 1 year after the last PPSV23
- RSV: is a shared clinical decision-making discussion
- COVID-19: Only needs one dose of COVID-19 2023-24 formula
- Shingrix (Zoster): whole series needs to be administered even though he had a Zostavax

adult-combined-schedule.pdf (cdc.gov)

Notes Recommended Adult Immunization Schedule, United States, 2023

Hepatitis A vaccination

Routine vaccination

- **Not at risk but want protection from hepatitis A** (identification of risk factor not required): 2-dose series HepA (Havrix 6–12 months apart or Vaqta 6–18 months apart [minimum interval: 6 months]) or 3-dose series HepA-HepB (Twinrix at 0, 1, 6 months [minimum intervals: dose 1 to dose 2: 4 weeks / dose 2 to dose 3: 5 months])

- **Travel in countries with high or intermediate endemic hepatitis A** (HepA-HepB [Twinrix] may be administered on an accelerated schedule of 3 doses at 0, 7, and 21–30 days, followed by a booster dose at 12 months)

Hepatitis B vaccination

- **Age 60 years or older with** known risk factors for hepatitis B virus infection **should** complete a HepB vaccine series.
- **Age 60 years or older without** known risk factors for hepatitis B virus infection **may** complete a HepB vaccine series.

Measles, mumps, and rubella vaccination

Routine vaccination

- **No evidence of immunity to measles, mumps, or rubella:** 1 dose

  - **Evidence of immunity:** Born before 1957 (health care personnel, see below), documentation of receipt of MMR vaccine, laboratory evidence of immunity or disease (diagnosis of disease without laboratory confirmation is not evidence of immunity)

adult-combined-schedule.pdf (cdc.gov)

Table 1 COVID-19 vaccination recommendations have changed. Find the latest recommendations at www.cdc.gov/covidschedule

Recommended Adult Immunization Schedule for ages 19 years or older, United States, 2023

Vaccine	19–26 years	27–49 years	50–64 years	≥65 years
COVID-19	2- or 3- dose primary series and booster (See Notes)			★
Influenza inactivated (IIV4) or **Influenza recombinant** (RIV4)	1 dose annually			★
or	or			
Influenza live, attenuated (LAIV4)	1 dose annually			
Tetanus, diphtheria, pertussis (Tdap or Td)	1 dose Tdap each pregnancy; 1 dose Td/Tdap for wound management (see notes)			
	1 dose Tdap, then Td or Tdap booster every 10 years			★
Measles, mumps, rubella (MMR)	1 or 2 doses depending on indication (if born in 1957 or later)			For healthcare personnel, see notes
Varicella (VAR)	2 doses (if born in 1980 or later)	2 doses		
Zoster recombinant (RZV)	2 doses for immunocompromising conditions (see notes)		2 doses	★
Human papillomavirus (HPV)	2 or 3 doses depending on age at initial vaccination or condition	27 through 45 years		
Pneumococcal (PCV15, PCV20, PPSV23)	1 dose PCV15 followed by PPSV23 OR 1 dose PCV20 (see notes)			★ See Notes See Notes
Hepatitis A (HepA)	2, 3, or 4 doses depending on vaccine			★
Hepatitis B (HepB)	2, 3, or 4 doses depending on vaccine or condition			★
Meningococcal A, C, W, Y (MenACWY)	1 or 2 doses depending on indication, see notes for booster recommendations			
Meningococcal B (MenB)	2 or 3 doses depending on vaccine and indication, see notes for booster recommendations			
	19 through 23 years			

Recommended vaccination for adults who meet age requirement, lack documentation of vaccination, or lack evidence of past infection

Recommended vaccination for adults with an additional risk factor or another indication

Recommended vaccination based on shared clinical decision-making

No recommendation/ Not applicable

adult-combined-schedule.pdf (cdc.gov)

Table 2 Recommended Adult Immunization Schedule by Medical Condition or Other Indication, United States, 2023

Vaccine	Pregnancy	Immuno-compromised (excluding HIV infection)	HIV infection CD4 percentage and count: <15% or <200 mm³	HIV infection CD4 percentage and count: ≥15% and ≥200 mm³	Asplenia, complement deficiencies	End-stage renal disease, or on hemodialysis	Heart or lung disease; alcoholism[a]	Chronic liver disease	Diabetes	Health care personnel[b]	Men who have sex with men
COVID-19		See Notes							★		
IIV4 or RIV4	1 dose annually								★		
or										or	
LAIV4	Contraindicated					Precaution				1 dose annually	
Tdap or Td	1 dose Tdap each pregnancy	1 dose Tdap, then Td or Tdap booster every 10 years							★		
MMR	Contraindicated*	Contraindicated		1 or 2 doses depending on indication							
VAR	Contraindicated*	Contraindicated			2 doses						
RZV		2 doses at age ≥19 years			2 doses at age ≥50 years				★		
HPV	Not Recommended*	3 doses through age 26 years			2 or 3 doses through age 26 years depending on age at initial vaccination or condition						
Pneumococcal (PCV15, PCV20, PPSV23)		1 dose PCV15 followed by PPSV23 OR 1 dose PCV20 (see notes)							★		
HepA					2, 3, or 4 doses depending on vaccine				★		
HepB	3 doses (see notes)	2, 3, or 4 doses depending on vaccine or condition							★		
MenACWY	1 or 2 doses depending on indication, see notes for booster recommendations										

Recommended vaccination for adults who meet age requirement, lack documentation of vaccination, or lack evidence of past infection

Recommended vaccination for adults with an additional risk factor or another indication

Recommended vaccination based on shared clinical decision-making

Precaution–vaccination might be indicated if benefit of protection outweighs risk of adverse reaction

Contraindicated or not recommended–vaccine should not be administered.

*Vaccinate after pregnancy.

No recommendation/ Not applicable

Use the legend on the bottom of the page to determine whether the patient is eligible for a vaccine due to their medical condition

Adults ≥65 years old

Complete pneumococcal vaccine schedules

Prior vaccines	Option A
None*	PCV20
PPSV23 only at any age	≥1 year → PCV20
PCV13 only at any age	≥1 year → PCV20
PCV13 at any age & **PPSV23** at <65 yrs	≥5 years → PCV20

[Pneumococcal Vaccine Timing for Adults greater than or equal to 65 years (cdc.gov)]

Notes

Recommended Adult Immunization Schedule, United States, 2023

Pneumococcal vaccination

Routine vaccination

- **Age 65 years or older who have:**
  - **Not previously received a dose of PCV13, PCV15, or PCV20 or whose previous vaccination history is unknown:** 1 dose PCV15 OR 1 dose PCV20. If PCV15 is used, this should be followed by a dose of PPSV23 given at least 1 year after the PCV15 dose. A minimum interval of 8 weeks between PCV15 and PPSV23 can be considered for adults with an immunocompromising condition,* cochlear implant, or cerebrospinal fluid leak to minimize the risk of invasive pneumococcal disease caused by serotypes unique to PPSV23 in these vulnerable groups.
  - **Previously received only PCV7:** follow the recommendation above.
  - **Previously received only PCV13:** 1 dose PCV20 at least 1 year after the PCV13 dose OR complete the recommended PPSV23 series as described here www.cdc.gov/vaccines/vpd/pneumo/downloads/pneumo-vaccine-timing.pdf.
  - **Previously received only PPSV23:** 1 dose PCV15 OR 1 dose PCV20 at least 1 year after the PPSV23 dose. If PCV15 is used, it need not be followed by another dose of PPSV23.
  - **Previously received both PCV13 and PPSV23 but NO PPSV23 was received at age 65 years or older:** 1 dose PCV20 at least 5 years after their last pneumococcal vaccine dose OR complete the recommended PPSV23 series as described here www.cdc.gov/vaccines/vpd/pneumo/downloads/pneumo-vaccine-timing.pdf.
  - **Previously received both PCV13 and PPSV23, AND PPSV23 was received at age 65 years or older:** Based on shared clinical decision-making, 1 dose of PCV20 at least 5 years after the last pneumococcal vaccine dose.
- For guidance on determining which pneumococcal vaccines a patient needs and when, please refer to the mobile app which can be downloaded here: www.cdc.gov/vaccines/vpd/pneumo/hcp/pneumoapp.html

Special situations

- **Age 19–64 years with certain underlying medical conditions or other risk factors** who have**
  - **Not previously received a PCV13, PCV15, or PCV20 or whose previous vaccination history is unknown:** 1 dose PCV15 OR 1 dose PCV20. If PCV15 is used, this should be followed by a dose of PPSV23 given at least 1 year after the PCV15 dose. A minimum interval of 8 weeks between PCV15 and PPSV23 can be considered for adults with an immunocompromising condition,* cochlear implant, or cerebrospinal fluid leak
  - **Previously received only PCV7:** follow the recommendation above.
  - **Previously received only PCV13:** 1 dose PCV20 at least 1 year after the PCV13 dose OR complete the recommended PPSV23 series as described here www.cdc.gov/vaccines/vpd/pneumo/downloads/pneumo-vaccine-timing.pdf.
  - **Previously received only PPSV23:** 1 dose PCV15 OR 1 dose PCV20 at least 1 year after the PPSV23 dose. If PCV15 is used, it need not be followed by another dose of PPSV23.
  - **Previously received both PCV13 and PPSV23 but have not completed the recommended series:** 1 dose PCV20 at least 5 years after their last pneumococcal vaccine dose OR complete the recommended PPSV23 series as described here www.cdc.gov/vaccines/vpd/pneumo/downloads/pneumo-vaccine-timing.pdf.
- For guidance on determining which pneumococcal vaccines a patient needs and when, please refer to the mobile app which can be downloaded here: www.cdc.gov/vaccines/vpd/pneumo/hcp/pneumoapp.html

*Note: Immunocomp… include chronic renal … immunodeficiency, la… generalized malignan… virus, Hodgkin disease… myeloma, solid organ… acquired asplenia, sick… hemoglobinopathies.

