PEDIATRIC INFECTIOUS DISEASE HOT TOPICS

GENEVIEVE BUSER

PEDIATRIC INFECTIOUS DISEASE

PROVIDENCE ST VINCENT

CONFLICT OF INTERESTS

- Gilead Foundation (2019-2021)
- Providence St Joseph employee

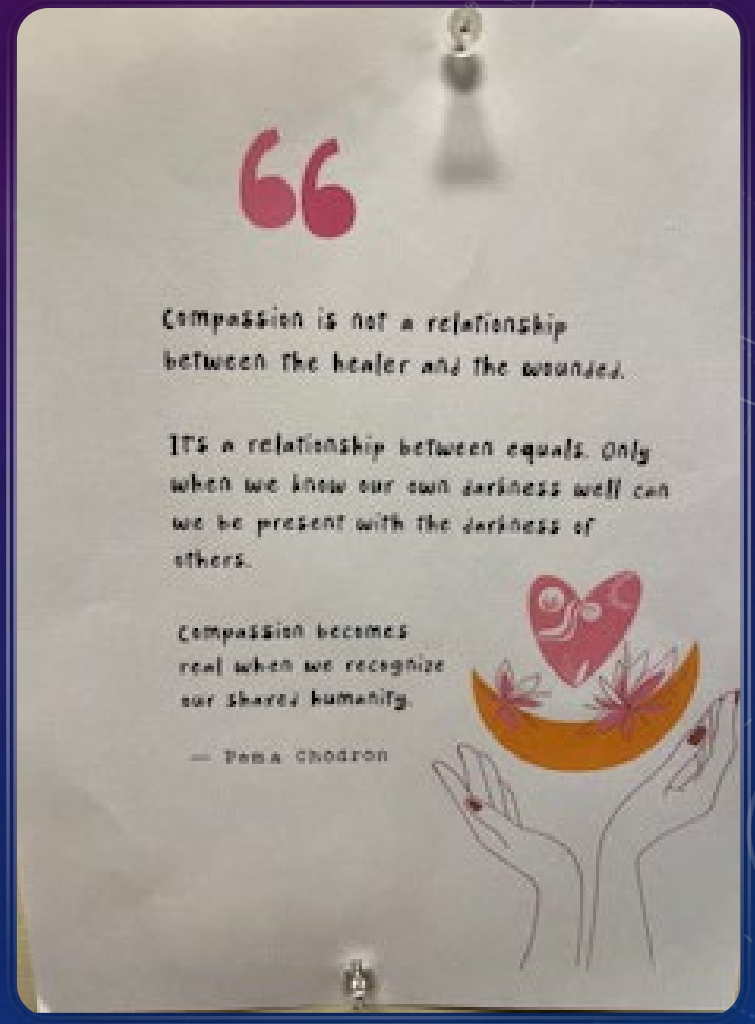
REFLECTION

“Compassion is not a relationship between the healer and the wounded. It is a relationship between equals.

Only when we known our own darkness well can we be present with the darkness of others.

Compassion becomes real when we recognize our shared humanity.”

--Pema Chôdron



LEARNING OBJECTIVES

- Describe the negative effects primary measles infection has on the immune system.
- Know where to find school vaccination rates for your locale.
- Understand current recommendations to screen for hepatitis C in pregnant patients.
- Identify indications for screening for congenital CMV infection in neonates.
- Choose appropriate empiric therapy for community acquired acute bacterial arthritis, according to patient risk factors.

MEASLES/RUBEOLA

EPI EPI EPI

Just in Time Teaching: http://cdc.gov/measles/hcp/clinical-overview/index.html

SUMMARY: STAGES OF MEASLES

Incubation
Primary viremia
7–14 days (av 10–11)
Usually asymptomatic or mild

Prodrome
Secondary viremia
10–12 days after exposure
Lasts 2–5 days avg
Fever
Malaise
Anorexia
3 C's: Conjunctivitis, Coryza, Cough
Day 2–3: Koplik spots (enanthem)

PRODROME ENANTHEM: KOPLIK SPOTS

Photo:
Courtesy of
Dr. Mike Cater

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Exanthem + high fever
Flat red spots (maculopapular)
Cephalic to Caudal progression
Coalescent
Spares palms & soles
Lasts 3–4 days
In OB, ~14 days between clusters of exanthems

