Emerging and re-emerging infectious diseases in pediatrics- what's on the horizon

September 19, 2024

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Disclosures

- Nothing relevant to disclose for this talk
  - Previously received funding for COVID-19 vaccine studies with Moderna Therapeutics, Inc; Pfizer; and AstraZeneca

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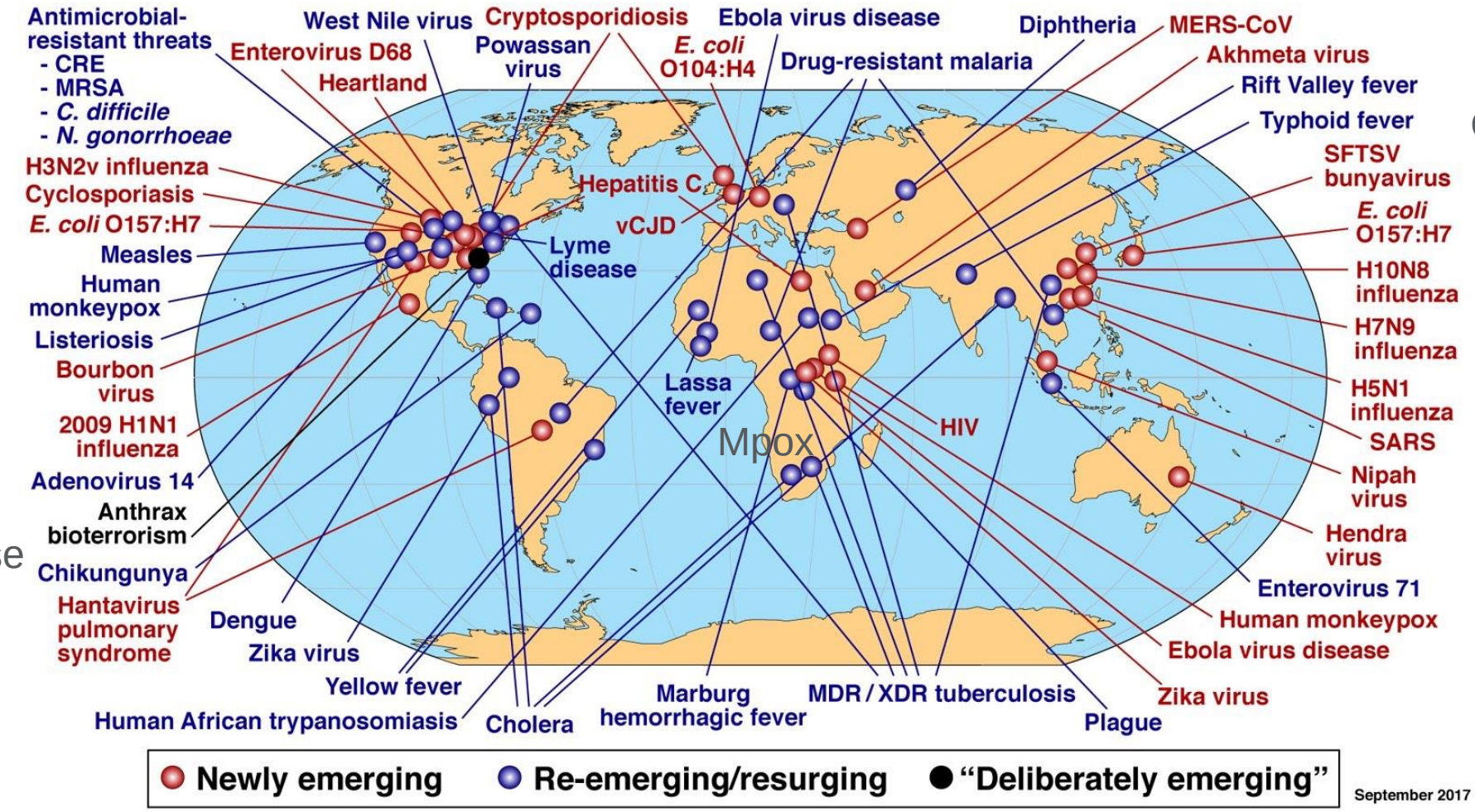
Global Examples of Emerging and Re-Emerging Infectious Diseases



Mpox

COVID-19

Oropouche virus disease

Paules CI. Annals of Internal Medicine. 2017; 167(11): 805-11.

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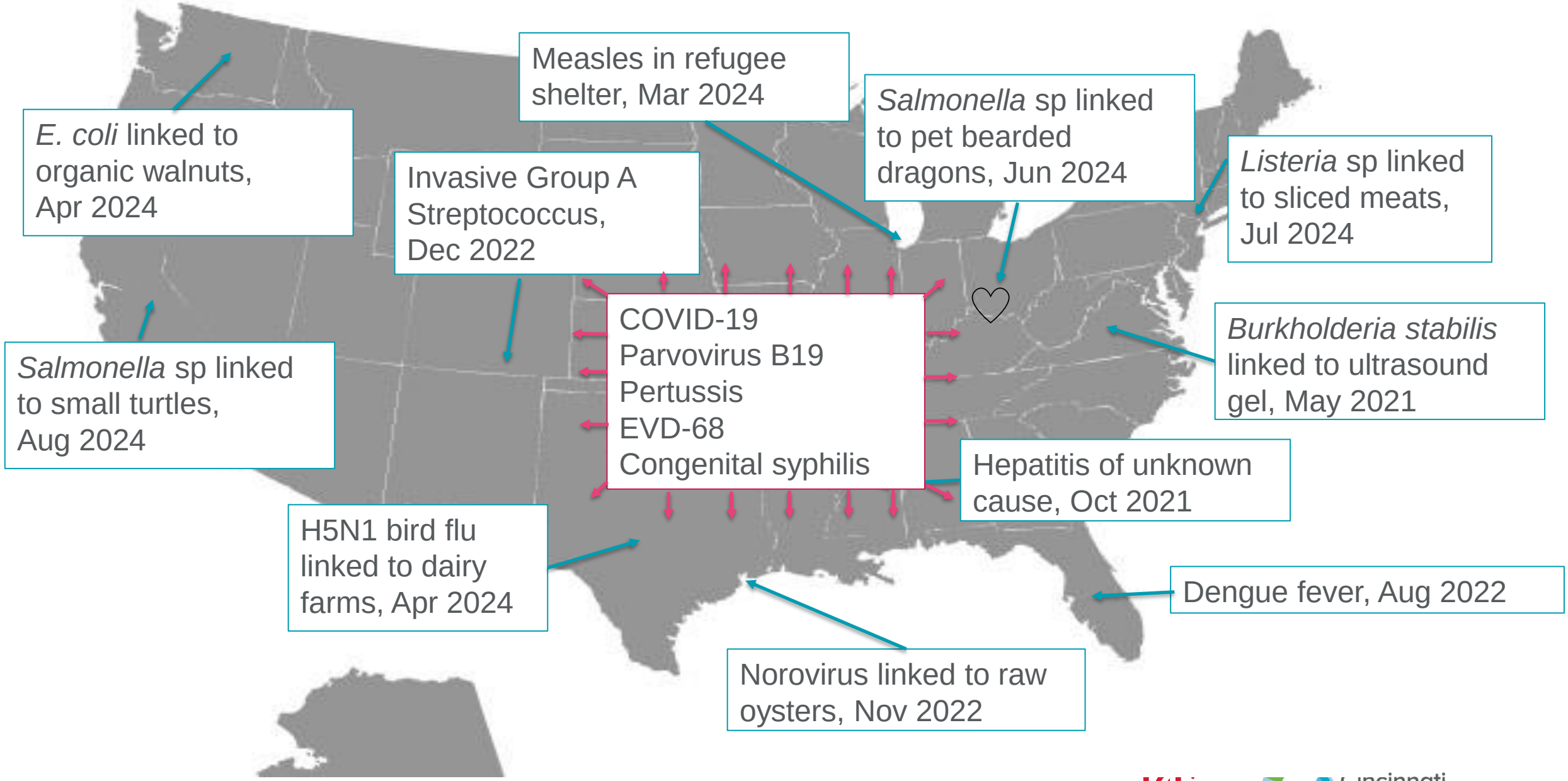