**Note: Underlying m… risk factors include alc… lung disease, chronic … cochlear implant, con… CSF leak, diabetes me… HIV, Hodgkin disease, … immunosuppression, … myeloma, nephrotic s… or sickle cell disease o…

Po…

Routine vaccination

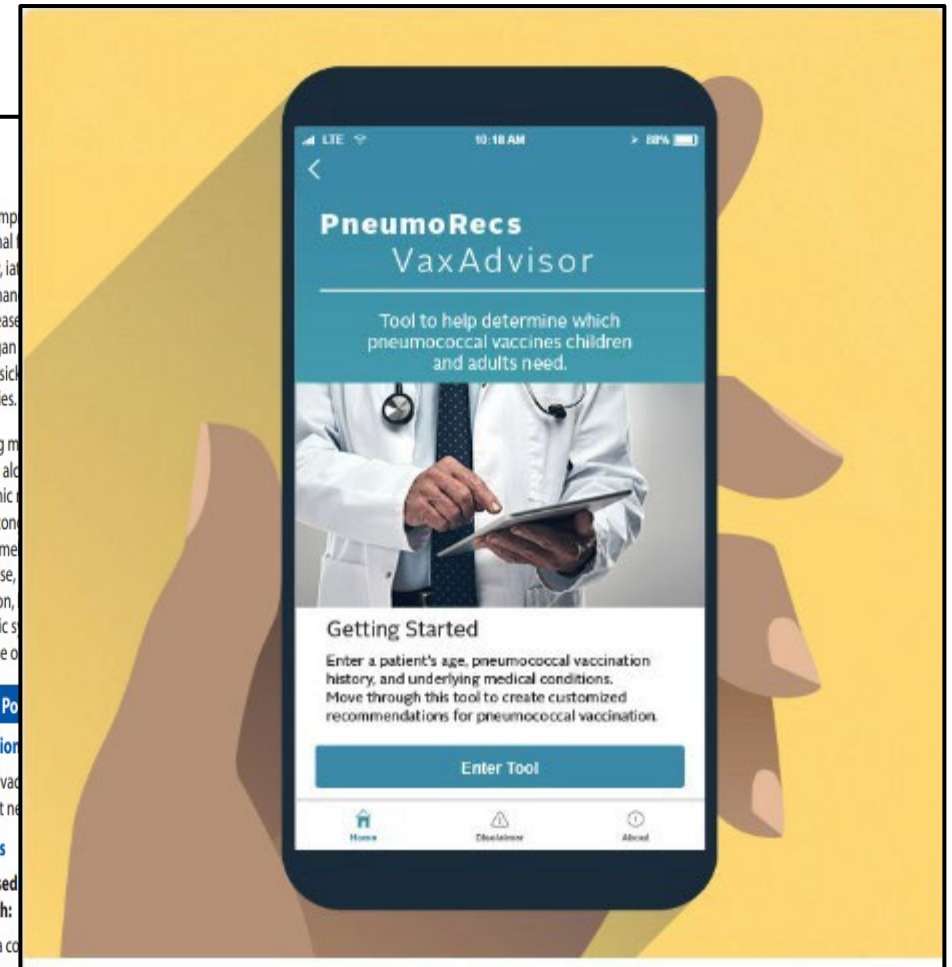
Routine poliovirus vac… United States is not ne…

Special situations

- **Adults at increased … to poliovirus with:**
  - No evidence of a co… (i.e., at least 3 doses … (1, 2, or 3 doses) to …
  - Evidence of comple… (i.e., at least 3 doses … IPV booster

For detailed informati… vpd/polio/hcp/recom…

[Adult Immunization Schedule – Healthcare Providers | CDC]

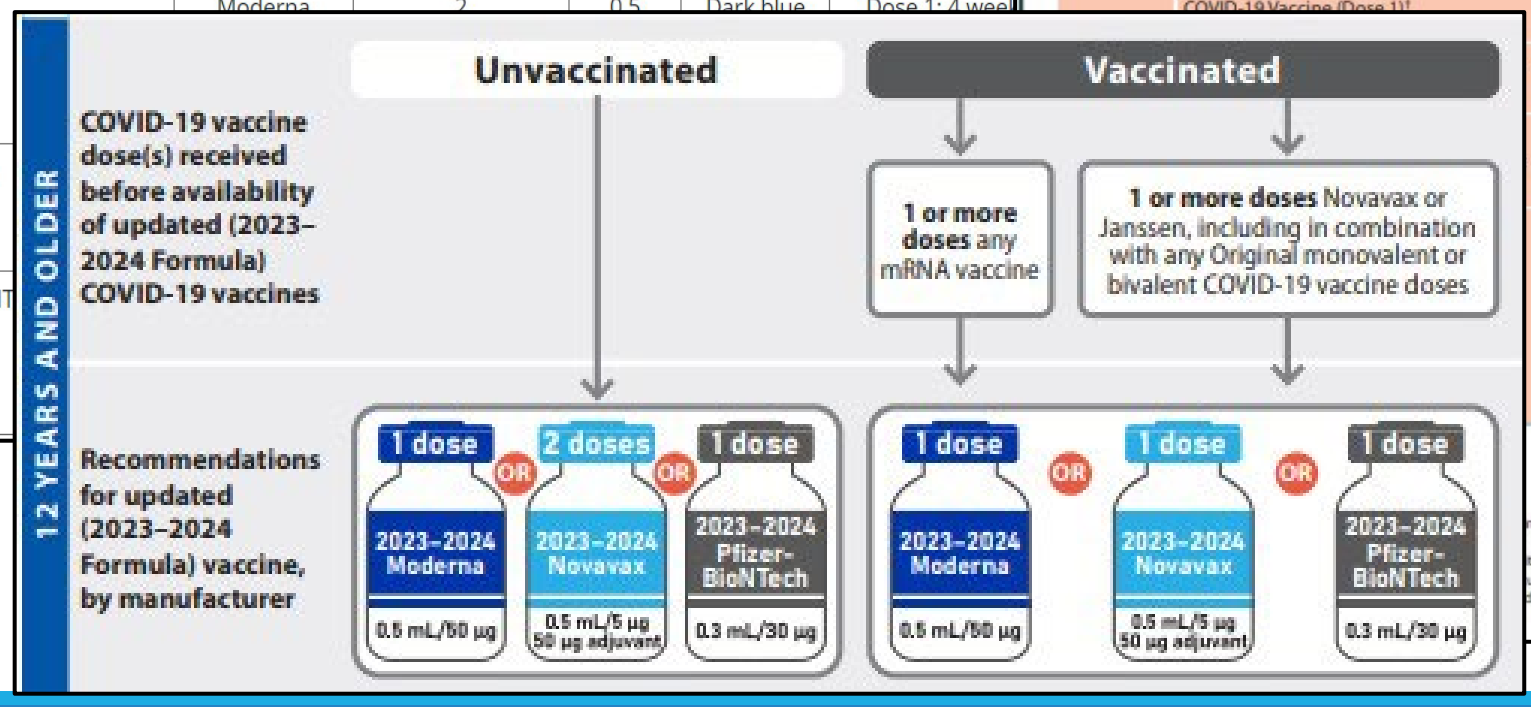


PneumoRecs VaxAdvisor is available for download on iOS and Android mobile devices.

[PneumoRecs VaxAdvisor: Vaccine Provider App | CDC]

Ages 12 years and older*

COVID-19 vaccination history prior to updated (2023–2024 Formula) vaccine†	Updated (2023–2024 Formula) mRNA vaccine	Number of updated (2023–2024 Formula) mRNA doses indicated‡	Dosage (mL/ug)	Vaccine vial cap and label colors§	Interval between dose
Unvaccinated	Moderna	3	0.5 mL/50 ug	Dark blue cap; blue label	Dose 1 and Dose weeks Dose 2 and Dos At least 4 week
	Pfizer-BioNTech	3	0.3 mL/30 ug	Gray cap; gray label	Dose 1 and Dose weeks Dose 2 and Dos At least 4 week
1 dose any Moderna	Moderna	2	0.5	Dark blue	Dose 1: 4 week
2 doses any Moderna					
1 dose any Pfizer-BioNT					



Updated (2023-2024 Formula) COVID-19 Vaccine

Interim 2023-2024 COVID-19 Immunization Schedule for Persons 6 Months of Age and Older

Table 2b. For people who **ARE** moderately or severely immunocompromised *Continued*

2023-24 Pfizer-BioNTech COVID-19 Vaccine - CONTINUED
Vaccine type: mRNA - Do **NOT** use any previously available Pfizer-BioNTech COVID-19 vaccine products.

Age	COVID-19 Vaccination History* (regardless of COVID-19 vaccine formula)	2023-24 Vaccine Schedule	Administer
	Unvaccinated: 0 doses	Give a 3-dose initial series. Administer: • Dose 1 now • Dose 2 at least 3 weeks after Dose 1 • Dose 3 at least 4 weeks after Dose 2	0.3 mL/30 µg From gray-capped vial with gray label or manufacturer-filled syringe with gray box on label Intramuscular (IM) injection
	1 previous dose of any Pfizer-BioNTech COVID-19 Vaccine (Dose 1)‡	Complete series. Administer: • Dose 2 at least 3 weeks after Dose 1 • Dose 3 at least 4 weeks after Dose 2	
	2 doses of any Pfizer-BioNTech COVID-19 vaccine	Complete series. Administer: • Dose 3 at least 4 weeks after Dose 2	
1	3 doses of any Pfizer-BioNTech COVID-19 vaccine	Give 1 dose at least 8 weeks (2 months) after the last dose	
		People who are moderately or severely immunocompromised have the **option to receive 1 additional dose at least 8 weeks (2 months) following** the last recommended dose. Further additional dose(s) may be administered, **informed by the clinical judgement** of a healthcare provider and personal preference and circumstances. Any further additional doses should be administered at **least 8 weeks (2 months) after the last** COVID-19 vaccine dose.	

nal monovalent (ancestral) mRNA, bivalent mRNA vaccine, Updated (2023–2024 Formula), or a combination of

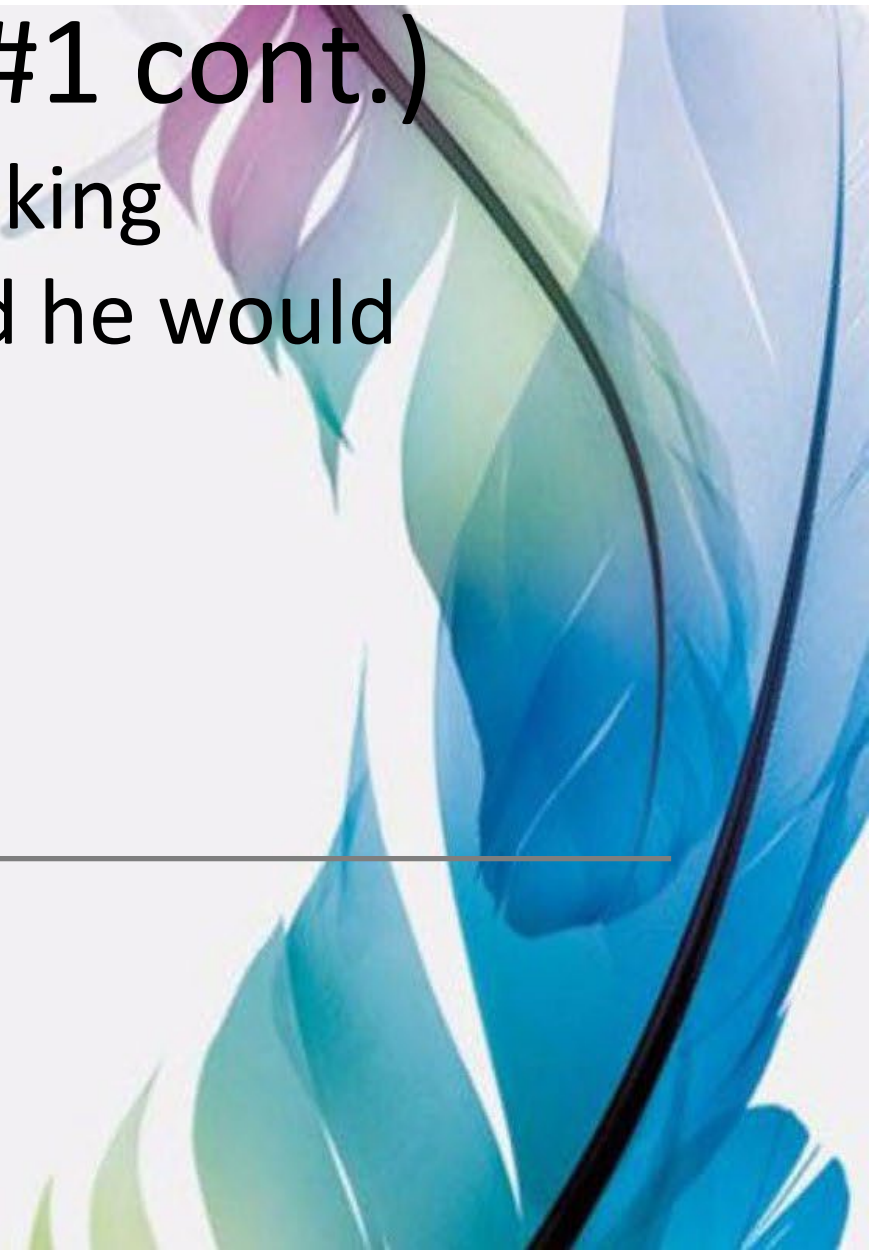
tial vaccination (i.e., children ages 6 months–4 years and people who are moderately or severely
urer. However, in the following exceptional situations a different age-appropriate COVID-19 vaccine product
d otherwise not complete the vaccination series, or the person starts but is unable to complete a vaccination

Interim Clinical Considerations for Use of COVID-19 Vaccines | CDC

Case Study #3: Buzz (question #1 cont.)