EXANTHEM CEPHALIC TO CAUDAL PROGRESSION

Photo:
Courtesy of
Dr. Mike Cater

EXANTHEM

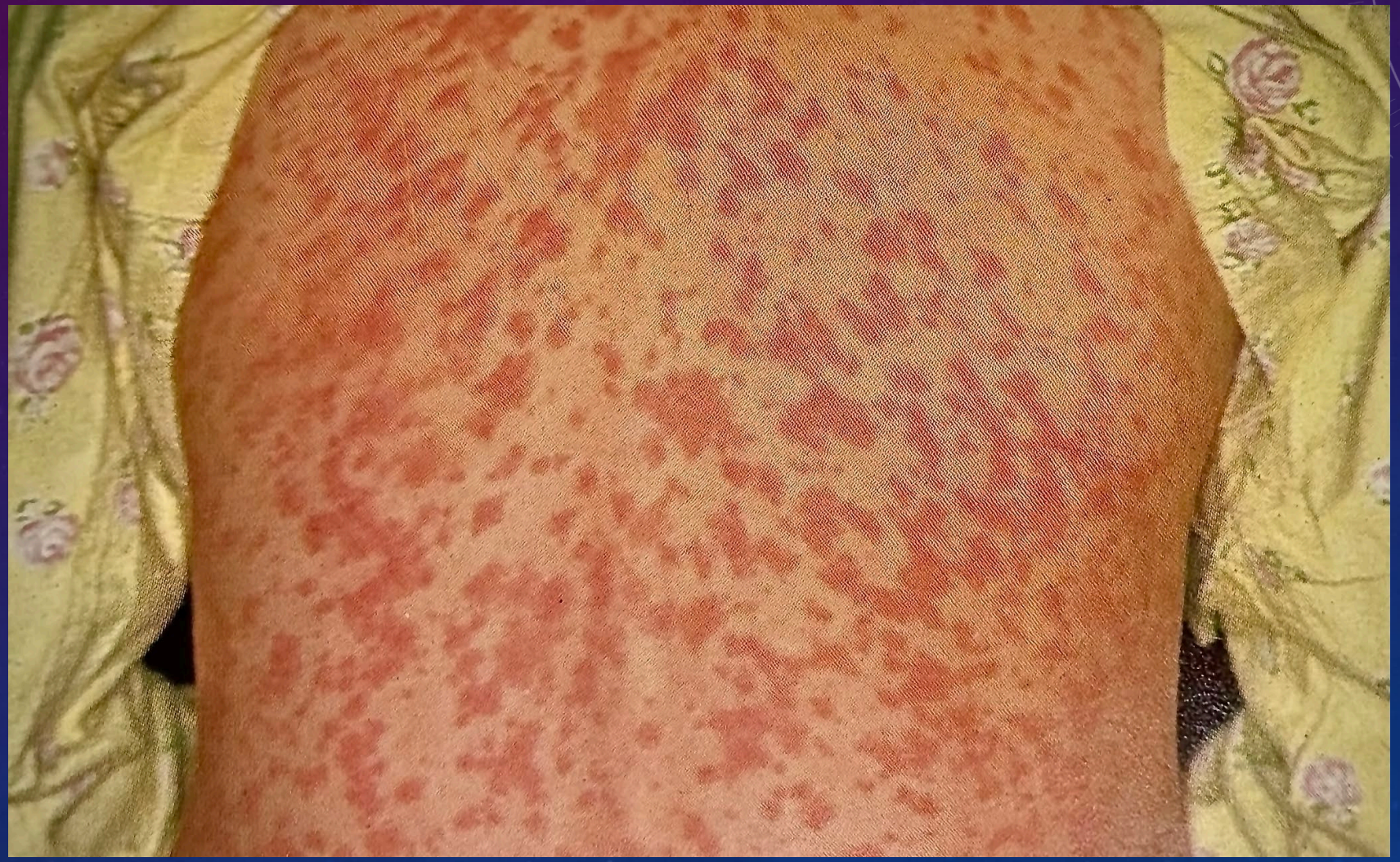

Photo:
Courtesy of
Dr. Mike Cater

EXANTHEM PROGRESSION DAY 1 TO 3

Images from DermnetNZ.org

EXANTHEM YOUNGER CHILD, DARKER SKIN

Images from DermnetNZ.org

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Recovery
Cough 1–3 weeks

Beware of fever lasting longer than day 3 of rash = no immune control or complication of measles (30%) (AOM, pneumonia, encephalitis, leukopenia, -itis, pregnancy loss…)

Long-term sequelae

Immune amnesia (common)
Hearing loss
Decreased fertility
Subacute sclerosing panencephalitis

FICTION #1: VACCINATED PATIENTS STILL GET MEASLES, IPSO FACTO IT'S NOT WORTH IT.

- Fact: Outbreaks are happening in UNVACCINATED communities.
- As of 23 May 2025
  - 1046 confirmed cases (more probable or unreported cases)
  - 14 outbreaks
  - Unvaccinated or unknown status = 96%
    - One MMR 1%
    - Two MMR 2%
  - Not just kids, either!
    - <5 yo: 30%
    - 5–19 yo: 37%
    - 20+ yo: 32%

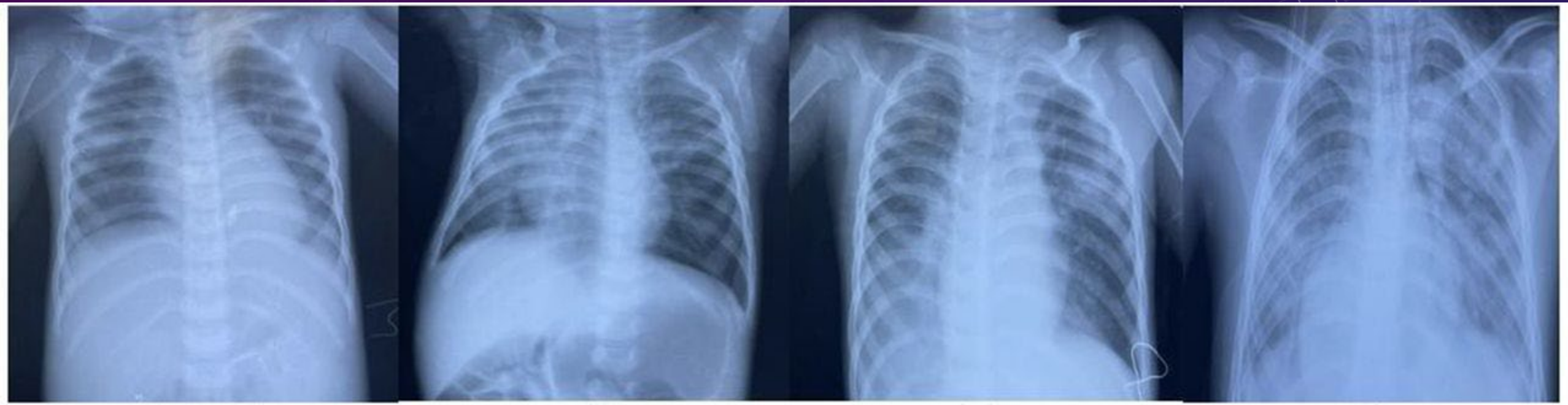
https://www.cdc.gov/measles/data-research/index.html

FICTION #2: “MEASLES ISN’T THAT BAD”

- Current 2025 US Measles outbreak:
  - 127 of 1046 hospitalized (12%)
  - 3 confirmed deaths due to measles
- Yes, most children in resource-rich countries survive measles, but…
  - Viremia to all organs
  - Estimate 30% complications 1-3 weeks after rash: otitis media, pneumonia, laryngotracheobronchitis, conjunctivitis, encephalitis, leukopenia, GI
  - Years: Rare/devastating subacute sclerosing panencephalitis*
  - Immune amnesia

https://www.cdc.gov/measles/data-research/index.html

1° AND 2° PNEUMONIA MOST COMMON COMPLICATION



(a) showing normal chest X-ray (b) opacification in bilateral lungs fields indicating consolidation (c) ground glass opacification in right lower zone and left mid zone with blunting of right costophrenic angle suggesting consolidation with right pleural effusion and (d) Patchy airspace opacities in bilateral lung fields.