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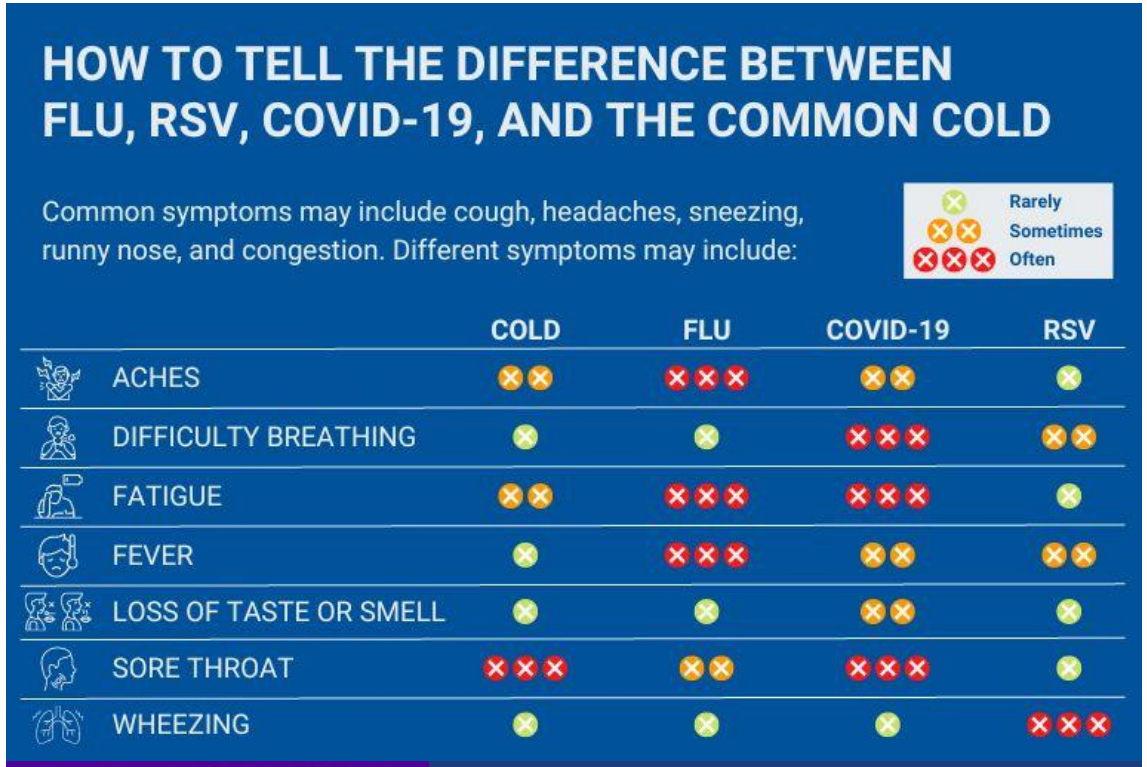
Centers for Disease Control & Prevention (CDC). Current Outbreak List. 2024.

Learning Objectives

- To discuss the clinical features and prevention of select respiratory viruses such as influenza.
- To discuss the clinical features and prevention of pertussis.

What's the deal with respiratory viruses?

- Leading cause of acute respiratory infections globally
- Up to 9.4 viral infections per year in children 0-2-years-old
- Disproportionately impact young children
  - RSV: 1 in 50 deaths of children <5-years-old worldwide
  - Influenza: 194 US pediatric deaths 2023/24
  - 1500/3800 children ages 6-11 years report "long COVID" 90 days after infection



RECOVER
Researching COVID to Enhance Recovery

Troeger C, et al. Estimates of the global, regional, and national morbidity, mortality, and aetiologies of lower respiratory infections in 195 countries, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet Infect Dis* 2018; 18:1191–210

Teoh Z,et al. Burden of Respiratory Viruses in Children Less Than 2 Years Old in a Community-based Longitudinal US Birth Cohort. Clin Infect Dis. 2023 Sep 18;77(6):901-909.

National Foundation for Infectious Diseases. "How to tell the difference between flu, RSV, COVID-19, and the common cold." Last accessed 8/23/24.

Li Y., Wang X., Blau D.M., Caballero M.T., Feikin D.R., Gill C.J., Madhi S.A., Omer S.B., Simoes E.A.F., Campbell H., et al. Global, regional, and national disease burden estimates of acute lower respiratory infections due to respiratory syncytial virus in children younger than 5 years in 2019: A systematic analysis. *Lancet.* 2022;**399**:2047–2064.

Gross RS, Thaweethai T, Kleinman LC, et al. Characterizing Long COVID in Children and Adolescents. *JAMA.* Published online August 21, 2024.

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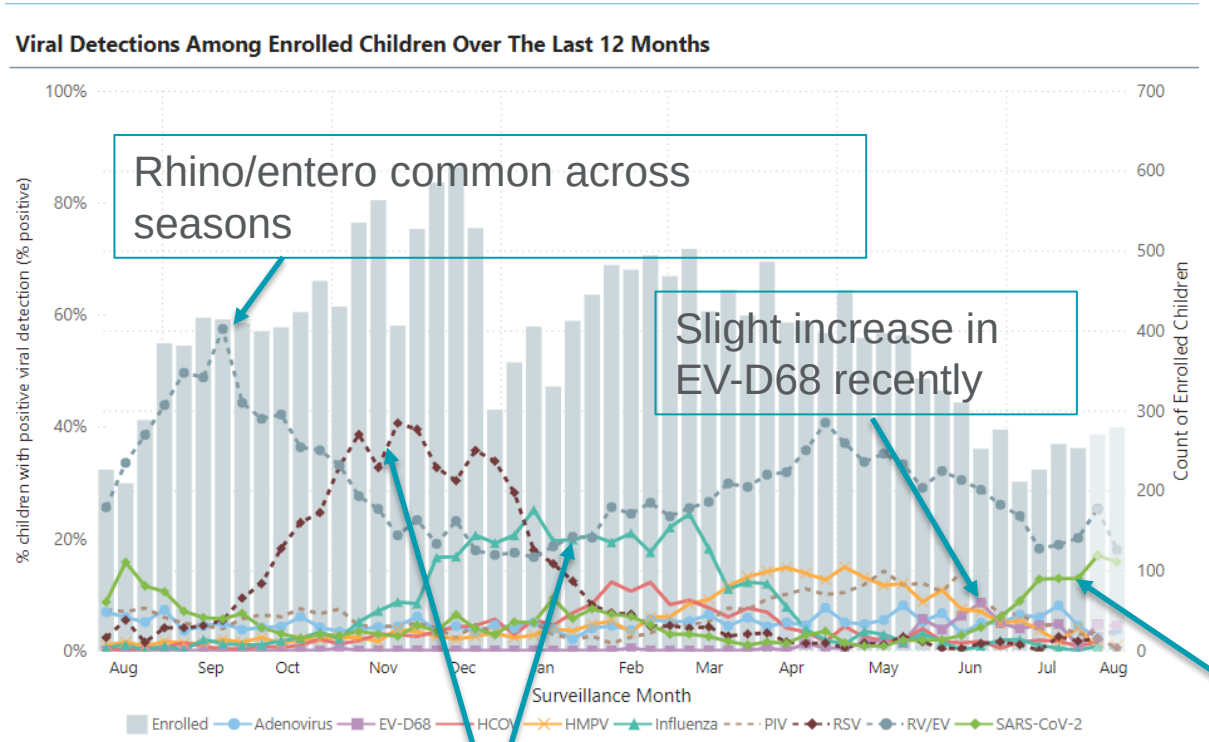
Respiratory Virus Activity (8/28/24)