After having a shared clinical decision-making discussion with his provider, Buzz decided he would get the following vaccines:

- Tdap
- Hep B (Twinrix)
- Hep A (Twinrix)
- Flu
- Pneumococcal
- RSV
- COVID-19
- Shingrix (Zoster)



ACIP Shared Clinical Decision-Making Recommendations | CDC

BUZZ'S MCIR RECORD:

Immunizations						Other
Series	**Dose 1**	**Dose 2**	**Dose 3**	**Dose 4**	**Dose 5**	**Dose 6+**
DTP/DTaP/ DT/Td/Tdap	06/10/1980 Td PF (adol/adult) 24yrs 4mos	08/11/1980 Td PF (adol/adult) 24yrs 6mos	11/02/2023 Tdap (adol/adult) 67yrs 8mos			
MMR	08/20/1961 MMR 5yrs 6mos					
Hepatitis B	11/02/2023 Hep A-Hep B (Twinrix) 67yrs 8mos					
Hepatitis A	11/02/2023 Hep A-Hep B (Twinrix) 67yrs 8mos					
Seasonal Influenza	08/10/2018 Influenza (Historical) 62yrs 6mos	10/07/2019 Influenza (Historical) 63yrs 8mos	10/15/2020 Influenza (Historical) 64yrs 8mos	11/01/2021 Influenza (Historical) 65yrs 8mos	10/21/2022 Influenza IIV4 High Dose (FluZone HD Quad) 66yrs 8mos	11/02/2023 Influenza IIV4 High Dose (FluZone HD Quad) 67yrs 8mos
Pneumococcal Adult	08/10/2018 PPSV23 (Pneumovax) 62yrs 6mos	11/02/2023 PCV20 (Prevnar 20) 67yrs 8mos				
SARS-CoV-2	09/19/2022 COVID-19 PFR Bivalent 30mcg/0.3mL 66yrs 7mos	11/02/2023 COVID-19 PFR Comirnaty 2023/24 30mcg 67yrs 8mos				
Zoster	08/09/2019 Zoster ZVL (Zostavax) 63yrs 6mos	11/02/2023 Zoster RZV (Shingrix) 67yrs 8mos				
RSV	11/02/2023 RSV vaccine (Arexvy) 67yrs 8mos					
Other Administrations						
Series						
Varicella	08/09/2019 Zoster ZVL (Zostavax) 63yrs 6mos					

Case Study #3: Buzz

Question #2:

When does Buzz need to return for his **next** immunizations and which ones?

A. 1 month for Hep B and Hep A (Twinrix)

B. 2-3 months for MMR, RSV, COVID-19

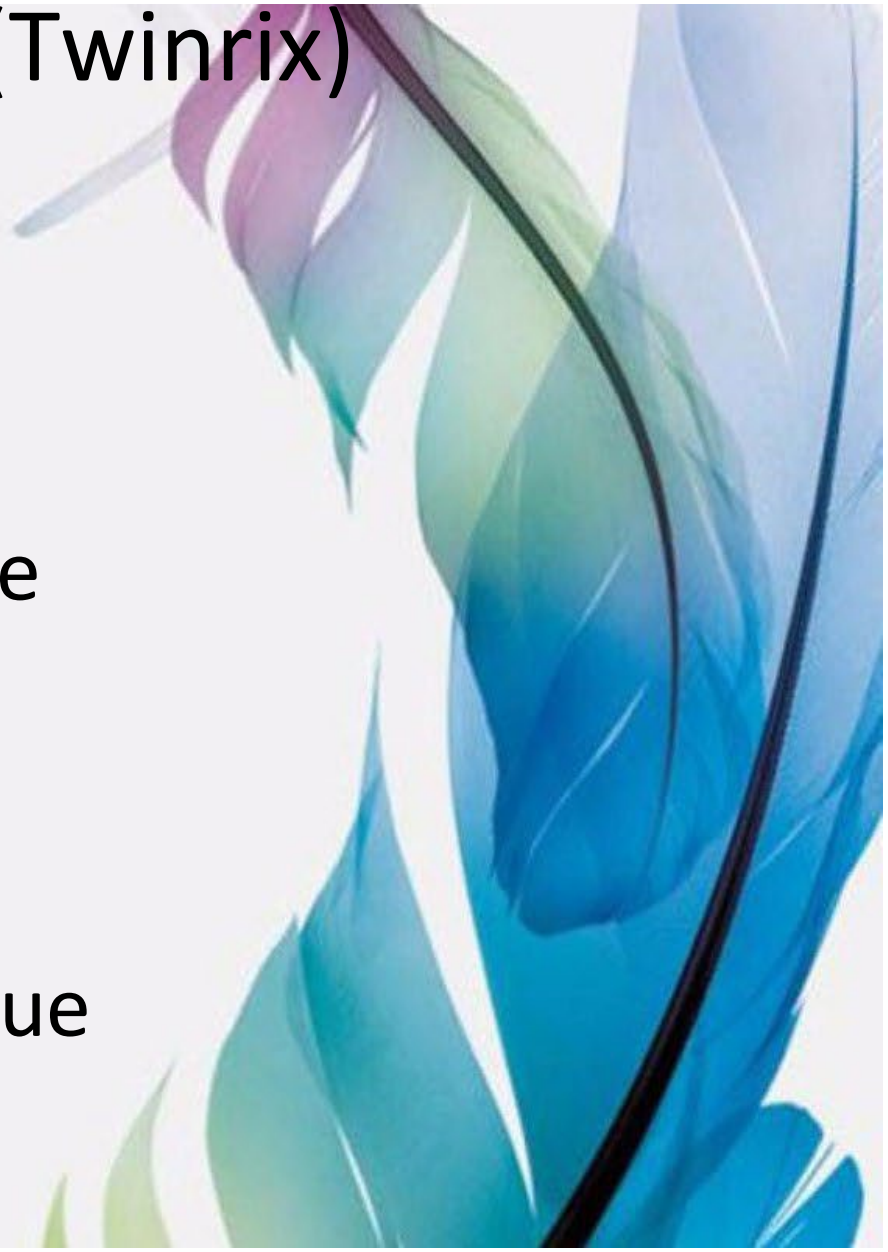
C. 3-6 months for MMR, Pneumococcal, RSV

D. 12 months for Shingrix (Zoster)

E. None of the above

Answer: A. 1 month for HepA/HepB (Twinrix)

- Td/Tdap: booster every 10 years
- Flu: only one flu shot per season
- Pneumococcal: He is complete
- RSV: At this time RSV is only a one dose recommendation
- COVID-19: He only needs 1 dose this season
- Shingrix (Zoster): 2nd and last dose is due 2-6 months after the first dose



Vaccine Quick Looks (michigan.gov)

Thank you so much for being here today and for everything you do.

If you have any further questions, please contact us at:
checcimms@michigan.gov

Stay Up-To-Date on Immunization Recommendations

- Stay up-to-date by joining the MDHHS Listserv and receive email updates
- To sign up, email Dara Barrera at djbarrera@msms.org and ask to be added to the MDHHS Immunization Listserv

Clusters of under vaccination, provider deserts, and preventing the next outbreak of vaccine preventable diseases in Michigan

Ryan Malosh, PhD MPH

Taylor Olsabeck, MS

Michigan Department of Health & Human Services

Agenda

- Maps!
- Provider deserts
  - COVID
  - VFC
- Vaccine Preventable Disease Update
  - Cases
  - Chickenpox
  - H. influenzae outbreak in Detroit

Maps - Fine area estimation

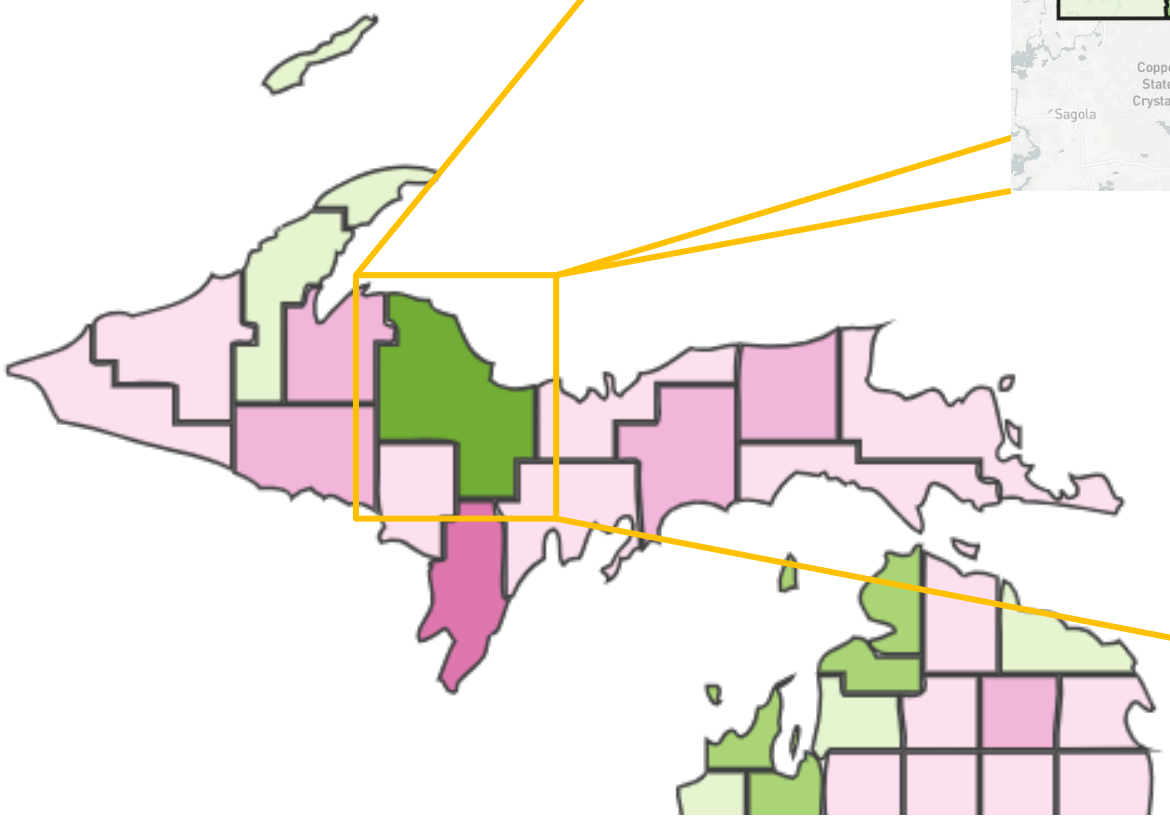
MDHHS
Michigan Department of Health & Human Services