Singla et al, 2024

FICTION #3: MEASLES IS NO BIG DEAL TO HANDLE

- Outbreak of measles in Clark County, WA, Dec 2018-April 2019, N=72 confirmed measles cases (4000+ exposures)
  - $3.4 million ($47,479 per case or $814 per contact)
  - ~$2.3 million, were incurred by the public health response
  - ~$1 million productivity losses
  - ~76,000 direct medical costs
- Clinical Infectious Disease 2020 review:
  - Approximate cost per day of investigation: $4,000
  - Median total cost per outbreak: $152,308 (range, $9,862-$1,063,936);
  - Median cost per case: $32,805 (range, $7,396-$76,154);
  - Median cost per contact: $223 (range, $81-$746);

CDC VFC MMR Cost: $26.33/dose

Pike J et al 2021; Pike J et al 2020

“IMMUNE AMNESIA” HYPOTHESIS

- Documented in 1908 with loss of (T-cell) response to tuberculin skin test after acute measles
- Measles binds to CD150/SLAMF1 (signaling lymphocytic activation molecule family member 1) receptor
- CD150/SLAMF1 highly expressed on memory T, naïve & memory B, and plasma cells
- Cell infection and apoptosis follow → Lymphopenia
- Lymphopenia resolves 2–4 weeks after viral clearance
- Immune memory and peripheral antibodies are reconstituted with re-exposure and time
- Arguments for and against this hypothesis

Laksono BM et al, 2018; Mina et al, 2019

Measles virus infection diminishes preexisting antibodies that offer protection from other pathogens

Michael J. Mina[1,2,3,*,†], Tomasz Kula[1,2], Yumei Leng[1], Mamie Li[2], Rory D. de Vries[4], Mikael Knip[5,6], Heli Siljander[5,6], Marian Rewers[7], David F. Choy[8], Mark S. Wilson[8], H. Benjamin Larman[9], Ashley N. Nelson[10,‡], Diane E. Griffin[10], Rik L. de Swart[4], Stephen J. Elledge[1,2,11,†]

- Elegant study: US-Netherlands-Finland collaboration
- 77 unimmunized children + primary measles infection
- 5 unimmunized children + no infection
- 33 young children before and after first MMR vaccine
- Blood sent for “epitope-specific antibody repertoires” by VirScan
- VirScan is a library of ~400 species and strains of most known human pathogenic viruses, many bacterial proteins; neutralizing and non-neutralizing antibodies

Science. 2019 November 01; 366(6465): 599–606. doi:10.1126/science.aay6485.

MEASLES INFECTION DIMINISHES ANTIBODY REPERTOIRE

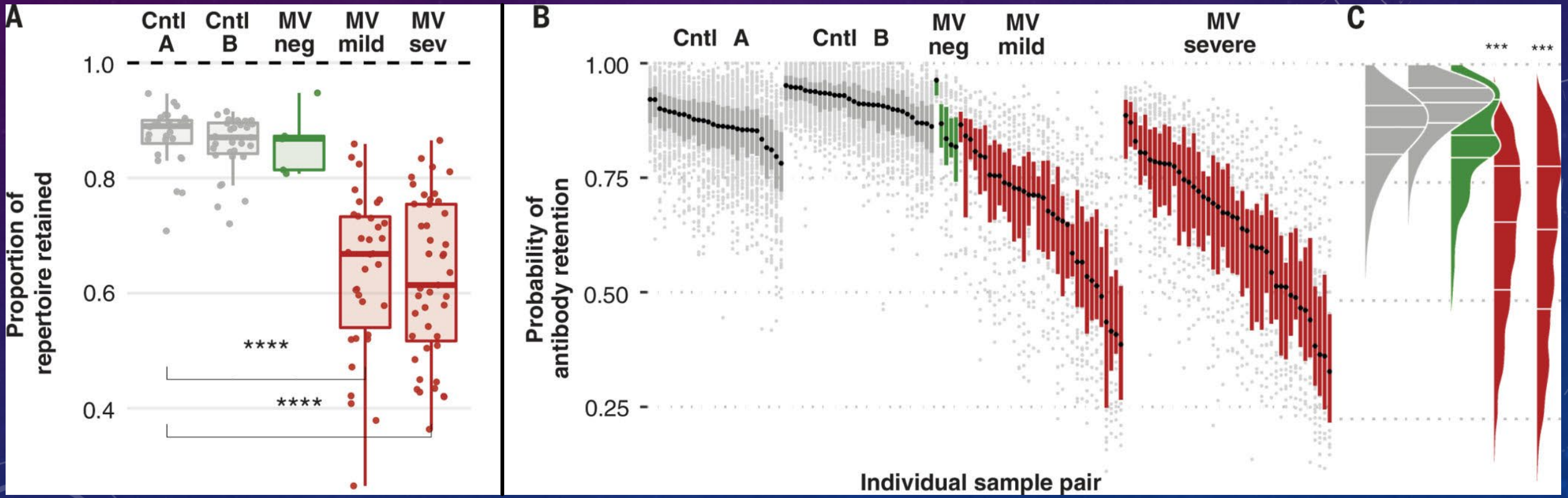
- 77 unimmunized children acute natural measles infection → impaired antibody #, function
  - Lost between 11 and 73% of their pre-existing pathogen-specific antibody repertoire
  - 12 (16%) lost >40%
  - Mild measles (n=34) lost median 33% (range: 12 to 73%)
  - Severe measles (n=43) lost median 40% (range: 11 to 62%)
  - No changes in total IgG, M, A quantities
- Vaccinated controls retained ~90% repertoires over similar or longer durations → no impairment