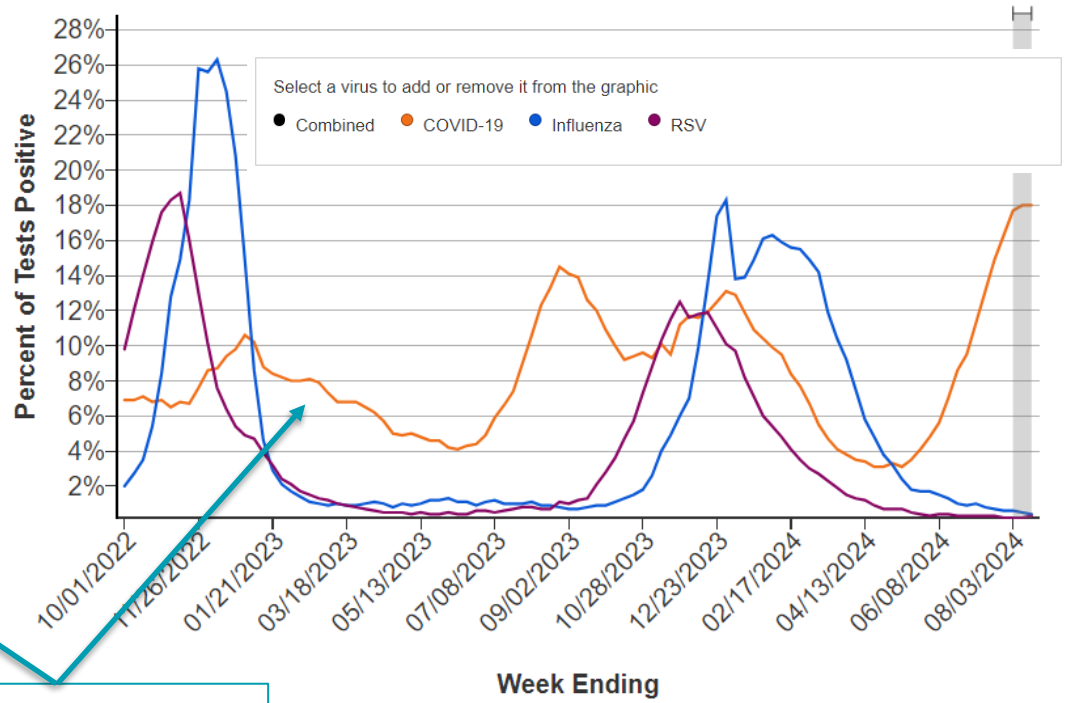


Rhino/entero common across seasons

Slight increase in EV-D68 recently

Influenza and RSV returning to pre-pandemic seasonality

Percent Positivity for Respiratory Viruses 2022 – Present (all ages)



SARS-CoV-2 increases in summer and winter

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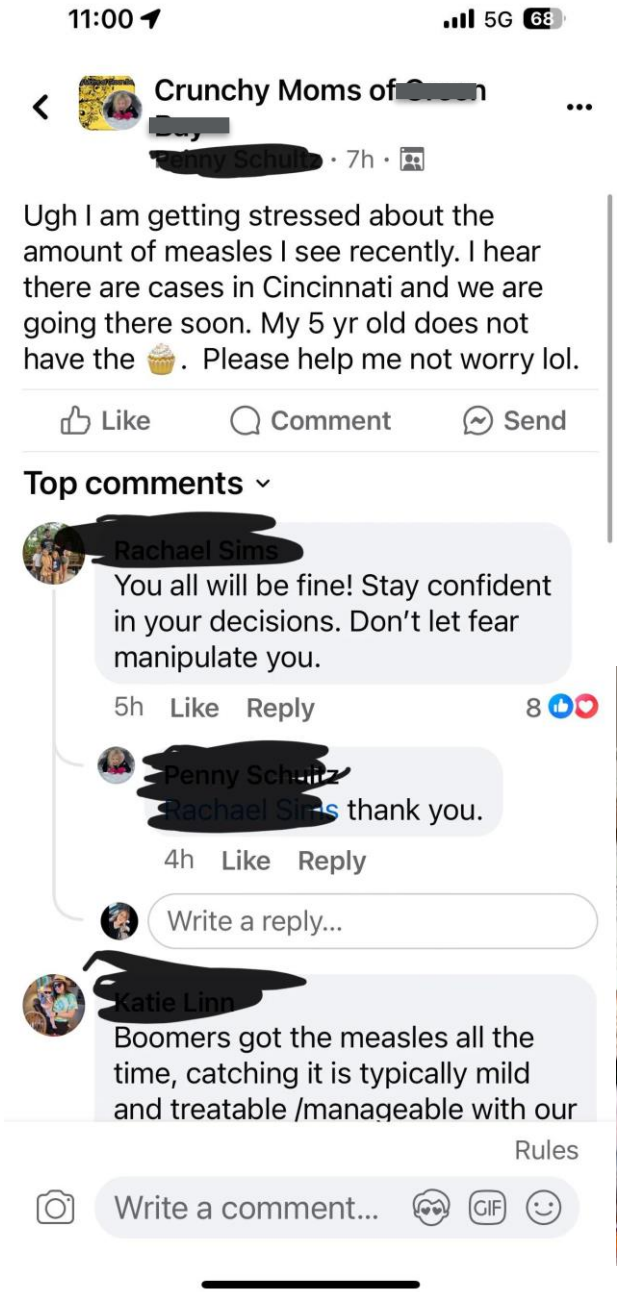
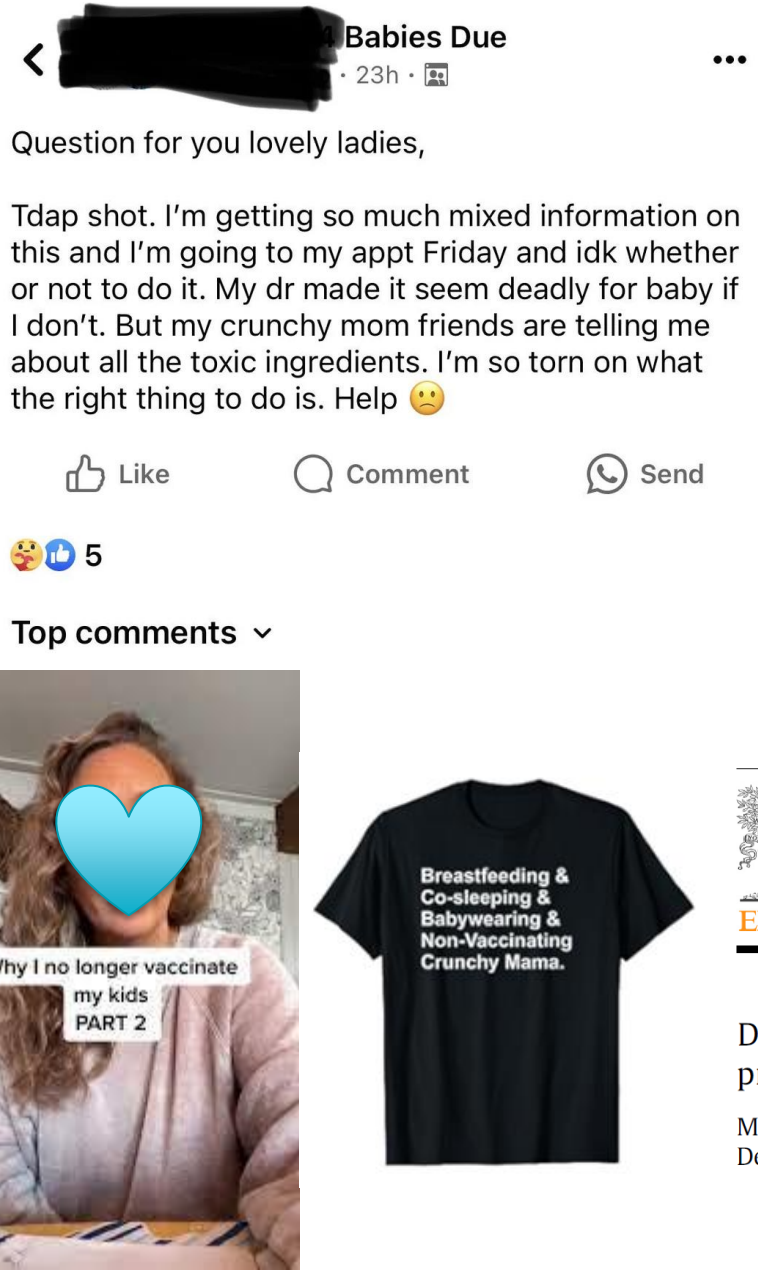
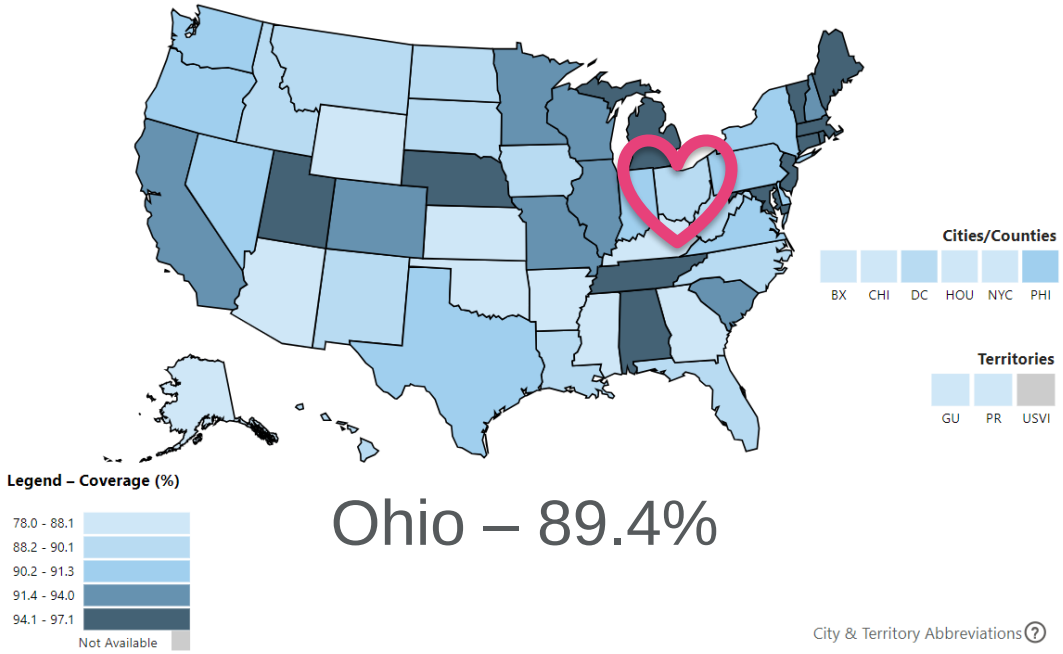
NVSN. Pediatric Acute Respiratory Illness Dashboard. https://www.cdc.gov/nvsn/php/ari-dashboard/index.html. Last accessed 8/28/24