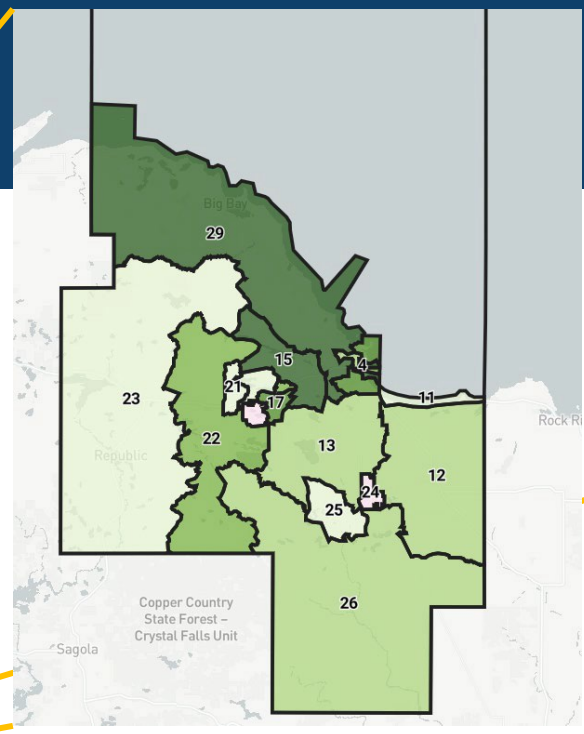
MI Lighthouse

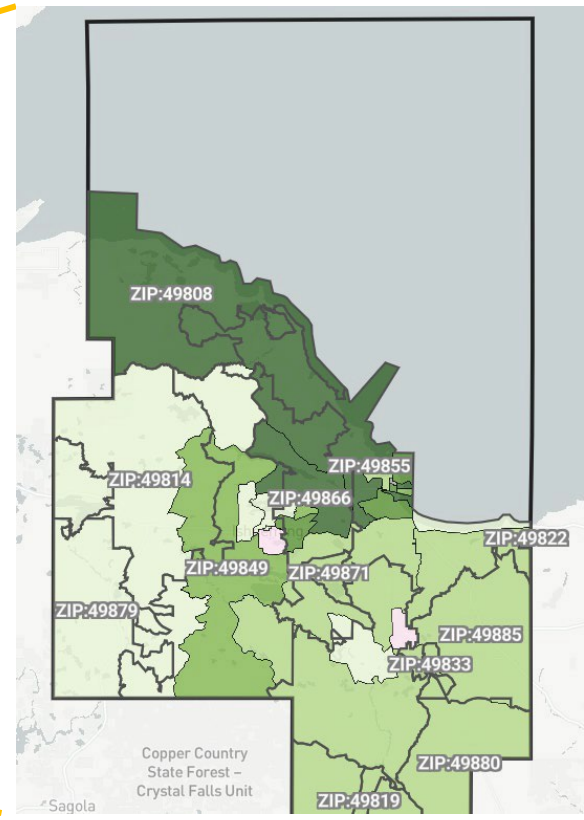
- A collaboration between the MDHHS, UM School of Public Health, UM School of Information, and the UM College of Engineering has created several vital tools used by public health professionals, health professionals, and the public to better understand the symptoms, risks, and available vaccination data throughout Michigan during the COVID-19 pandemic.
- MI Lighthouse is a vaccine visualization and analysis platform developed to provide local, high-resolution information on COVID-19 vaccine coverage for Local Health Department staff.
- MI Lighthouse has been used by public health officials to enable data-informed decision-making about vaccine clinics, resource allocation, and response efforts since the introduction of the COVID-19 vaccines.
- The MI Lighthouse team is currently focused on expanding the scope of MI Lighthouse beyond COVID-19 to provide vaccine visualization and analytics for a wide range of vaccines, Starting with MMR.

MI Lighthouse

MDHHS
Michigan Department of Health & Human Services







Michigan Coverage Maps at Different Spatial Scales

- Interactive Mapping tools can be useful for exploring regional and census-tract level variation in MMR and Varicella Coverage at different spatial scales (e.g. county, census tract).
- For school buildings, a data table will appear with enrollment and MMR/VAR coverage from 2017-2021,
- The size of school points is proportional to their median enrollment over the study period, and the color is related to the MMR coverage in 2021.
- As a note - tracts in white are censored (meaning denominator of 5 year olds of 10 or fewer children).

Data on MMR Coverage

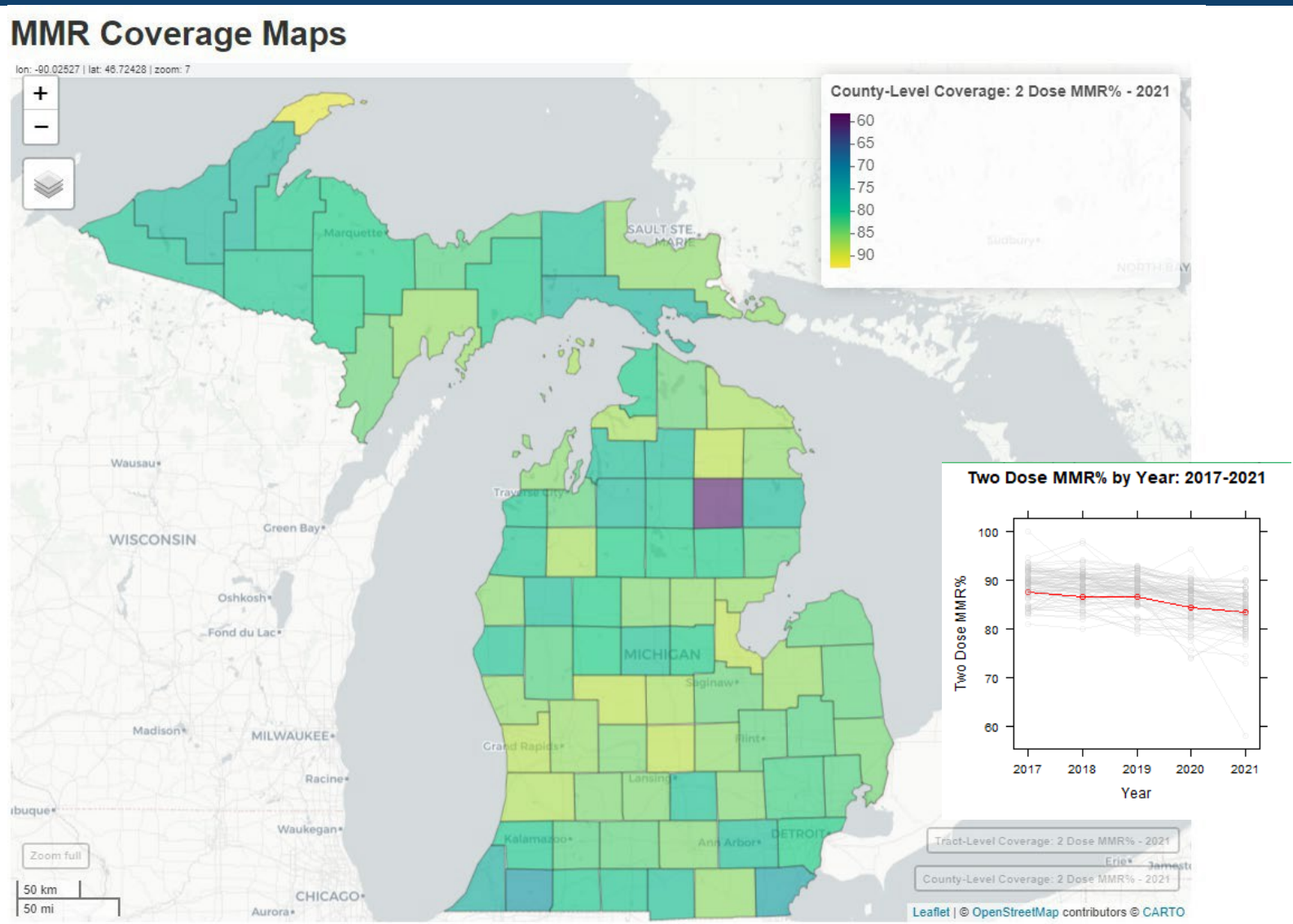
Summary of Vaccination Coverage from IIS Data

Table 1. MMR Doses and Coverage - IIS Data, 2017-2021

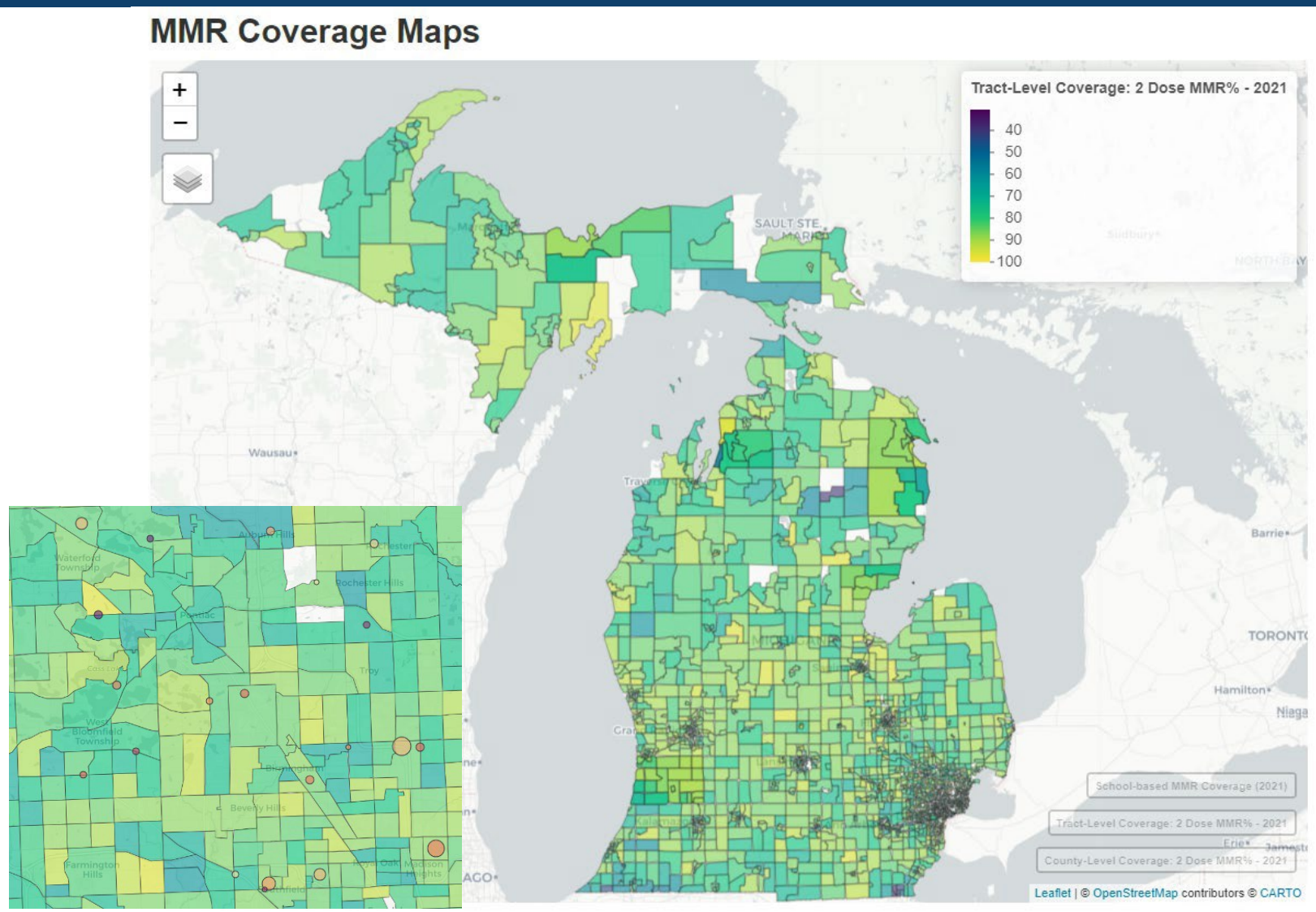
Year	IIS Denominator	0-Dose MMR	1-Dose MMR	2-Dose MMR	0-Dose MMR%	1-Dose MMR%	2-Dose MMR%
2017	121679	5071	7861	108747	4.2	6.5	89.4
2018	122743	5465	8577	108701	4.5	7.0	88.6
2019	124145	5051	9496	109598	4.1	7.6	88.3
2020	123516	6059	12010	105447	4.9	9.7	85.4
2021	122025	6944	12592	102489	5.7	10.3	84.0