Mina et al, 2019

MEASLES ELIMINATES PREEXISTING IMMUNE MEMORY

Total epitopes per child

Individual pathogen antibodies per child



One point represents one child

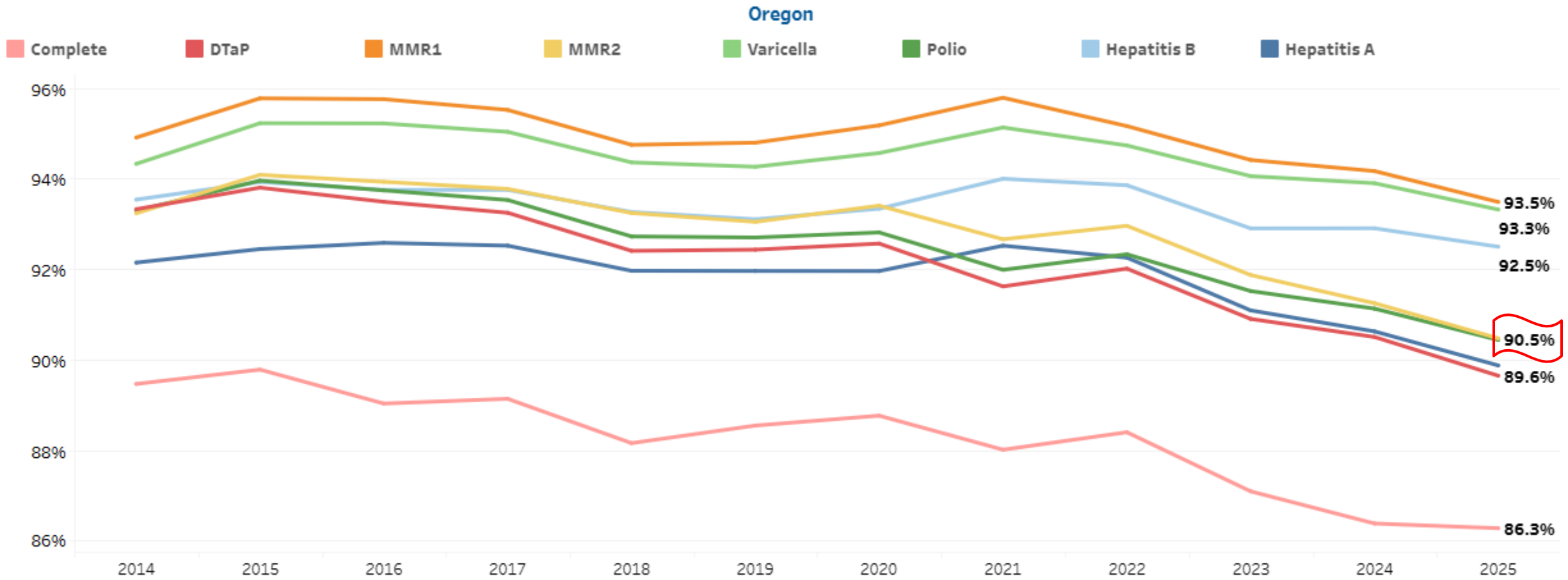
Each black dot = median retention probability per child

Mina et al, 2019

OREGON SCHOOL VACCINATION RATES

ZIPCODE MATTERS

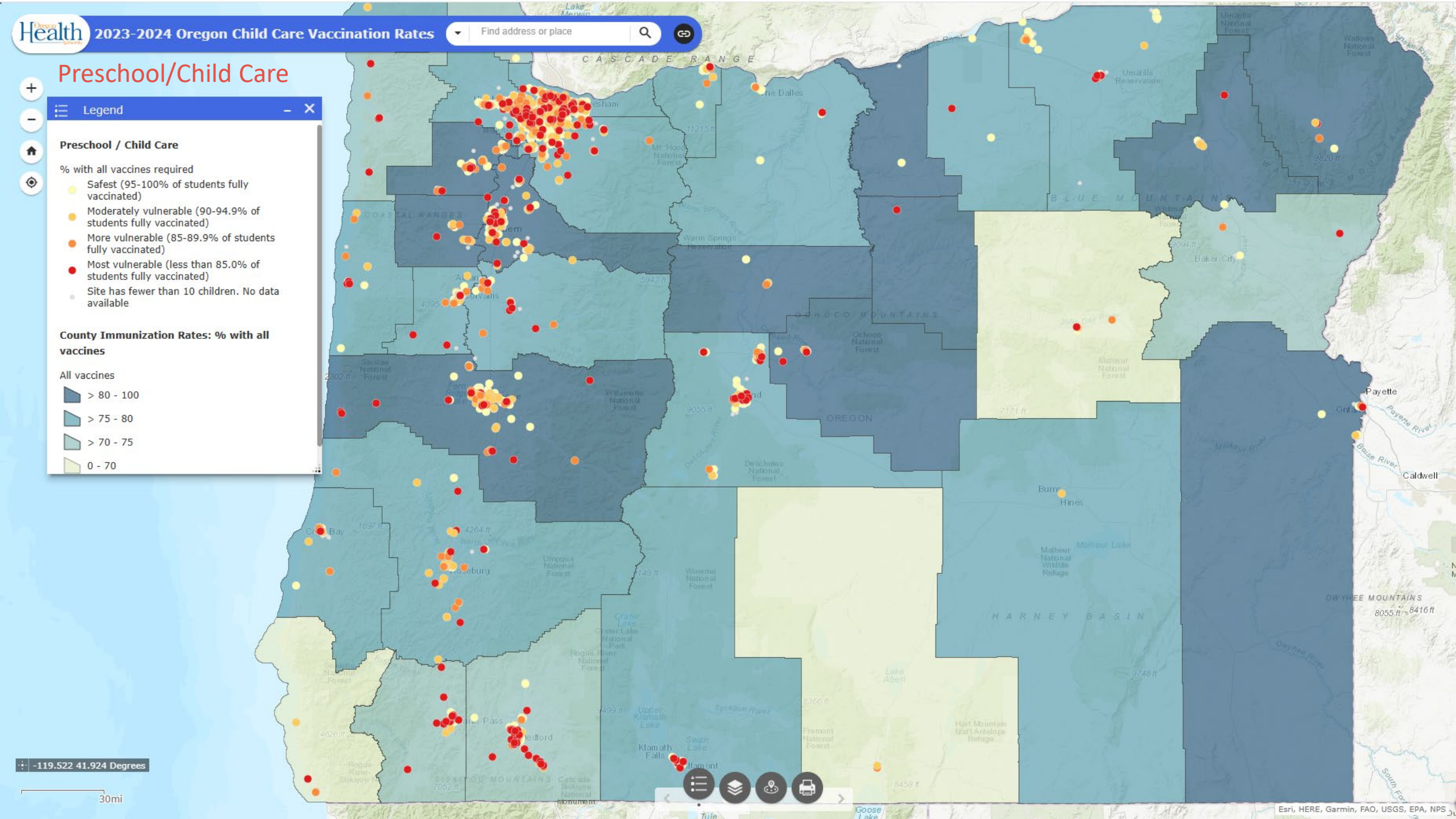
Kindergarten vaccination rates for DTaP (Diphtheria, Tetanus and Pertussis), Hepatitis A, Hepatitis B, MMR (1st dose of Measles, Mumps and Rubella), 2nd dose of Measles, Polio, and Varicella are shown from 2014 to 2025. To look at one vaccine at a time click on the vaccine of interest in the graph.