CDC. Respiratory virus activity levels. https://www.cdc.gov/respiratory-viruses/data/activity-levels.html#cdc_data_surveillance_section_4-percent-of-tests-positive-for-respiratory-viruses. Last accessed 8/28/24





≥1 Dose MMR Vaccination Coverage by Age 24 Months among Children Born in 2020, National Immunization Survey-Child



Ohio – 89.4%

Contents lists available at ScienceDirect
Vaccine
journal homepage: www.elsevier.com/locate/vaccine

Declining influenza vaccination rates in an underserved pediatric primary care center during the COVID-19 pandemic

Melissa E. Day [a,*], Melissa Klein [b,c], Heidi Sucharew [c,d], Mary Carol Burkhardt [b,c], Allison Reyner [f], Destiney Giles [c], Andrew F. Beck [b,c], Elizabeth P. Schlaudecker [c,e]

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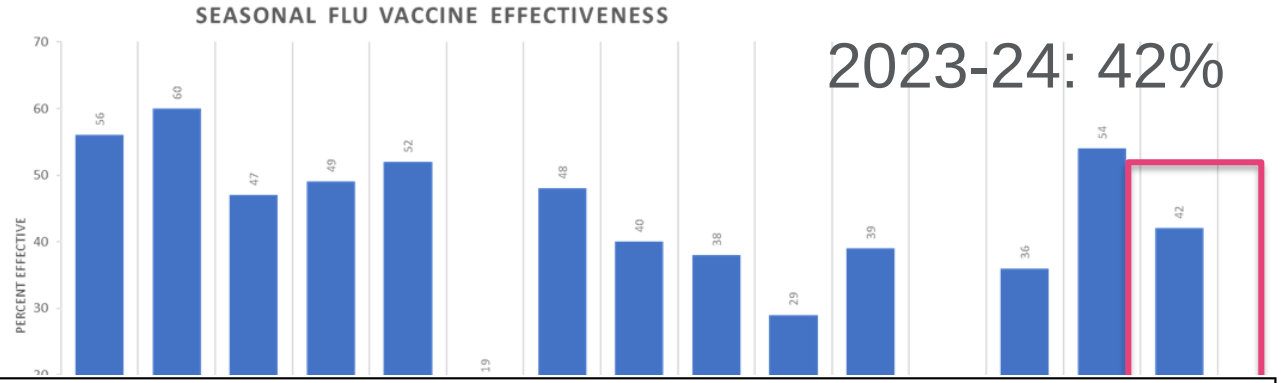
Centers for Disease Control and Prevention. Vaccination Coverage among Young Children (0-35 Months). https://www.cdc.gov/vaccines/imz-managers/coverage/childvaxview/interactive-reports/index.html. Last accessed 8/26/24.
Day ME, et al. Declining influenza vaccination rates in an underserved pediatric primary care center during the COVID-19 pandemic. Vaccine. 2022 Oct 19;40(44):6391-6.