County level maps

- County level maps are the first level of analysis
- Identifying areas with low coverage
- Allows for broad inferences (i.e. rural vs urban, border vs non-border)



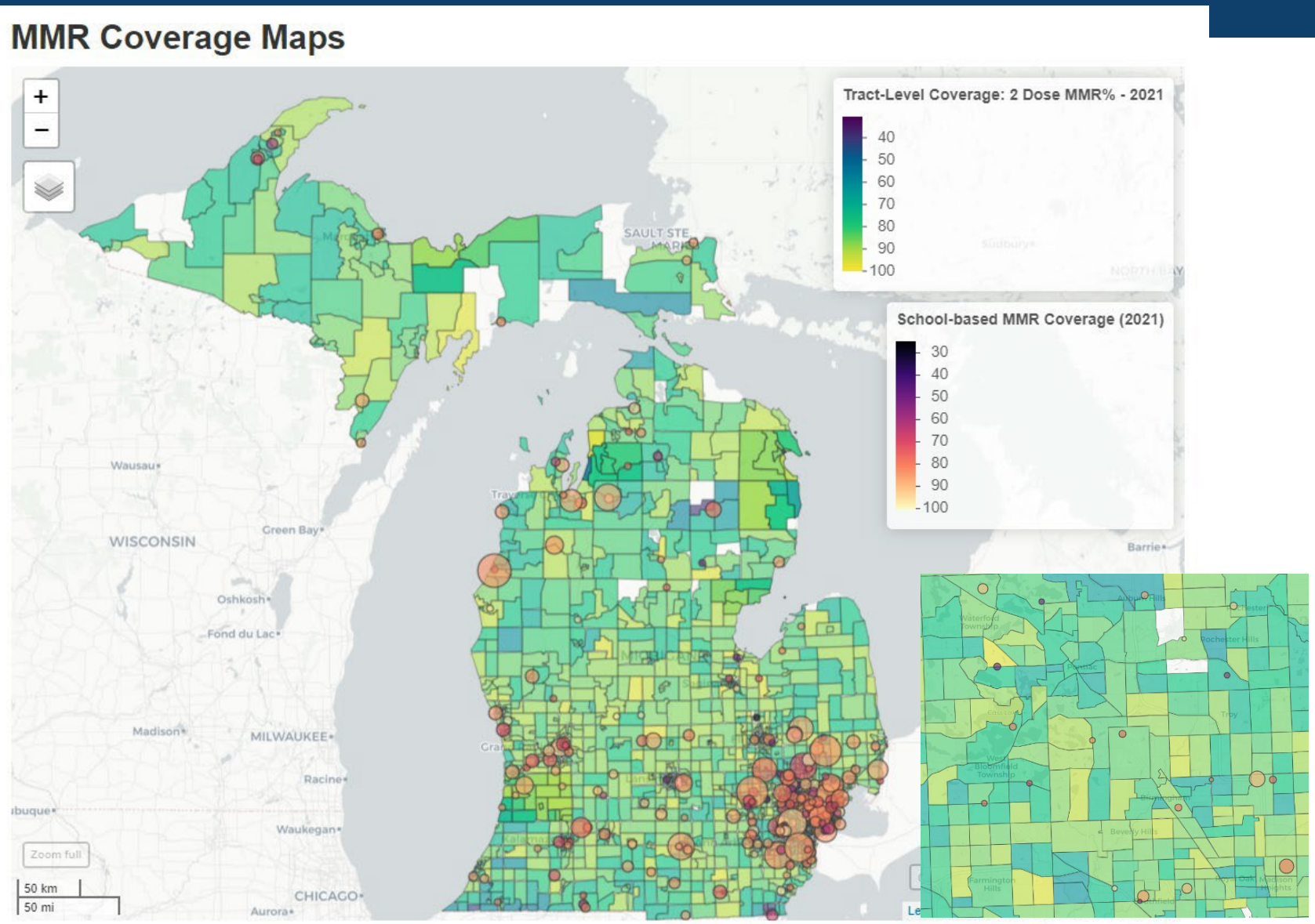
Census tract level maps



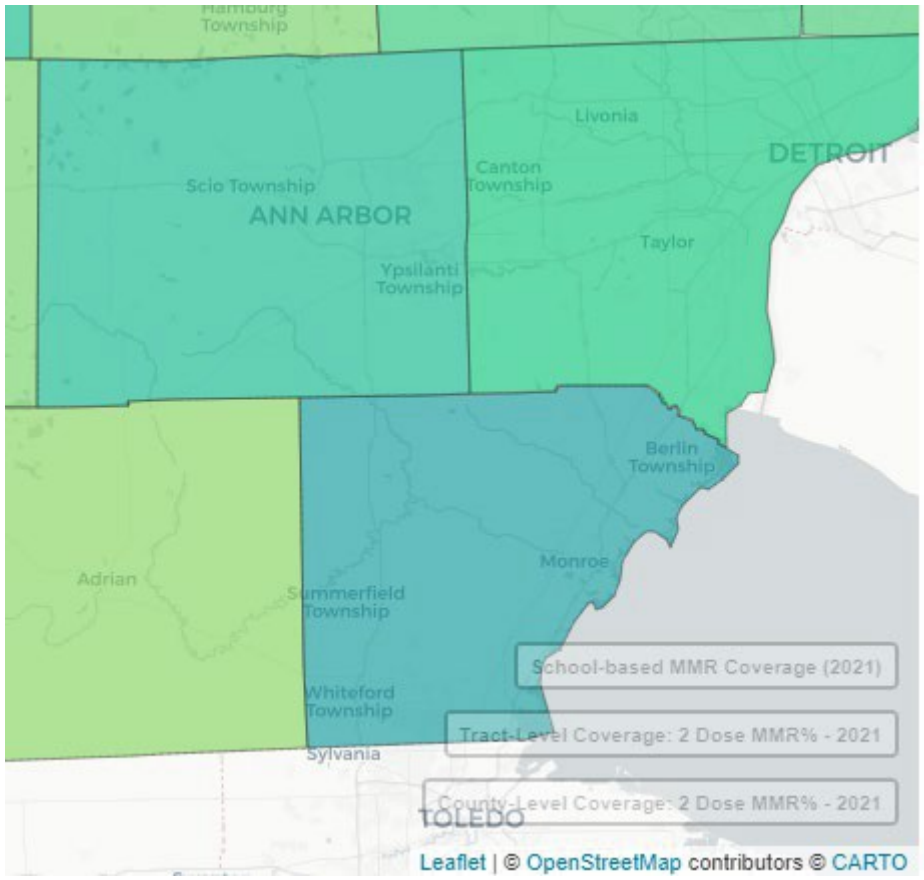
- Tract level maps can highlight specific areas in a county that have low coverage
- Tracts in high coverage counties have low coverage

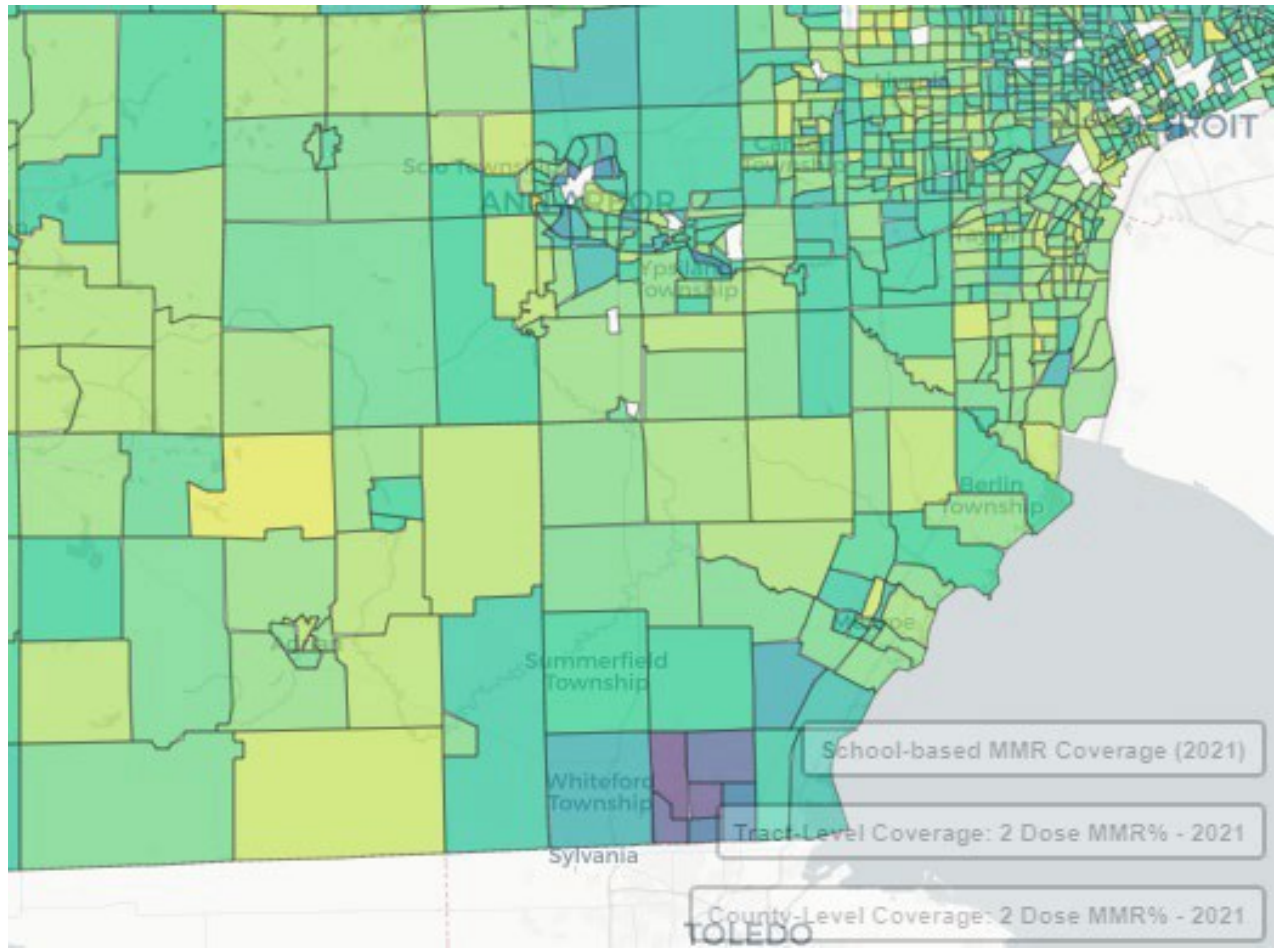
Adding school data

- Can also add school building level data for MMR
- Future work will allow for ISD level aggregation