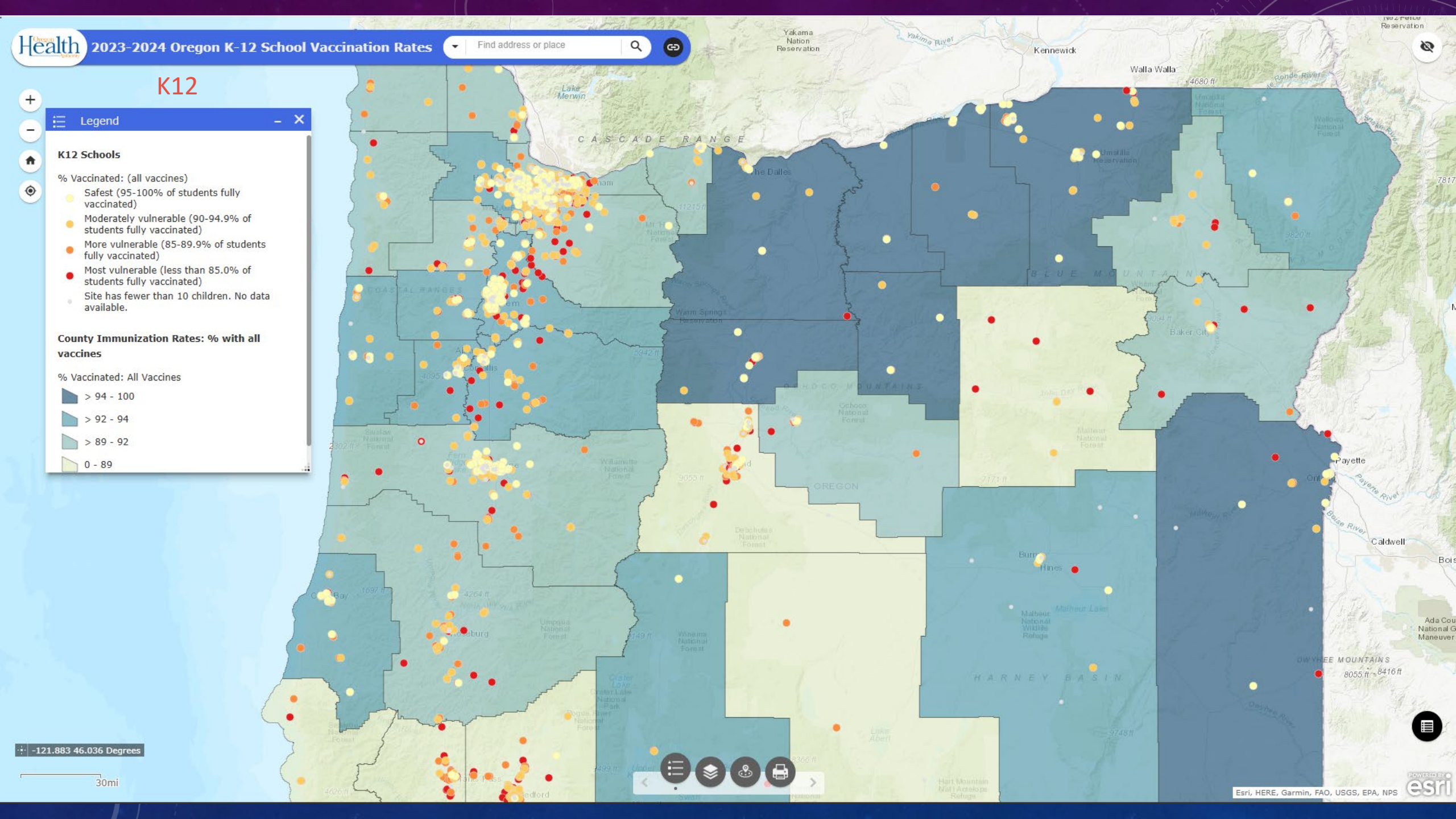


Counties with fewer schools and smaller student populations may see large changes each year because small changes in vaccinations and exemptions have a greater impact on smaller populations than larger ones. To provide helpful context for interpreting the county-level data, the table below contains 2024-2025 kindergartner enrollment and school counts as well as population estimates from Portland State University's (PSU) 2024 Annual Population Report Tables.

	Year	Number of sites serving kindergartners	Kindergarten site enrollment	<5-year-olds (PSU)	Total Population (PSU)
Oregon	2025	1,058	38,247	193,089	4,267,261

https://public.tableau.com/app/profile/oregon.immunization.program/viz/SchoolLawTableau/Kimmunizations


Oregon Health Authority
2023-2024 Oregon Child Care Vaccination Rates
Find address or place
Preschool/Child Care
Legend
Preschool / Child Care
% with all vaccines required
Safest (95-100% of students fully vaccinated)
Moderately vulnerable (90-94.9% of students fully vaccinated)
More vulnerable (85-89.9% of students fully vaccinated)
Most vulnerable (less than 85.0% of students fully vaccinated)
Site has fewer than 10 children. No data available
County Immunization Rates: % with all vaccines
All vaccines
> 80 - 100
> 75 - 80
> 70 - 75
0 - 70
CASCADE RANGE
OREGON
HARNEY BASIN
OWYHEE MOUNTAINS
BLUE MOUNTAINS
Payette
Caldwell
Burns
Hines
Klamath Falls
Roseburg
Medford
-119.522 41.924 Degrees
30mi
Esri, HERE, Garmin, FAO, USGS, EPA, NPS


Health
2023-2024 Oregon K-12 School Vaccination Rates
Find address or place
K12
Legend
K12 Schools
% Vaccinated: (all vaccines)
Safest (95-100% of students fully vaccinated)
Moderately vulnerable (90-94.9% of students fully vaccinated)
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% Vaccinated: All Vaccines
> 94 - 100
> 92 - 94
> 89 - 92
0 - 89
-121.883 46.036 Degrees
30mi
Esri, HERE, Garmin, FAO, USGS, EPA, NPS
CASCADE RANGE
OREGON
Yakama Nation Reservation
Kennewick
Walla Walla
Lake Merwin
The Dalles
Warm Springs Reservation
Umatilla Reservation
Payette
Caldwell
Burns
Hines
HARNEY BASIN
OWYHEE MOUNTAINS