Influenza Prevention Myth Busters

1. The flu vaccine doesn't work very well!

   Prevents hospitalizations, ED visits, and influenza infections in infants (when pregnant people are vaccinated)



Clinical Infectious Diseases

MAJOR ARTICLE

IDSA Infectious Diseases Society of America

hivm hiv medicine as

Vaccine Effectiveness Against Pediatric Influenz A–Associated Urgent Care, Emergency Departm and Hospital Encounters During the 2022–2023 VISION Network

Katherine Adams,[1] Zachary A. Weber,[2] Duck-Hye Yang,[2] Nicola P. Klein,[3] Malini B. DeSilva,[4] Kristin Dascomb,[5] Stephanie A. I Suchitra Rao,[7] Manjusha Gaglani,[8,9] Brendan Flannery,[1] Shikha Garg,[1] Anupam B. Kharbanda,[10] Shaun J. Grannis,[11,12] Toa Karthik Natarajan,[15,16] Bruce Fireman,[3] Ousseny Zerbo,[3] Kristin Goddard,[3] Julius Timbol,[3] John R. Hansen,[3] Nancy Grisel,[5] Sarah W. Ball,[2] Margaret M. Dunne,[2] Lindsey Kirshner,[2] Jessie R. Chung,[1] and Mark W. Tenforde[1]

Infants <6 months of age	No. Vaccinated Mothers /Total no. (%) Case-infants	Control infants	Effectiveness of Maternal Vaccination against Infant Influenza Illness % (95% CI)
Overall effectiveness of maternal vaccination	93/216 (43)	1961/3603 (54)	33 (10 to 50)
Infants <3 months of age	48/104 (46)	1331/2185 (61)	54 (31 to 69)
Vaccinated during first or second trimester of pregnancy	59/182 (32)	1016/2658 (38)	14 (-19 to 38)
Vaccinated during third trimester of pregnancy	34/157 (22)	945/2587 (37)	53 (31 to 68)
Hospital admission	53/118 (45)	1435/2527 (57)	40 (12 to 59)
ED visit	39/97 (40)	493/999 (49)	18 (-26 to 47)
Influenza A	70/153 (46)	1961/3603 (54)	23 (-8 to 45)
H1N1	21/51 (41)	1961/3603 (54)	37 (-9 to 63)
H3N2	40/83 (48)	1961/3603 (54)	18 (-28 to 47)
Influenza B	24/65 (37)	1961/3603 (54)	49 (16 to 69)

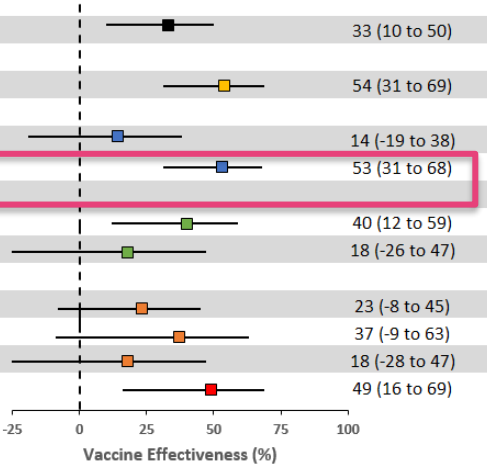


Figure 1. Effectiveness of Maternal Influenza Vaccination against Influenza Illness in Infants, Stratified According to Infant Age, Maternal Vaccination Timing, Hospital Admission, and Influenza Subtype. Maternal vaccine effectiveness was calculated as (1 – adjusted odds ratio) x 100, where the odds ratio is the odds of maternal vaccination among mothers of case infants as compared with control infants. Models were adjusted a priori for infant age (by month), hospital site, and calendar time (by month of enrollment). Firth penalized regression was used for all subgroup analyses.

CDC. Seasonal flu vaccine effectiveness studies. https://www.cdc.gov/flu-vaccines-work/php/effectiveness-studies/index.html. Last accessed 8/26/24.
Sahni LC, et al. Sustained within-season vaccine effectiveness against influenza-associated hospitalization in children: evidence from the New Vaccine Surveillance Network, 2015–2016 through 2019–2020. CID. 2023 Feb 1;76(3):e1031-9.
Adams K, et al. Vaccine Effectiveness Against Pediatric Influenza-A-Associated Urgent Care, Emergency Department, and Hospital Encounters During the 2022-2023 Season: VISION Network. Clin Infect Dis. 2024 Mar 20;78(3):746-755.
Sahni LC, Olson SM, Halasa NB, et al. Maternal Vaccine Effectiveness Against Influenza-Associated Hospitalizations and Emergency Department Visits in Infants. *JAMA Pediatr*. 2024;178(2):176–184.

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Influenza Prevention Myth Busters

Clinical Infectious Diseases

IDSA GUIDELINE

Open Forum Infectious Diseases

MAJOR ARTICLE

Five-Day vs 10-Day Postexposure Chemoprophylaxis With Oseltamivir to Prevent Hospital Transmission of Influenza: A Noninferiority Randomized Open-Label Study

Lidija Lepen,[1] Rok Blagus,[2] Maša Velušček,[1] Rajko Saletinger,[1] Miroslav Petrovec,[3] Fajko F. Bajrović,[4] and Daša Stupica[1,5]

Clinical Practice Guidelines by the Infectious Diseases Society of America: 2018 Update on Diagnosis, Treatment, Chemoprophylaxis, and Institutional Outbreak Management of Seasonal Influenza[a]

Timothy M. Uyeki,[1] Henry H. Bernstein,[2] John S. Bradley,[3,4] Janet A. Englund,[5] Thomas M. File,[6] Alicia M. Fry,[1] Stefan Gravenstein,[7] Frederick G. Hayden,[8] Scott A. Harper,[9] Jon Mark Hirshon,[10] Michael G. Ison,[11] B. Lynn Johnston,[12] Shandra L. Knight,[13] Allison McGeer,[14] Laura E. Riley,[15] Cameron R. Wolfe,[16] Paul E. Alexander,[17,18] and Andrew T. Pavia[19]

2. Tamiflu (oseltamivir) prophylaxis isn't worth it!

Not substitute for vaccination but 7-day course impactful in exposed patients who are high-risk of severe disease and likely under-utilized, preferably within 48 hrs of exposure

*Offered to infants <3 mos rarely

Management of Influenza in Households: A Prospective, Randomized Comparison of Oseltamivir Treatment With or Without Postexposure Prophylaxis

Frederick G. Hayden,[1] Robert Belshe,[2] Catalina Villanueva,[3] Riin Lanno,[5] Claire Hughes,[6] Ian Small,[6] Regina Dutkowski,[4] Penelope Ward,[6] and Jackie Carr[4]

277 households with 298 flu cases – 58.5% efficacy in reducing secondary cases

CDC. Influenza Antiviral Medications Summary for Clinicians. https://www.cdc.gov/flu/professionals/antivirals/summary-clinicians.htm. Last accessed 8/28/24
Uyeki TM, et al. Clinical Practice Guidelines by the Infectious Diseases Society of America: 2018 Update on Diagnosis, Treatment, Chemoprophylaxis, and Institutional Outbreak Management of Seasonal Influenza. Clin Infect Dis. 2019 Mar 5;68(6):895-902.
Hayden FG, et al. Management of influenza in households: a prospective, randomized comparison of oseltamivir treatment with or without postexposure prophylaxis. J Infect Dis 2004; 189:440-9.
Lidija L, et al. Five-Day vs 10-Day Postexposure Chemoprophylaxis with Oseltamivir to Prevent Hospital Transmission of Influenza: A Noninferiority Randomized Open-Label Study, OFID, 7(8), 2020: OFAA240

Influenza – On the Horizon

ARTICLES
https://doi.org/10.1038/s41591-020-1118-7
nature medicine

Check for updates

A chimeric hemagglutinin-based universal influenza virus vaccine approach induces broad and long-lasting immunity in a randomized, placebo-controlled phase I trial