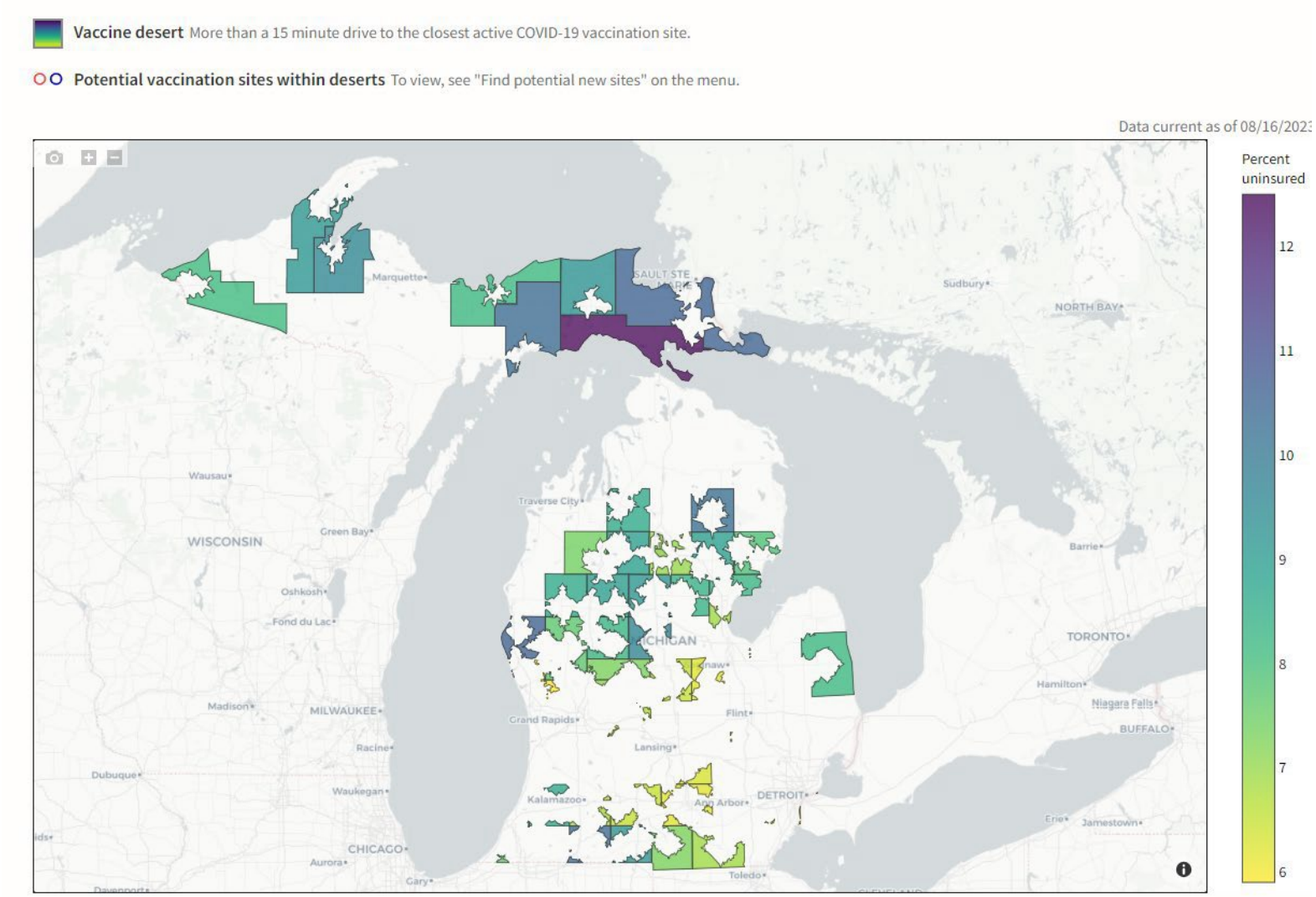
Within counties you can see variation





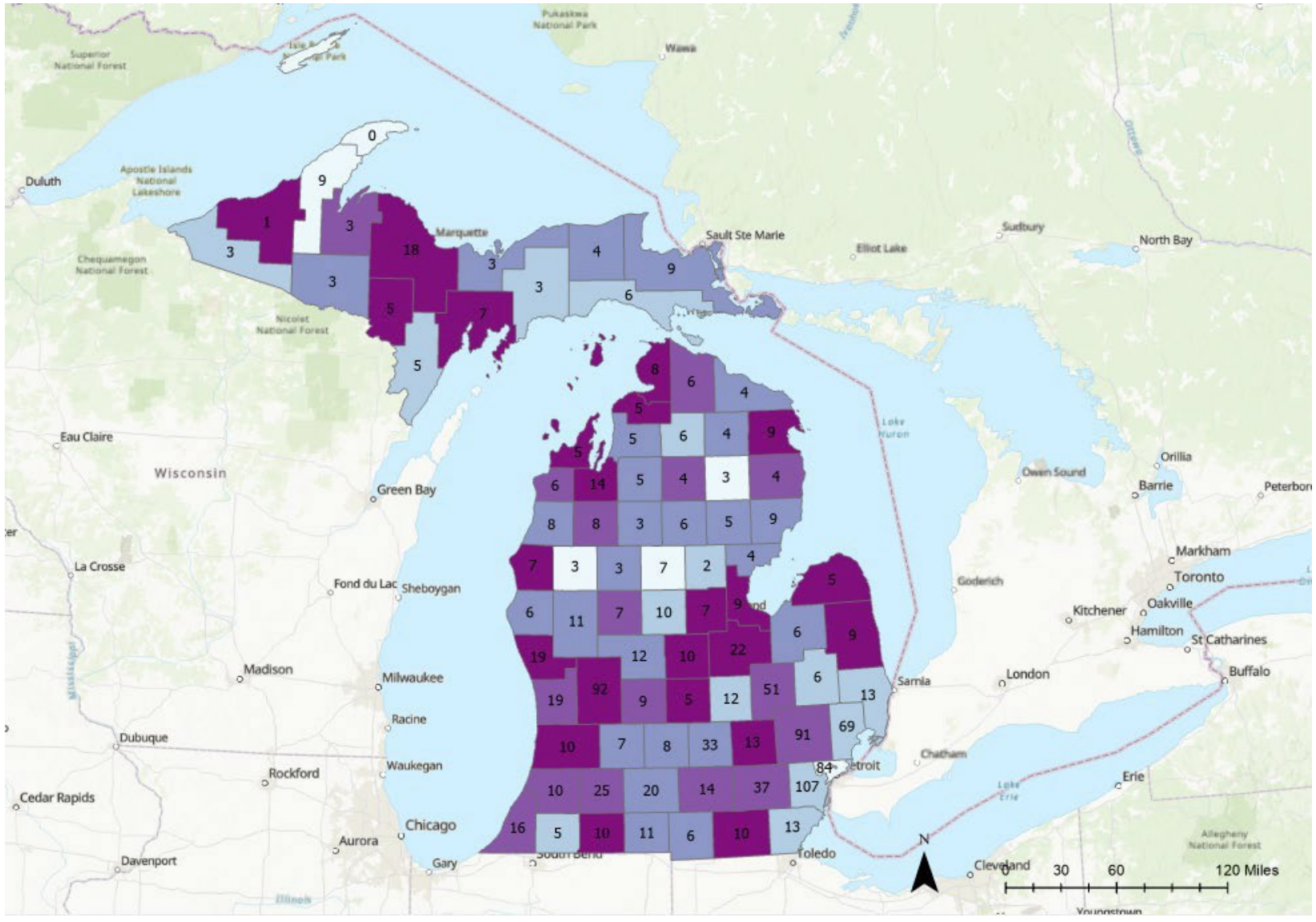
Provider Deserts

COVID Vaccine Provider Deserts

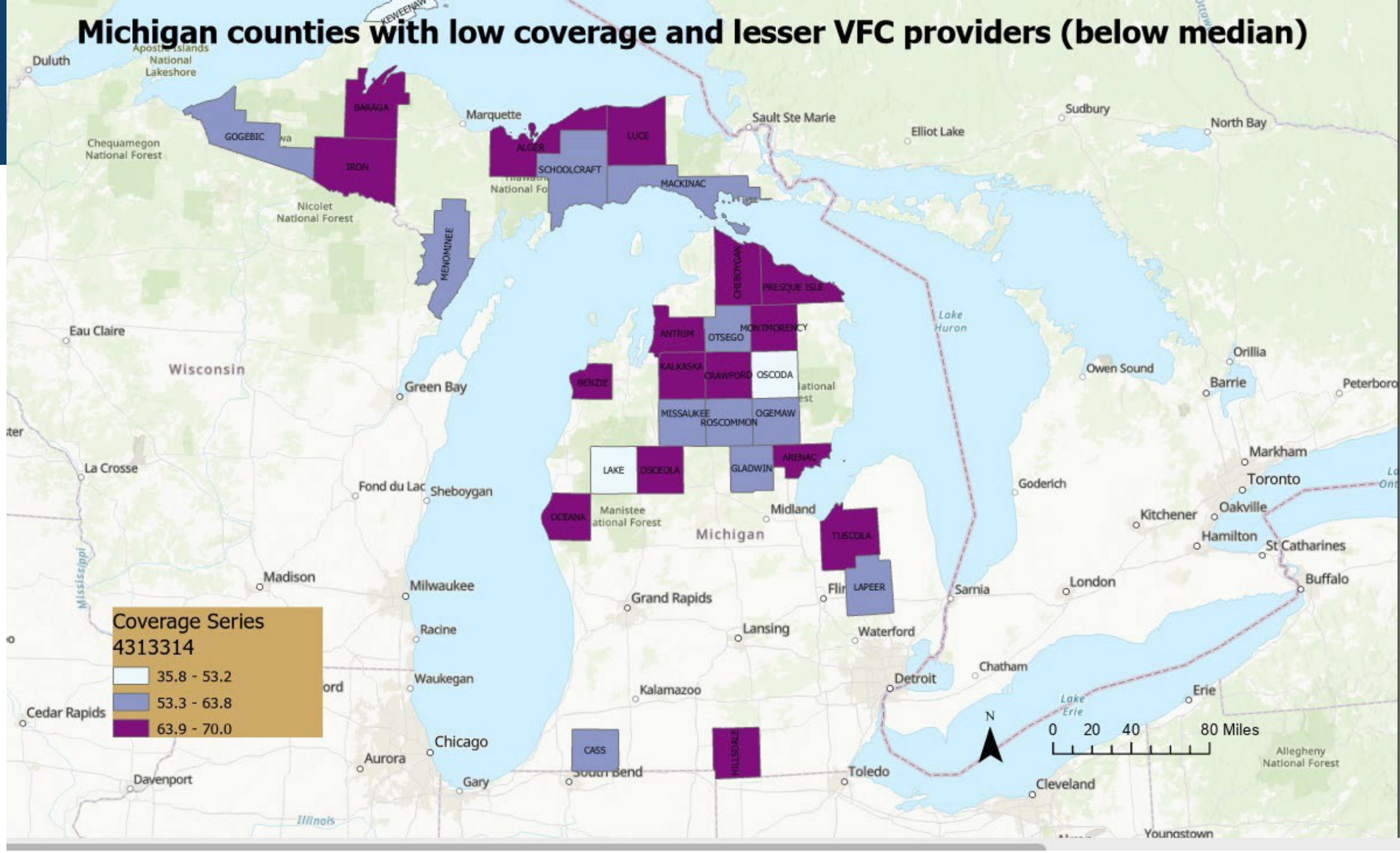


- Work with eTrueNorth to identify independent pharmacies and encourage them to enroll
- Identify opportunities for community outreach
- Work with vaccine champions

Count of VFC providers by county



Michigan counties with low coverage and lesser VFC providers (below median)



VPD Update

Health department: Measles case confirmed in Milwaukee resident

By: CBS 58 Newsroom

Posted: Oct 10, 2023 2:12 PM CDT

Morbidity and Mortality Weekly Report

Notes from the Field

Measles Outbreak — Central Ohio, 2022–2023

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On November 5, 2022, Columbus Public Health, Ohio and the Ohio Department of Health were notified of two children aged 2 years who were admitted to a central Ohio hospital with rash, fever, cough, and congestion, suggestive of measles. Both children were undergoing medical evaluation and treatment for other etiologies before measles was considered in the differential diagnosis. Neither child had received measles, mumps, and rubella (MMR) vaccine, and neither had known contact with a person with measles. Each patient subsequently received a positive measles real-time reverse transcription–polymerase

Health Public Health Laboratory performed RT-PCR testing of specimens from 193 persons during the outbreak; 74 (87%) measles cases were laboratory-confirmed,† and the remaining 11 (13%) were epidemiologically linked to confirmed cases. Among 65 genotyped specimens, all were genotype B3. The median patient age was 1 year (range = 6 months–15 years). Eighty (94%) patients had not received MMR vaccine. Sixty (71%) patients were aged ≥1 year and age-eligible for routine MMR vaccination,§ but only three (5%) had documentation of receipt of 1 MMR vaccine dose at the time of infection¶; vaccination status of one (2%) patient was unknown.