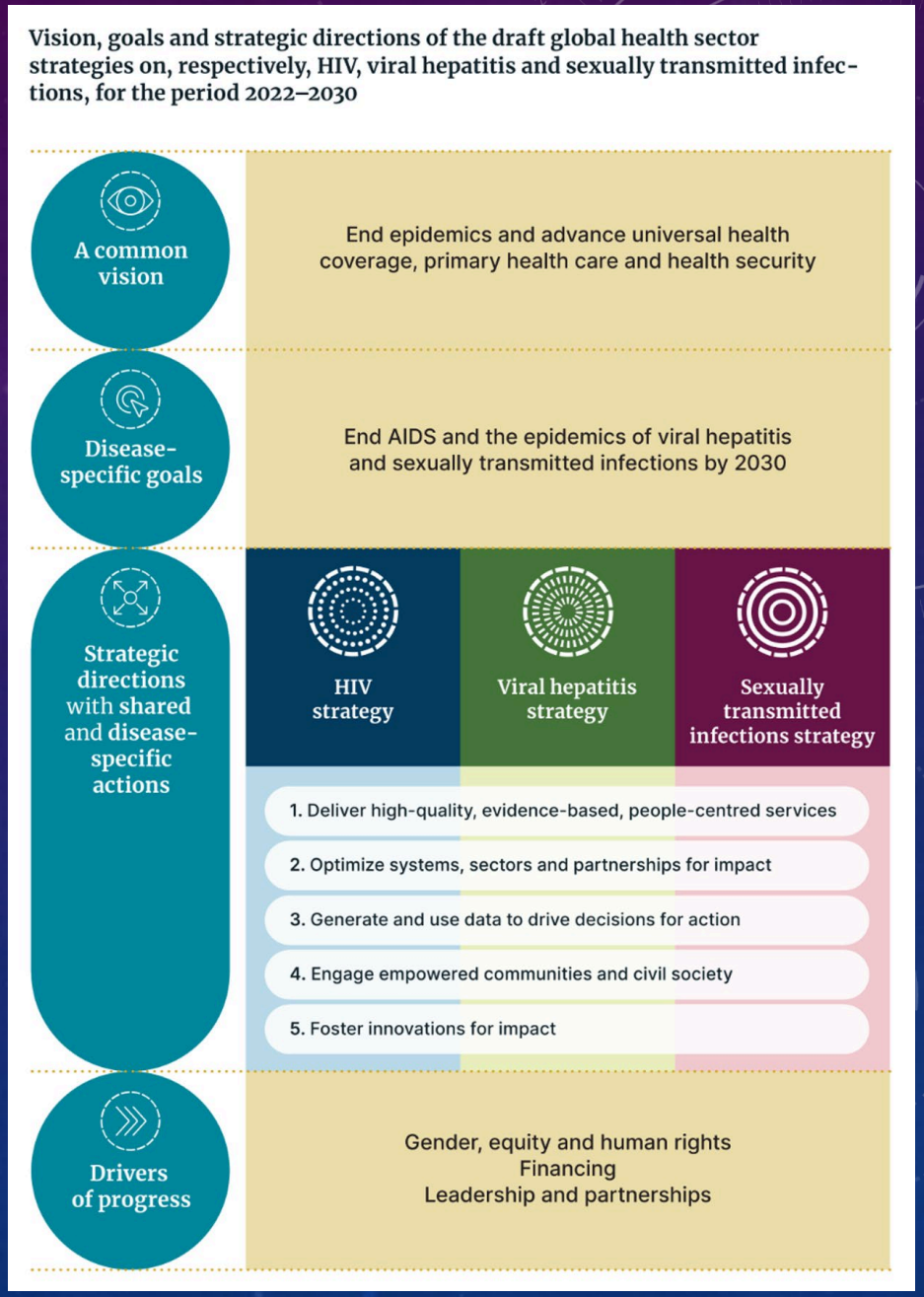
BRIEF UPDATES

KEEP ON YOUR RADAR

HEPATITIS C ELIMINATION

- WHO Hepatitis (& HIV & STI) Goal:
  - Reduce new hepatitis infections by 90% and deaths by 65% between 2016 and 2030.

- SCREEN
  - Universal screening, where appropriate
- TREAT
  - Access to highly active retroviral therapy (HART) and direct-acting antiviral (DAA) therapies
- PREVENT
  - Vaccination for hepatitis A, B, (HPV)



https://www.who.int/teams/global-hiv-hepatitis-and-stis-programmes/strategies/global-health-sector-strategies

CONSIDER EARLY SCREEN FOR INFANTS EXPOSED TO ACTIVE MATERNAL HEPATITIS C

TABLE 2. Perinatal HCV testing recommendations, by organization — United States, 2023

Return

Organization	NAT for HCV RNA at age ≥2–6 months?	Confirm anti-HCV at age ≥18 months?	Anti-HCV with reflex* NAT for RNA at age ≥18 months?	Retest for HCV RNA before initiating treatment?	Test siblings?
CDC (2023)	Yes†	No	If not previously tested	Yes	Yes
AAP (2021 Red Book)§	Consider	Yes	Yes	NA	NA
AASLD-IDSA (2020)¶	Consider**	Yes	Yes	Yes	Yes
NASPGHAN (2020)††	Consider§§	NA	Yes	Yes	Yes
AAFP (2010)¶¶	Yes***	NA	Yes	NA	NA

CDC Recommendations for Hepatitis C Testing Among Perinatally Exposed Infants and Children — 2023

HEPATITIS C INFECTION SCREENING AND CONNECTION TO CARE AMONG POSTPARTUM PATIENTS AND EXPOSED INFANTS IN TWO COMMUNITY HOSPITALS, 3-YEAR FOLLOW-UP - OREGON, 2019-2024

Genevieve L Buser, Horia Marginean, Mayen Dada, Savannah Woodward, Alexis Young, Chiayi Chen, Mark W Tomlinson

- Convenience sample of postpartum patients at one urban and one suburban hospital
- Rapid fingerstick testing for hepatitis C antibodies
- Screened 2060 postpartum participants
- 20 (0.97%) had evidence of past or current HCV infection (vs 0 HIV, 1 syphilis)
- Median follow-up of 3.75 years, 6 of 12 participants (50.0%) with chronic HCV infection completed treatment with cure
- 9 of 20 infants (45.0%) completed screening
- One neonatal transmission event occurred (5.8%)
- Supports universal maternal screening and earl(ier) infant screeing

doi: 10.1038/s41372-024-02138-4

CYTOMEGALOVIRUS: JUST THINK ABOUT IT!