Raffael Nachbagauer[1,15], Jodi Feser[2], Abdollah Naficy[2], David I. Bernstein[3,4], Jeffrey Guptill[5], Emmanuel B. Walter[5,6], Franceso Berlanda-Scorza[2,16], Daniel Stadlbauer[1], Patrick C. Wilson[7,8], Teresa Aydillo[1,9], Mohammad Amin Behzadi[1], Disha Bhavsar[1], Carly Bliss[1], Christina Capuano[1], Juan Manuel Carreño[1], Veronika Chromikova[1], Carine Claeys[10,17], Lynda Coughlan[1], Alec W. Freyn[1,11], Christopher Gast[2], Andres Javier[1], Kaijun Jiang[1], Chiara Mariottini[1], Meagan McMahon[1], Monica McNeal[3,4], Alicia Solórzano[1,18], Shirin Strohmeier[1,12], Weina Sun[1], Marie Van der Wielen[10], Bruce L. Innis[2], Adolfo García-Sastre[1,9,13,14], Peter Palese[1,13,14] and Florian Krammer[1]✉

PNAS RESEARCH ARTICLE | MICROBIOLOGY

Check for updates

Assessment of a quadrivalent nucleoside-modified mRNA vaccine that protects against group 2 influenza viruses

Meagan McMahon[a], George O'Dell[a], Jessica Tan[a,b], András Sárközy[c], Máté Vadovics[c], Juan Manuel Carreño[a], Eduard Puente-Massaguer[a], Hiromi Muramatsu[c], Csaba Bajusz[c,d], Willemijn Rijnink[a], Mitchell Beattie[e], Ying K. Tam[e], Ericka Kirkpatrick Roubidoux[a,b], Isabel Francisco[a], Shirin Strohmeier[a], Masaru Kanekiyo[f], Barney S. Graham[f], Florian Krammer[a,g,1], and Norbert Pardi[c,1]

Edited by Michael Oldstone, The Scripps Research Institute, La Jolla, CA; received April 11, 2022; accepted September 29, 2022

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But wait, there's more….

Bird Flu (Influenza A H5N1)

- Current outbreak: 14 human cases since 2022 in CO, MI, TX
  - 4 after exposure to dairy cows
  - 10 after exposure to poultry
- Recommendation to treat with oseltamivir

Swine/Variant Flu (H1N1, H3N2, H1N2)

- 7 cases from 2024-25
  - 1 case in OH late Aug 2024 after exposure to pigs at agricultural event

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CDC. Bird Flu. https://www.cdc.gov/bird-flu/index.html. Last accessed 8/29/24.
CDC. Information on Swine/Variant Influenza. https://www.cdc.gov/swine-flu/about/index.html. Last updated 7/8/24. Last accessed 8/29/24.

New RSV Prevention Strategies

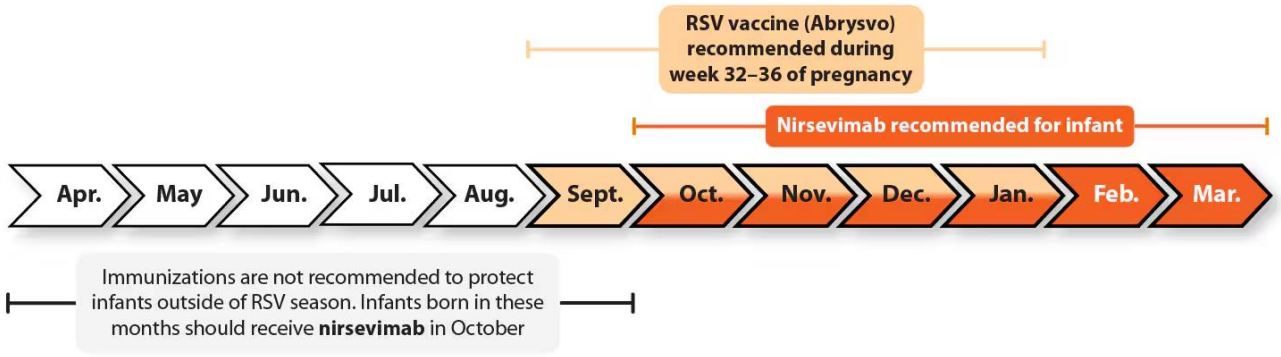
What about palivizumab?
Who owns administration?

Nirsevimab (Sanofi, Beyfortus)

- Single IM injection of anti-RSV monoclonal antibody
- All infants ≤8 months old entering first RSV season if no maternal RSV vaccine
- Some children 8-19 months at risk of severe RSV disease entering 2nd RSV season
- Covered by Vaccines for Children (VFC) programs, private insurance plans vary

RSV vaccine (Pfizer, Abrysvo) for Pregnant People

- Single IM injection of recombinant RSV F protein antigen
- 32 – 36 weeks gestation during September through January
- Covered by Medicaid, Children's Health Insurance Program (CHIP), and VFC, private insurance plans vary



Jones JM, Fleming-Dutra KE, Prill MM, et al. Use of Nirsevimab for the Prevention of Respiratory Syncytial Virus Disease Am
Recommendations of the Advisory Committee on Immunization Practices — United States, 2023. MMWR Morb Mortal Wkly
ACOG. Maternal respiratory syncytial virus vaccination. https://www.acog.org/clinical/clinical-guidance/practice-advisory/artic
vaccination. Last accessed 8/28/24.

RSV Prevention Myth Busters

1. Babies do fine with RSV, nirsevimab is too much hassle!

   Prevents hospitalizations, ED visits, and lower respiratory tract infections in infants

2. Maternal vaccination is dangerous!

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Nirsevimab and Hospitalization for RSV Bronchiolitis

Z. Assad, A.-S. Romain, C. Aupiais, M. Shum, C. Schrimpf, M. Lorrot, H. Corvol, B. Prevost, C. Ferrandiz, A. Giolito, Z. Valtuille, M. Bendavid, J.F. Cohen, J. Toubiana, L. de Pontual, C.F. Delande, M. Levy, P. See, R. Cohen, C. Levy, F. Angoulvant, L. Lenglart, M. Gits-Muselli, V. Biran, K. Diallo, O. Alemede, M.M. El Hebil, X. Durrmeyer, G. Labouret, N. Casanovas, B. Hallak, O. Maréchal, C. Jung, C. Bréhin, and N. Ouldali

Estimated effectiveness of 83% against RSV-associated bronchiolitis hospitalization

First season nirsevimab product effectiveness (PE) against RSV-associated ED encounters and hospitalization – VISION, October 8, 2023 – March 31, 2024

Outcome | Nirsevimab dosage pattern	Total encounters	RSV-positive encounters N (Row %)	Median days since dose (IQR)	Adjusted PE (95% CI)*
RSV-associated ED encounter				
No nirsevimab doses	4,610	1,988 (43)	N/A	ref
Nirsevimab, ≥7 days prior	442	63 (14)	53 (27-84)	77 (69-83)
RSV-associated hospitalization				
No nirsevimab doses	927	601 (65)	N/A	ref
Nirsevimab, ≥7 days prior	93	4 (4)	48 (25-84)	98 (95-99)

Assad Z, Romain AS, Aupiais C, Shum M, Schrimpf C, Lorrot M, Corvol H, Prevost B, Ferrandiz C, Giolito A, Valtuille Z New England Journal of Medicine. 2024 Jul 11;391(2):144-54.
Payne A. Summary of effectiveness of nirsevimab in infants. National Center for Immunization and Respiratory Diseases. 6/8/24. https://www.cdc.gov/vaccines/acip/meetings/downloads/slides-2024-06-26-28/04-RSV-Mat-Peds-Payne-508.pdf. Last accessed 8/29/24.