Forty-four (52%) of the 85 measles patients experienced complications, including otitis media (33; 39%), diarrhea (22; 26%), and pneumonia (seven; 8%); 36 (42%) patients were hospitalized, predominately for dehydration.** The median length of hospitalization was 3 days (range = 1–7 days). Twelve hospitalized patients had coinfections with other respiratory pathogens (e.g., respiratory syncytial virus [RSV]).†† No deaths were reported.

Measles Exposure at a Large Gathering in Kentucky, February 2023 and Global Measles Outbreaks

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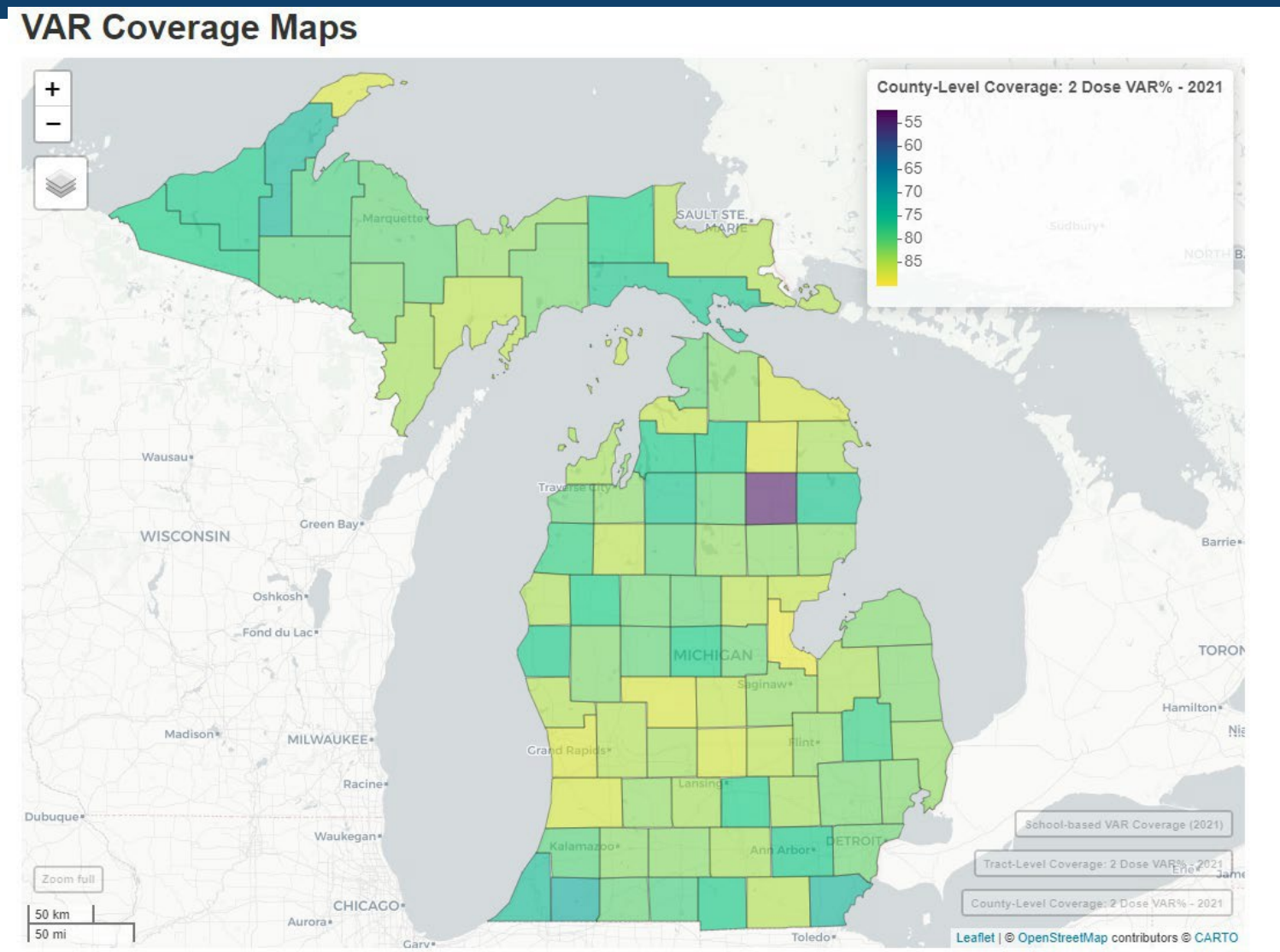
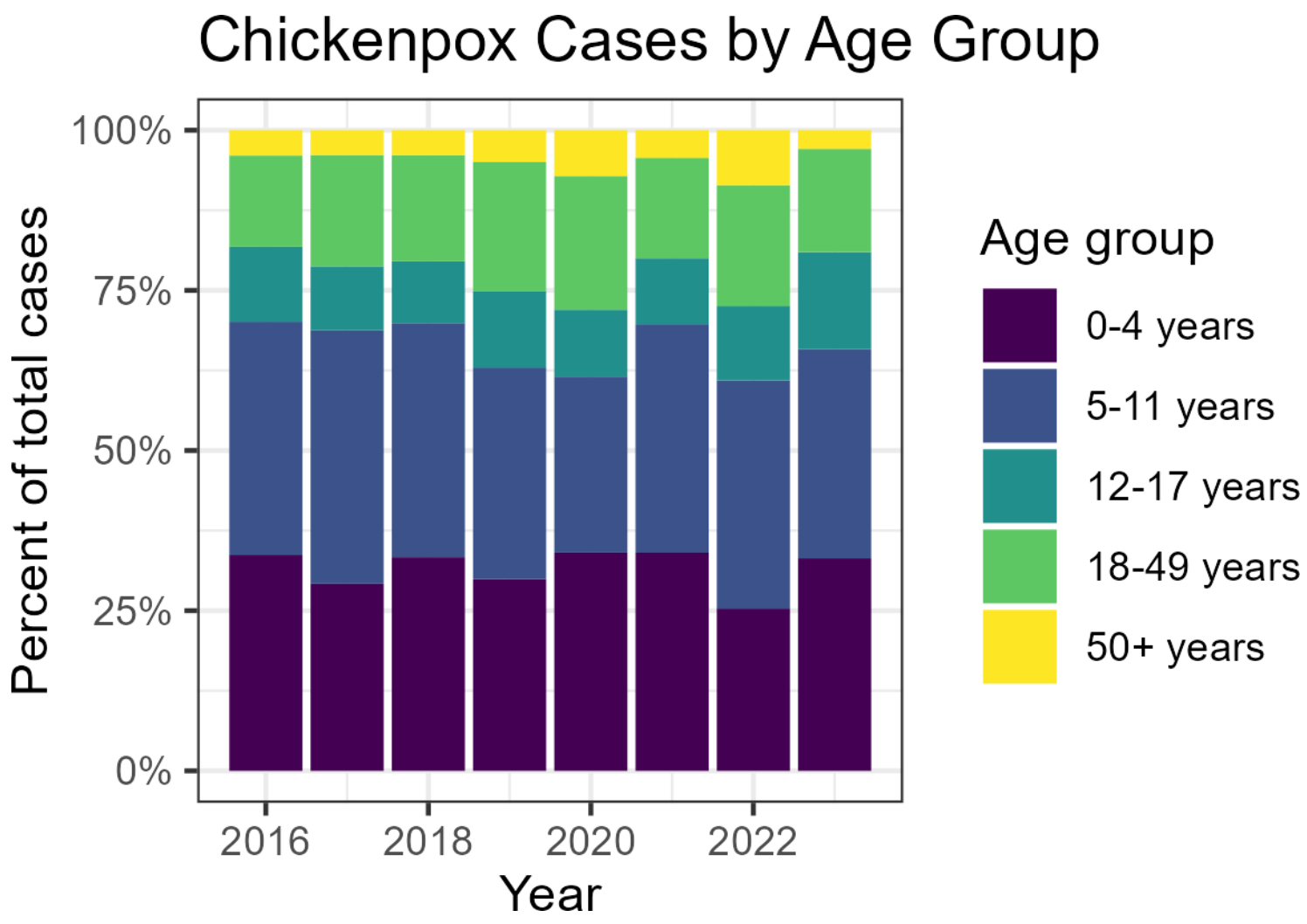
VPD Cases over time

Disease	Pre-pandemic average (2016)	Total Cases, 2020	Total Cases, 2021	Total Cases, 2022	Cases to Date, 2023 Sept. 1, 2023
Congenital Rubella	0	0	0	0	0
Diphtheria	0	0	0	0	0
H. influenzae – Invasive in <15 year olds (serotype b)	23.5	11 (1)	14 (1)	24 (0)	13 (1)
Measles	17	0	1	4	0
Meningococcal disease	5.75	3	6	5	6
Mumps	30	4	5	15	11
Pertussis	596.5	157	41	85	42
Poliomyelitis	0	0	0	0	0
Rubella	--	1	5	4	3
Tetanus	1.5	0	1	1	1
Varicella (associated with outbreaks)	489.75	185 (15)	178 (25)	231 (25)	220 (57)