- Most common congenital viral infection
  - Estimate 20,000-40,000 infants/year affected in US
- Most women (~60%) of child-bearing age in developed countries are seronegative
  - If infected, 33% will have transplacental viral transmission to the fetus
- Most infants appear normal at birth
  - 85-90% asymptomatic
  - 10-15% symptomatic
- Both with risk of audio-visual defects over time
  - 10→100% auditory; 10→20% visual

Infant with petechial rash + jaundice due to congenital CMV

https://www.cdc.gov/ncbddd/birthdefects/surveillancemanual/quick-reference-handbook/congenital-cytomegalovirus.html Photo: CDC, Jacob Johan

CONSIDER SCREENING FOR CMV AT BIRTH WHEN…

Prenatal

- Maternal seroconversion
- +CMV amniocentesis
- Abnormal prenatal ultrasound
- Maternal febrile illness without source

Postnatal

- Microcephaly ≥2 SD below mean for GA
- IUGR/SGA ≥2 SD below mean for GA
- Hepatomegaly
- Petechiae
- Blueberry muffin rash
- Prolonged jaundice

Clinical

- Culture-negative sepsis, pneumonia
- Unexplained, prolonged cholestasis
- Periventricular calcifications & other
- Spontaneous intestinal perforation
- Seizures
- Failed hearing screen*

Send bag urine PCR for CMV QUAL

NEW: ISOLATED SENSINEURAL HEARING LOSS “SYMPTOMATIC” CONGENITAL CMV & WARRANTS TREATMENT DISCUSSION

- CONCERT2 Trial (Chung PK et al, 2024):
  - 25 treated infants enrolled up to 13 weeks PMA vs refusal and historical controls
  - Treated PO valganciclovir x 6 weeks, no dose change.
  - Treated infants had overall less hearing loss at 18–22 months follow-up
- Mean best-ear
  - Deteriorated by 13.7dB in control group vs improved 3.3dB in treatment (95%, 2.6–31.4. *P*=0.02)*
- Red Book updates 2024:
  - Severely symptomatic : VGC x 6 months modest improved outcomes at 2yo
  - SNHL alone: VGC x 6 weeks modest improved outcomes at ~2yo when started <13 wks old
  - Mild symptomatic: No data to support treatment
  - Asymptomatic: should not be treated outside research study

**Barely Perceptible Change 3dB; About Twice/Half as Loud 10dB*

2023 GUIDELINE ON DIAGNOSIS AND MANAGEMENT OF ACUTE BACTERIAL ARTHRITIS IN PEDIATRICS

Charles R Woods , John S Bradley , Archana Chatterjee , Matthew P Kronman , Sandra R Arnold , Joan Robinson , Lawson A Copley , Antonio C Arrieta , Sandra L Fowler , Christopher Harrison , Stephen C Eppes , C Buddy Creech , Laura P Stadler , Samir S Shah , Lynnette J Mazur , Maria A Carrillo-Marquez , Coburn H Allen , Valéry Lavergne

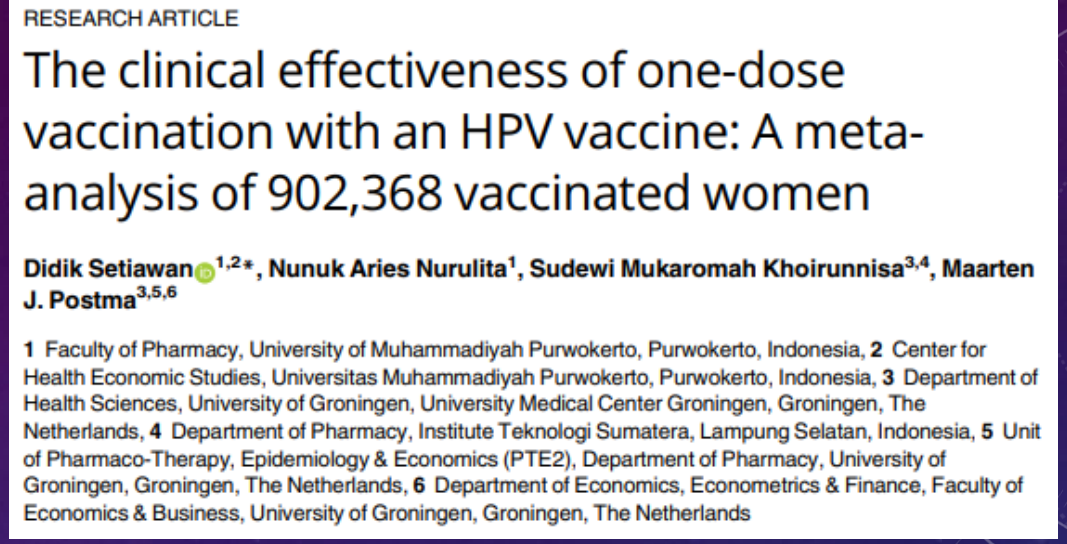
- Oral over IV step-down therapy, when appropriate
- *S. aureus* infections (n = 211 from 6 studies)
  - 42.6% (95%CI: 35.1 to 47.2%) for those with ABA in absence of osteomyelitis
  - 69.9% (95%CI: 47.9 to 78.2%) when associated osteomyelitis [OR: 2.44, 95%CI 1.81 to 3.27]
- Consider empiric MRSA coverage when rates >10-20%
  - Clindamycin +/-, vancomycin, ceftaroline, daptomycin, linezolid

https://doi.org/10.1093/jpids/piad089

SELECTED KEY POINTS

Recommendation	Certainty of evidence
Obtain blood culture prior to antibiotics	Strong recommendation Moderate certainty of evidence
Use C-reactive protein for diagnosis and monitoring Avoid procalcitonin (due to low sensitivity)	Conditional recommendation Very low certainty of evidence
Empiric coverage against Staphylococcus aureus	Strong recommendation Moderate certainty of evidence
Empiric coverage for *Kingella kingae* recommended those 6-48 months old	Conditional recommendation Very low certainty of evidence
Step-down to oral antibiotics when clinically appropriate (vs IV)	Strong recommendation Low certainty of evidence
Duration 10–14 days antibiotic therapy (IV+PO) if uncomplicated, rapid response first week, good antibiotic option for common pathogens (S aureus, S pyogenes, S pneumoniae, H influenzae type B)	Conditional recommendation* Low certainty evidence *IMHO: patient selection important

OR EPI 2025 HIGHLIGHTS



RESEARCH ARTICLE

The clinical effectiveness of one-dose vaccination with an HPV vaccine: A meta-analysis of 902,368 vaccinated women

Didik Setiawan[1,2*], Nunuk Aries Nurulita[1], Sudewi Mukaromah Khoirunnisa[3,4], Maarten J. Postma[3,5,6]