RSV Prevention Myth Busters

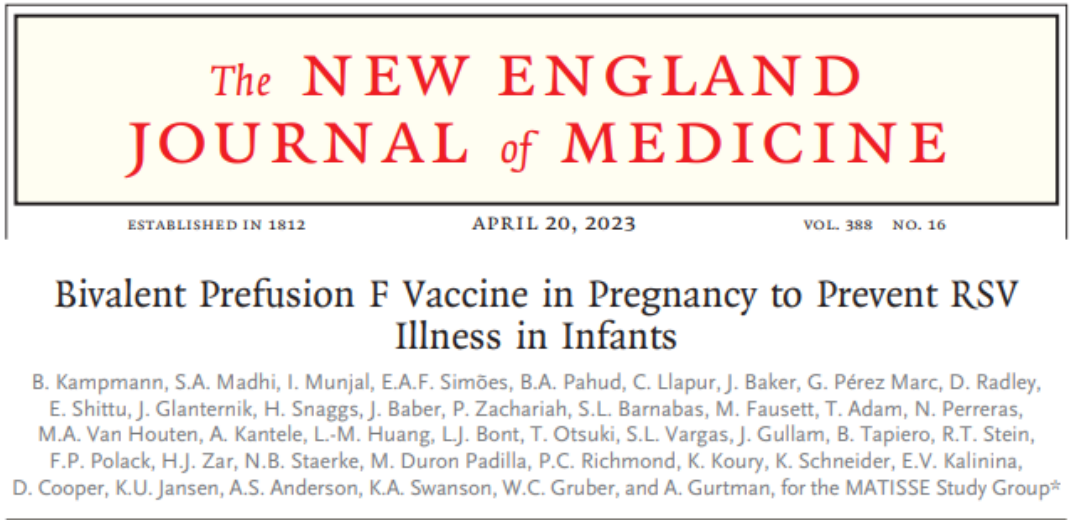

JAMA Network Open

Original Investigation | Infectious Diseases

Nonadjuvanted Bivalent Respiratory Syncytial Virus Vaccination and Perinatal Outcomes

Moeun Son, MD, MSCI; Laura E. Riley, MD; Anna P. Staniczenko, MD, MSc; Julia Cron, MD; Steven Yen, MS; Charlene Thomas, MS; Evan Sholle, MS; Lauren M. Osborne, MD; Heather S. Lipkind, MD, MS

infections in infants


The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 APRIL 20, 2023 VOL. 388 NO. 16

Bivalent Prefusion F Vaccine in Pregnancy to Prevent RSV Illness in Infants

B. Kampmann, S.A. Madhi, I. Munjal, E.A.F. Simões, B.A. Pahud, C. Llapur, J. Baker, G. Pérez Marc, D. Radley, E. Shittu, J. Glanternik, H. Snaggs, J. Baber, P. Zachariah, S.L. Barnabas, M. Fausett, T. Adam, N. Perreras, M.A. Van Houten, A. Kantele, L.-M. Huang, L.J. Bont, T. Otsuki, S.L. Vargas, J. Gullam, B. Tapiero, R.T. Stein, F.P. Polack, H.J. Zar, N.B. Staerke, M. Duron Padilla, P.C. Richmond, K. Koury, K. Schneider, E.V. Kalinina, D. Cooper, K.U. Jansen, A.S. Anderson, K.A. Swanson, W.C. Gruber, and A. Gurtman, for the MATISSE Study Group*

2. Maternal vaccination is dangerous!

   Pre-eclampsia noted in 1.8% of recipients (1.4% in placebo group). 1.9% and 1% increase respectively in preterm births of adjuvanted vaccine (GlaxoSmithKline) and RSV preF vaccine; contributed to conservative gestation recommendation (eg, not 24 wks)

Dieussaert I, Hyung Kim J, Luik S, et al. RSV prefusion F protein-based maternal vaccine—preterm birth and other outcomes. *N Engl J Med*. 2024;390(11):1009-1021.
Fleming-Dutra KE, et al. Use of the Pfizer respiratory syncytial virus vaccine during pregnancy for the prevention of respiratory syncytial virus–associated lower respiratory tract disease in infants: recommendations of the Advisory Committee on Immunization Practices—United States, 2023. *MMWR Morb Mortal Wkly Rep*. 2023;72(41):1115-1122.
Kampmann B, et al; MATISSE Study Group. Bivalent prefusion F vaccine in pregnancy to prevent RSV illness in infants. *N Engl J Med*. 2023;388(16):1451-1464.

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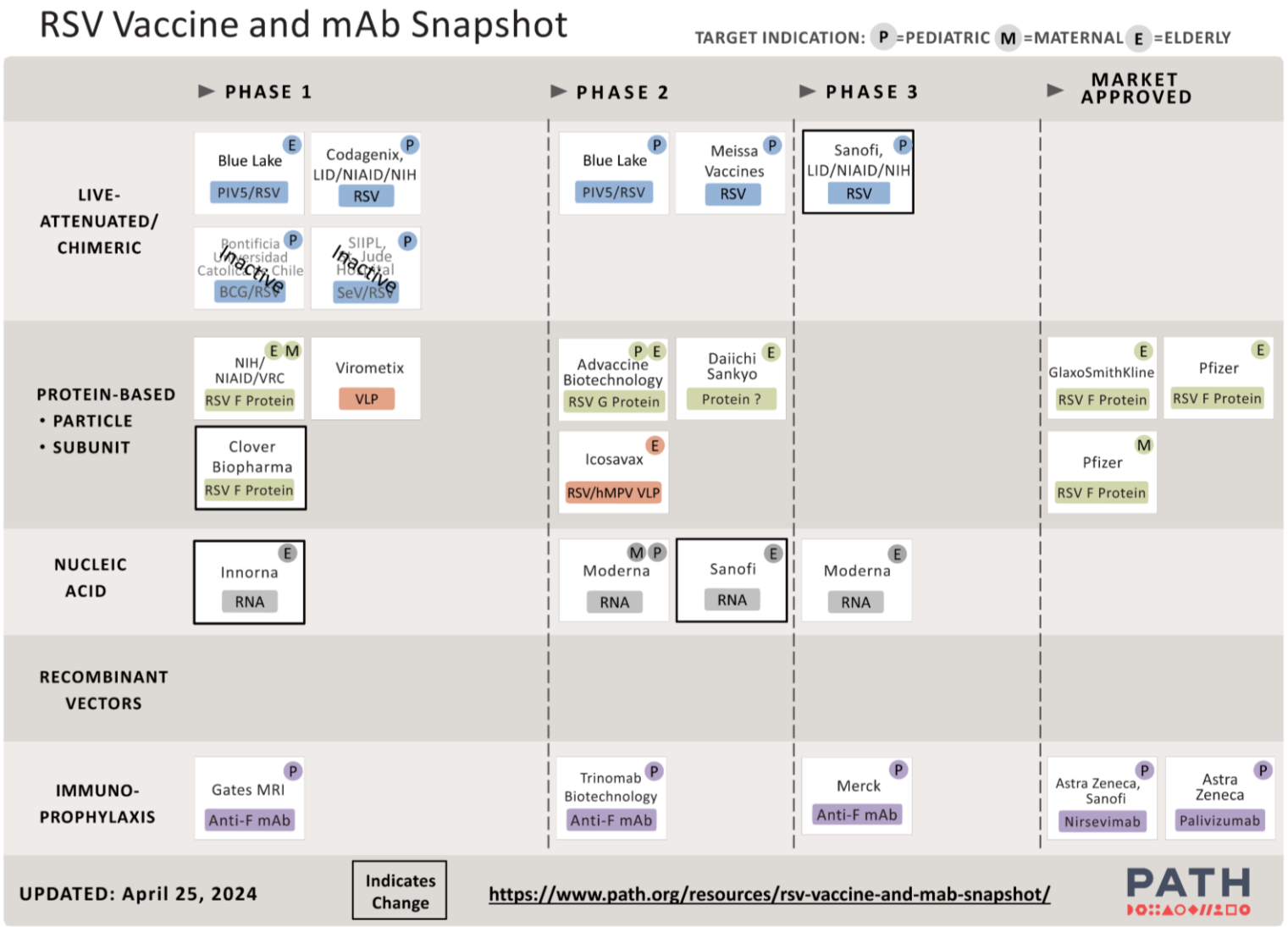
RSV – On the Horizon