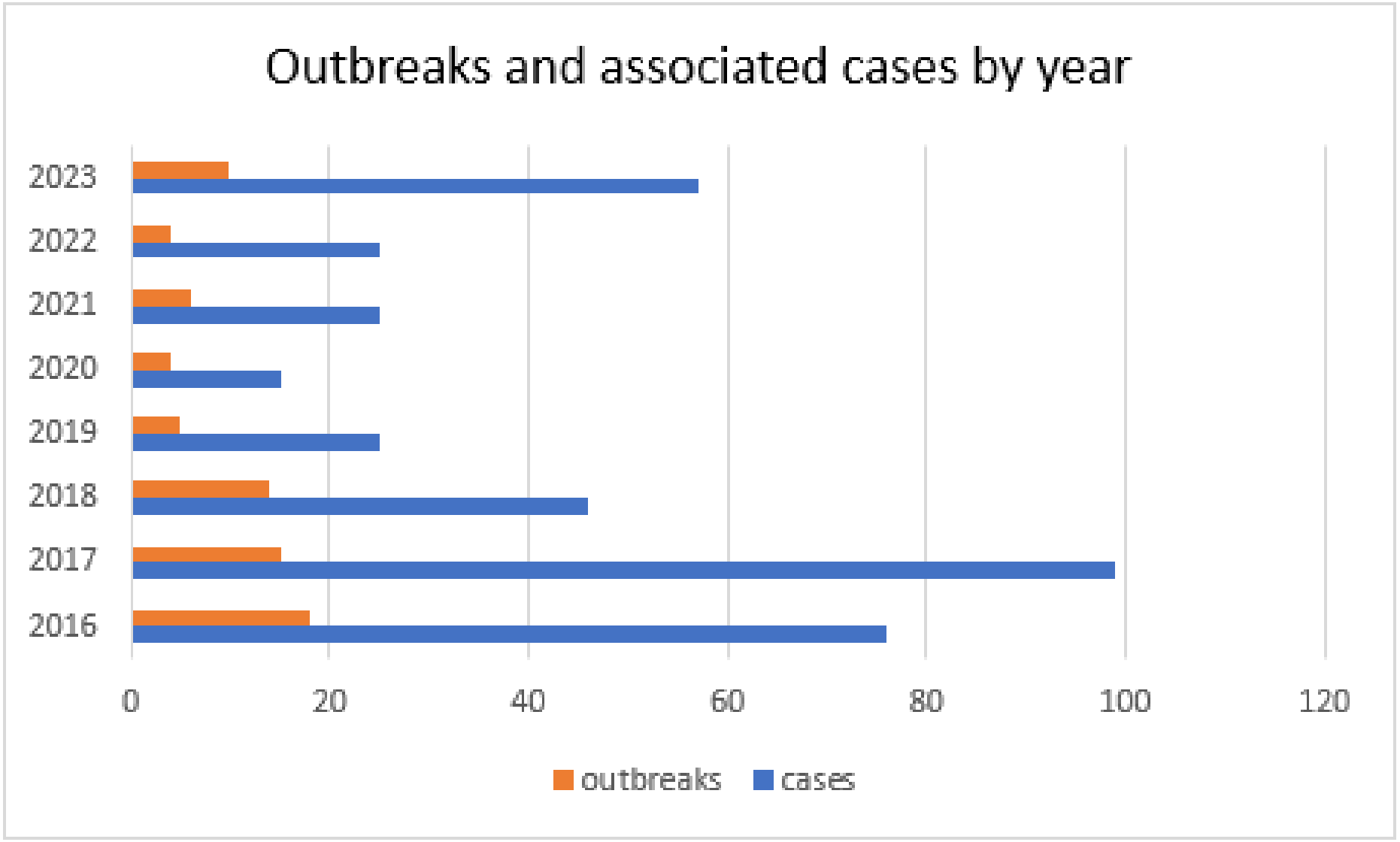
Varicella coverage by county



Chickenpox cases by age
2023 to date

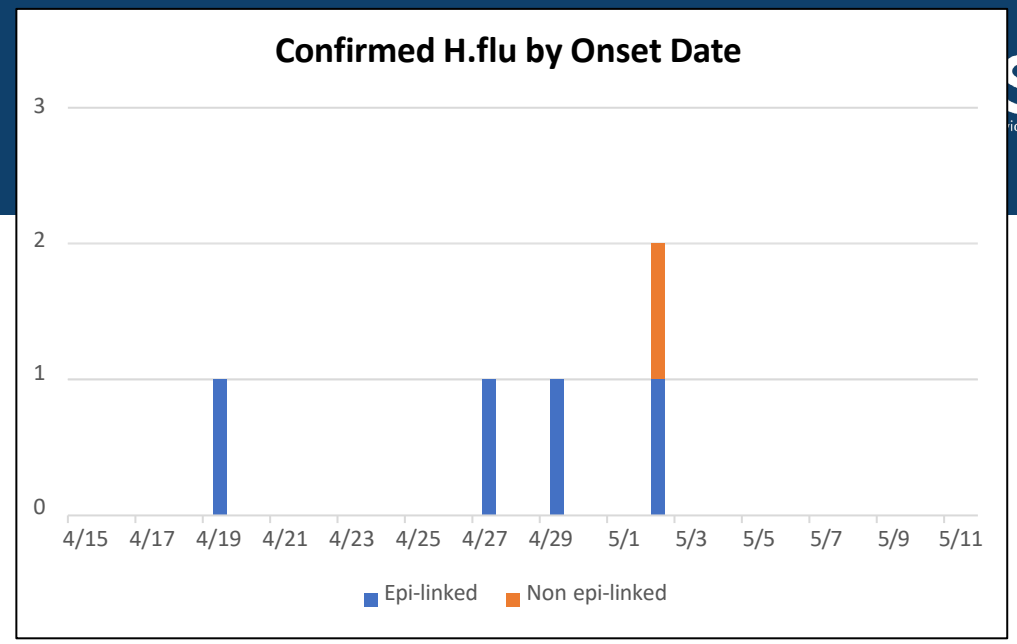


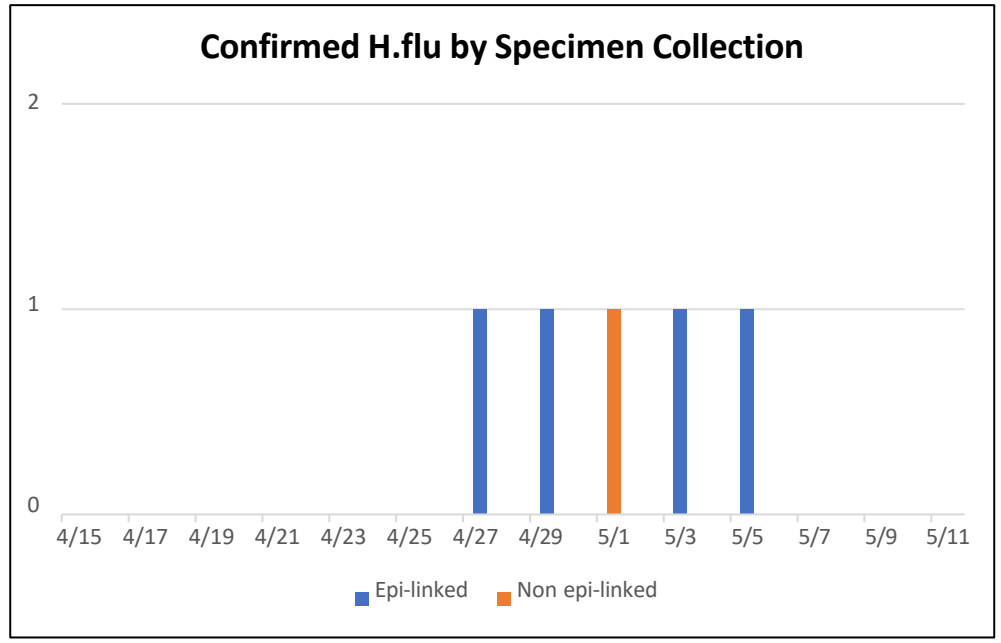
Chickenpox cases and outbreaks increasing



Detroit Hflu Outbreak May 2023

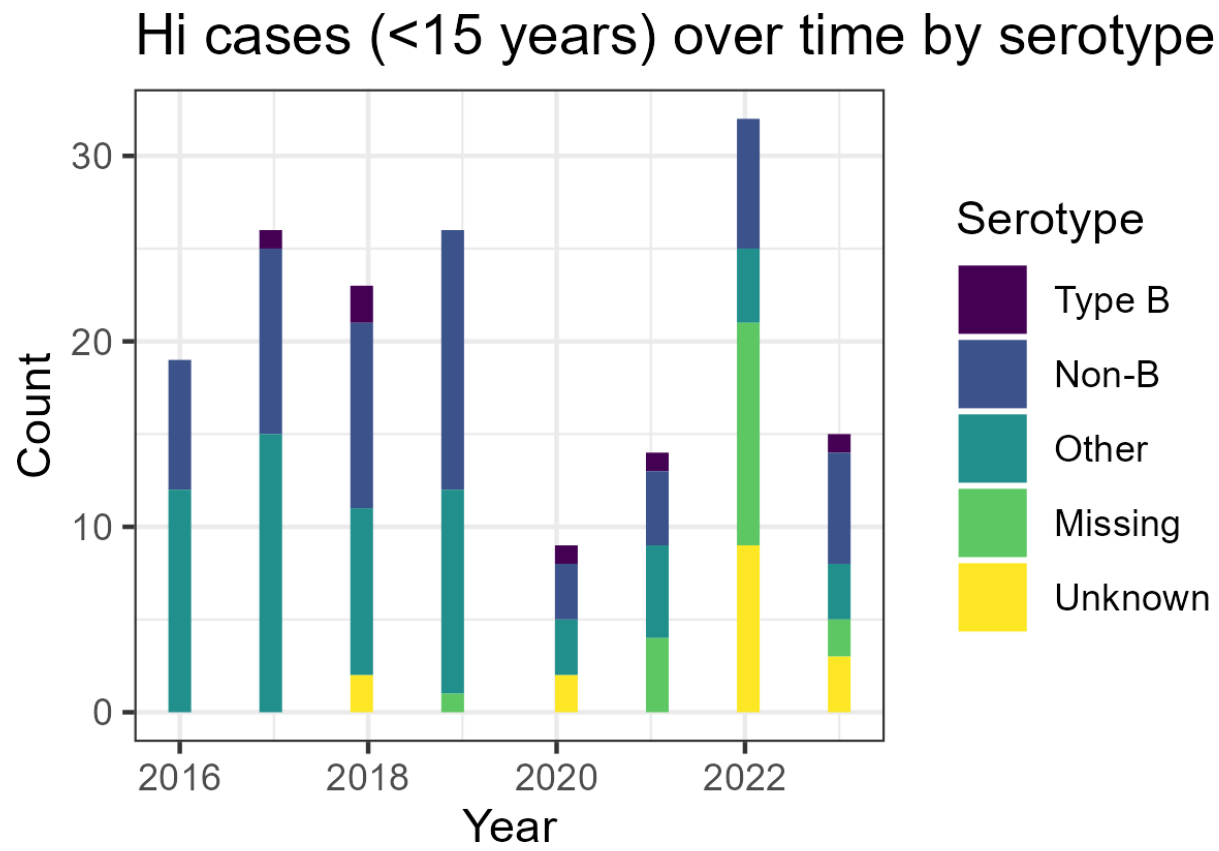
- Between May 1-May 8, Detroit Health Dept. was notified of 4 cases of invasive *Haemophilus influenzae* among students in the same school and grade.
  - Index patient – deceased
  - 2 of 3 additional cases identified in same classroom as index case
  - All cases seen at hospital with sudden onset or rapid worsening of symptoms (fever, myalgia, lethargy, headache, vomiting, sore throat)
- In addition to Hi, 3 cases tested PCR positive for: adenovirus (2), rhinovirus/enterovirus (2), group A Streptococcus (2), RSV (1), SARS-CoV2 (1), and coronaviruses HKU1 and NL63 (1)





Detroit H Flu Continued

- Specimen from all 4 cases were sent to BOL for serotyping between 5/05-5/12 – all resulted as **nontypeable**
- Additional Whole Genome Sequencing (WGS) was performed by BOL and all specimen were found to share the same sequence type, **indicating high probability of transmission**.
- Nontypeable (unencapsulated) is the most common cause of invasive Hi disease, however secondary transmission is rare, and outbreaks are not often reported



'Other' includes nontypeable, beta-lactamase negative, type pending, or serogroups not marked as 'non-b.'

'Non-B' includes any cases marked as such + a serogroup, beta-lactamase negative, unable to grow, or *Haemophilus parainfluenza*.

Recap

- Fine area estimation of vaccine coverage can provide additional insights.
- Particularly during a VPD outbreak, these additional data can help drive decisions around resource allocation, priority communities, and vulnerable populations
- VPD cases and outbreaks are starting to return to pre-COVID levels, particularly for chickenpox.
- As we discussed this morning low immunization coverage leaves our communities and schools susceptible to outbreaks.