1 Faculty of Pharmacy, University of Muhammadiyah Purwokerto, Purwokerto, Indonesia, **2** Center for Health Economic Studies, Universitas Muhammadiyah Purwokerto, Purwokerto, Indonesia, **3** Department of Health Sciences, University of Groningen, University Medical Center Groningen, Groningen, The Netherlands, **4** Department of Pharmacy, Institute Teknologi Sumatera, Lampung Selatan, Indonesia, **5** Unit of Pharmaco-Therapy, Epidemiology & Economics (PTE2), Department of Pharmacy, University of Groningen, Groningen, The Netherlands, **6** Department of Economics, Econometrics & Finance, Faculty of Economics & Business, University of Groningen, Groningen, The Netherlands

- What's not in question:
  - Best serologic responses when given in early teen years
  - Vaccination decreases infection with high-risk HPV strains, decreases HSIL, CIN2/3, CA, warts
- Is a single dose of HPV vaccine non-inferior to 2- and 3-vaccine schedule to prevent cervical cancer?
  - Weakness: heterogenous studies; strength: numbers
  - >1 dose schedules were same to slightly more effective than 1 dose, but not by much (depended on site)
  - In a study, 8-year durability of antibody levels after single dose
  - May be a strategy when resources are limited
- Oregon 2024 HPV 1/HPV complete： 65%/38% 13 yo and 75%/58% adolescents aged 13–17 yo

https://doi.org/10.1371/journal.pone.0290808
https://public.tableau.com/app/profile/oregon.immunization.program/viz/OregonAdolescentImmunizations/D-Landing

ESPID HIGHLIGHTS: BUCHAREST 2025

- Pediatric vaccines are part of antimicrobial resistance prevention!
  - In combination with WASH (hand hygiene and sanitation) and IPC (infection prevention and control) in healthcare settings
  - Less bacterial circulation, less infection, less antibiotics, less resistance selection
  - Viral >bacterial vaccines due to prevalence of viruses
    - Measles, influenza, varicella, RSV, pneumococcal, meningococcal…

Espidmeeting.org/

BORED? LOOKING FOR A GOOD STORY? CHECK OUT THE INTERNATIONAL OUTBREAK MUSEUM!

- https://www.outbreakmuseum.com/
- Homage to dear friend and colleague Dr. Bill Keene, PhD, OHA Foodborne Epidemiologist, photographer, raconteur, fellow traveler
- *"It's all about the children."*

Bill Keene in his International Outbreak Museum/office.

QUESTIONS? CONCERNS? STORIES?

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REFERENCES

Singla A, Gupta S, Chhapola V, et al 6819 Clinical and laboratory spectrum of post-measles complications in Indian children : an observational study. Archives of Disease in Childhood 2024;109:A181-A182.

Mina MJ, Kula T, Leng Y, Li M et al. Measles virus infection diminishes preexisting antibodies that offer protection from other pathogens. Science 2019; 366(6465): 599-606. doi:10.1126/science.aay6485

Laksono BM, de Vries RD, Verburgh RJ, Visser EG, de Jong A, Fraaij PLA, Ruijs WLM, Nieuwenhuijse DF, van den Ham HJ, Koopmans MPG, van Zelm MC, Osterhaus ADME, de Swart RL. Studies into the mechanism of measles-associated immune suppression during a measles outbreak in the Netherlands. Nat Commun. 2018 Nov 23;9(1):4944. doi: 10.1038/s41467-018-07515-0. PMID: 30470742; PMCID: PMC6251901.

Jamison Pike, Alan Melnick, Paul A. Gastañaduy, Meagan Kay, Jeff Harbison, Andrew J. Leidner, Samantha Rice, Kennly Asato, Linda Schwartz, Chas DeBolt; Societal Costs of a Measles Outbreak. Pediatrics April 2021; 147 (4): e2020027037. 10.1542/peds.2020-027037

Pike J, Leidner AJ, Gastanaduy PA. A review of measles outbreak cost estimates from the US in postelimination era (2004–2017): estimates by perspective and cost type. Clinical Infectious Diseases 2020;71(6):1568–76. DOI: 10.1093/cid/ciaa070.

Buser GL, Marginean H, Dada M, Woodward S, Young A, Chen C, Tomlinson MW. Hepatitis C infection screening and connection to care among postpartum patients and exposed infants in two community hospitals, 3-year follow-up - Oregon, 2019-2024. J Perinatol. 2025 Jan;45(1):122-127. doi: 10.1038/s41372-024-02138-4. Epub 2024 Oct 5. PMID: 39369084.

Panagiotakopoulos L, Sandul AL, et al. CDC Recommendations for Hepatitis C Testing Among Perinatally Exposed Infants and Children — United States, 2023. MMWR Recomm Rep 2023;72(No. RR-4):1–19. DOI: http://dx.doi.org/10.15585/mmwr.rr7204a1.

Chung PK, Schornagel FAJ, Soede W, van Zwet EW, Kroes ACM, Oudesluys-Murphy AM, Vossen ACTM. Valganciclovir in Infants with Hearing Loss and Clinically Inapparent Congenital Cytomegalovirus Infection: A Nonrandomized Controlled Trial. J Pediatr 2024;268:113945. DOI: 10.1016/j.jpeds.2024.113945

Rawlinson WD et al. Congenital cytomegalovirus infection in pregnancy and the neonate: consensus recommendations for prevention, diagnosis, and therapy. Lancet Infect Dis 2017; 17: e177–88. Published Online March 10, 2017. http://dx.doi.org/10.1016/ S1473-3099(17)30143-3.

Cytomegalovirus. Committee on Infectious Diseases, American Academy of Pediatrics. David W. Kimberlin, MD, FAAP, ed. 2024. Red Book: 2024-2027 Report of the Committee on Infectious Diseases - 33rd Ed. American Academy of Pediatrics. ISBN 978-1-61002-734-2. eISBN 978-1-61002-735-9.

Woods CR, Bradley JS, Chatterjee A, et al. 2023 Guideline on Diagnosis and Management of acute bacterial arthritis in pediatrics. Journal of the Pediatric Infectious Diseases Society, Volume 13, Issue 1, January 2024, Pages 1–59, https://doi.org/10.1093/jpids/piad089

Setiawan D, Nurulita NA, Khoirunnisa SM, Postma MJ (2024) The clinical effectiveness of one-dose vaccination with an HPV vaccine: A metaanalysis of 902,368 vaccinated women. PLoS ONE 19(1): e0290808. https://doi.org/10.1371/journal. pone.0290808

Woods CR, Bradley JS, Chatterjee A, Kronman MP, Arnold SR, Robinson J et al. Clinical Practice Guideline by PIDS and IDSA: 2023 Guideline on Diagnosis and Management of Acute Bacterial Arthritis in Pediatrics. JPIDS 2024;13(1):1–59. https://doi.org/10.1093/jpids/piad089.