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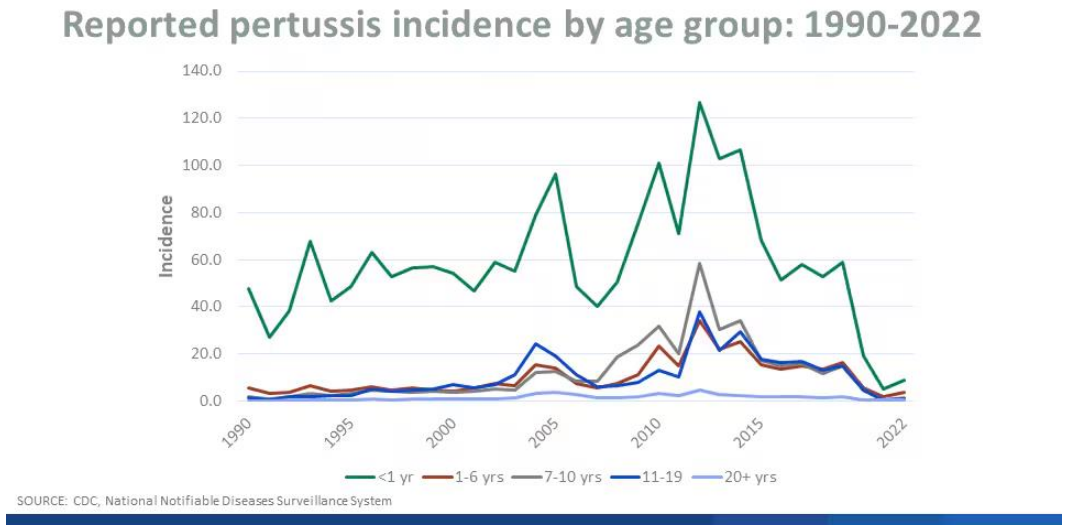
Pertussis – Making a Comeback

- *Bordetella pertussis* characterized by paroxysmal cough with inspiratory gasp
  - "21 day cough"
- As of 8/21/24: 300% increase in cases in 2024 compared to 2023

Reporting Area	Current Week	Previous 52 Weeks	Cum YTD 2024	Cum YTD 2023
Ohio	17*	40	590	476

*For Week ending 8/24/24 (Week 34)



CDC. Pertussis Cases by Year (1922-2022). https://www.cdc.gov/pertussis/php/surveillance/index.html .Last accessed 8/29/24.
American Academy of Pediatrics. Committee on Infectious Diseases. "Red Book : Report of the Committee on Infectious Diseases." Elk Grove Village, IL :American Academy of Pediatrics, 2024.

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Pertussis Prevention Myth Busters

1. Pertussis vaccine doesn't work!
   Acellular-component pertussis vaccine (DTaP) or Tdap vaccine available since 1997. Immunity wanes 3-5 years after series.
2. Every exposed person needs antibiotic prophylaxis!

Protective Effect of Contemporary Pertussis Vaccines: A Systematic Review and Meta-analysis

T. Roice Fulton,[1,2] Varun K. Phadke,[3] Walter A. Orenstein,[4,5] Alan R. Hinman,[5] Wayne D. Johnson,[2] and Saad B. Omer[1,2,4,5]

Lower effectiveness than whole cell vaccine but still excellent (84%).

Epidemics

journal homepage: www.elsevier.com/locate/epidemics

Association between pertussis vaccination coverage and other sociodemographic factors and pertussis incidence using surveillance data

Madhura S. Rane [a,*], Jonathan Wakefield [b,c], Pejman Rohani [d,e], M. Elizabeth Halloran [a,b,f]

Tracking of vaccine uptake at school district level may further decrease pertussis outbreak risk

CDC. Pertussis: Summary of Vaccine Recommendations. Last reviewed 1/22/20. https://www.cdc.gov/vaccines/vpd/pertussis/recs-summary.html?gad_source=1&gclid=EAIaIQobChMI7puEt-2aiAMVQ0b_AR0XEAadEAAYAiAAEgLwNPD_BwE. Last accessed 8/29/24.
Fulton TR, Protective Effect of Contemporary Pertussis Vaccines: A Systematic Review and Meta-analysis, *Clinical Infectious Diseases*, 62(9);2016:1100–1110.
Rane MS, Wakefield J, Rohani P, Halloran ME. Association between pertussis vaccination coverage and other sociodemographic factors and pertussis incidence using surveillance data. Epidemics. 2023 Sep 1;44:100689.

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Pertussis Prevention Myth Busters

1. Pertussis vaccine doesn't work!

   Acellular-component pertussis vaccine (DTaP) or Tdap vaccine available since 1997. Immunity wanes 3-5 years after series.

2. Every exposed person needs antibiotic prophylaxis!

   Early chemoprophylaxis associated with reduced risk of transmission. "Use antibiotics only when necessary." Even with antimicrobials, must monitor for 21 days for symptoms.

Setting	Chemoprophylaxis recommended?
High risk of severe disease	Yes. Infants <12 mos, people with pre-existing conditions exacerbated by pertussis (eg, asthma), pregnant person in 3rd trimester
Household contact	Yes
Childcare	Yes
School	Usually not for large groups, case-by-case basis
Healthcare setting	If high-risk exposure: no PPE + 10 min face-to-face contact, procedure, >1 hr in room Especially in NICU, maternity wards
Nonhousehold contact	Depends. High risk or close contact with other high risk person.

Dodhia H, et al. Review of the evidence for the use of erythromycin in the management of persons exposed to pertussis. Epidemiol Infect. 1998 Mar;120(2):143-9.
De Serres G, et al. Field effectiveness of erythromycin prophylaxis to prevent pertussis within families. Pediatr Infect Dis J. 1995 Nov;14(11):969-75.
Yeh SH. Pertussis: persistent pathogen, imperfect vaccines. Expert Rev Vaccines. 2003 Feb;2(1):113-27.
CDC. Postexposoure antimicrobial prophylaxis. https://www.cdc.gov/pertussis/php/postexposure-prophylaxis/?CDC_AAref_Val=https://www.cdc.gov/pertussis/pep.html. Last updated 4/2/24. Last accessed 8/29/24.

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Pertussis – On the Horizon

Immunogenicity and safety of BPZE1, an intranasal live attenuated pertussis vaccine, versus tetanus–diphtheria-acellular pertussis vaccine: a randomised, double-blind, phase 2b trial

Cheryl Keech, Vicki E Miller, Barbara Rizzardi, Christopher Hoyle, Melinda J Pryor, Jonathan Ferrand, Ken Solovay, Marcel Thalen, Stephanie Noviello, Peter Goldstein, Andrew Gorringe, Breeze Cavell, Qiushui He, Alex-Mikael Barkoff, Keith Rubin, Camille Locht

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Many Remaining Questions

- Mpox preparedness in Ohio?
- Role of masking in respiratory viral illness prevention?
- Return to work in healthcare settings after COVID-19 infection?
- Increase in EV-D68?
- Next measles outbreak?

Questions?

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