



CONTAGIOUS COMMENTS

Respiratory Diseases Surge While Immunizations Wane

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Current Respiratory Virus Immunizations

RSV

- Pregnant persons 32-36 weeks gestation September-January (Abrysvo®)
- All infants <8 months without maternal vaccination and high-risk infants 8-19 months October-March (nirsevimab)
- All adults ≥75 years, high risk adults 60-74 years (Arexvy®, mResvia®, Abrysvo®)

COVID-19

- Everyone 6 months and older (doses needed dependent on age and previous vaccination; 2024-2025 Pfizer, Moderna, and Novavax Formulations)

Influenza

- Everyone 6 months and older annually (trivalent vaccines)

Pneumococcus

- Children <5 and adults ≥50 years, see CDC recommendations

Among both Colorado (CO) children and adults, respiratory illnesses were the first and second most common vaccine preventable diseases (VPDs) associated with emergency department (ED) visits or hospitalization in 2023. For children, preventable respiratory illnesses (Respiratory Syncytial Virus, COVID-related illnesses, influenza) accounted for 95% of all VPD-related hospitalizations in CO in 2023. Despite the prevalence, morbidity/mortality, and large financial cost of these illnesses, uptake of related vaccines is significantly lower than other vaccines. 92% of CO K-12 students last school year were up to date on routine childhood immunizations but only 61% of children 6 months-17 years old had received a flu vaccine.¹ Only ~10% are up to date with COVID vaccination as of October 2024.² These failures to vaccinate leave CO children, especially infants, very vulnerable to the respiratory infections they are most likely to encounter in day-to-day life. Additionally, poor respiratory vaccine coverage increases risk for the older adults those children live with and could transmit to.

Respiratory Syncytial Virus (RSV):

CO RSV hospitalizations and ED visits increased dramatically in 2023 among all age groups. Children aged 0-5 saw a five-fold increase in RSV hospitalizations from 2022 to 2023 (Figure 1). For the first time in 3 years, RSV supplanted COVID as the illness accounting for the most hospitalizations in pediatric patients (0-19) (Appendix Table 1). In addition, CO children with RSV require higher levels of care than they did pre-pandemic. Among adults older than 80 years, RSV hospitalizations increased six-fold from 2022 to 2023 (Figure 2).

These increases align well with the national surges of RSV hospitalizations in 2022 and 2023 following the removal of non-pharmacologic interventions (NPIs) like masking and social distancing after 2021.

Figure 1: Rate of Vaccine Preventable Respiratory Disease Hospitalization in Children 0-5 Years Old, 2021-2023

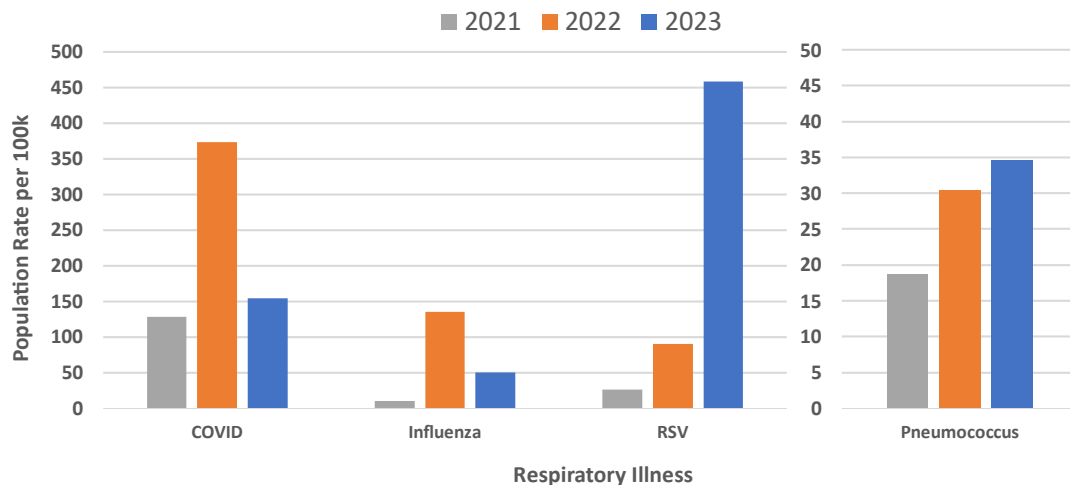
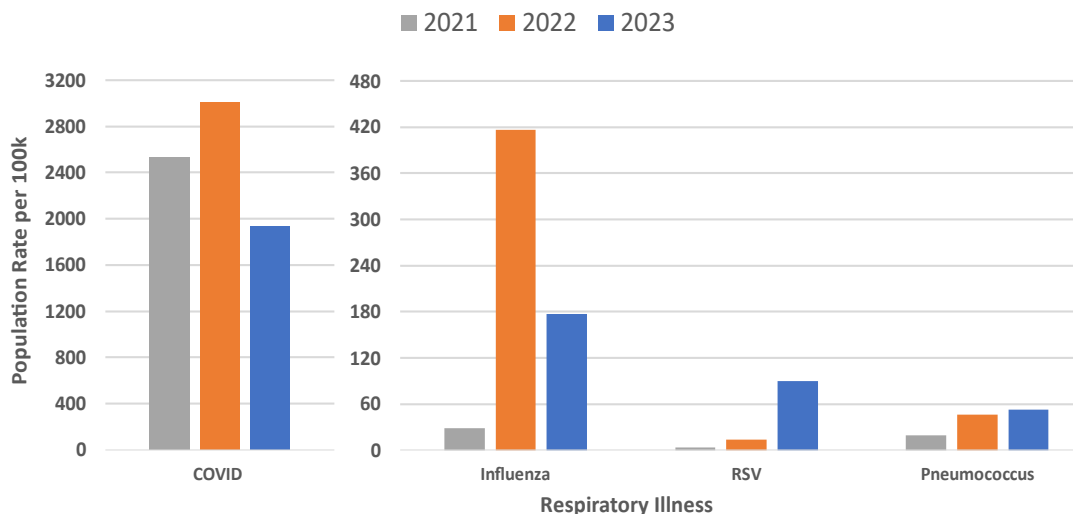


Figure 2: Rate of Vaccine Preventable Respiratory Disease Hospitalization in Adults 80+ Years Old, 2021-2023



2023 marked the first time that immunizations were available to prevent RSV disease for adults and infants. The Advisory Committee on Immunization Practices (ACIP) has recommended adult RSV vaccination for adults ≥ 60 years old since June 2023. That advisory was revised in 2024 to fully recommend that all adults ≥ 75 years should receive an RSV vaccine as should adults aged 60-74 years with certain conditions that put them at increased risk for severe RSV disease. Finally, in October 2024, FDA approved one RSV vaccine

(Pfizer's Abrysvo®) for adults 18-59 who have a chronic condition putting them at increased risk of severe disease. There are currently 3 FDA approved adult RSV vaccines—an mRNA vaccine (Moderna mResvia®) and 2 protein subunit vaccines (GSK Arexvy® and Pfizer Abrysvo®). During the 2023-2024 RSV season, both Arexvy® and Abrysvo® had excellent vaccine effectiveness (VE) against RSV-associated ED visits (77% and 79%, respectively) and RSV-associated hospitalization (83% and 73%).³ mResvia, available this season for the first time, demonstrated clinical trial VE of ~80% against RSV pneumonia with a good safety profile.⁴ Despite efficacy and availability, by the end of the last RSV season (March 2024), only 28.5% of eligible Coloradans ≥ 60 years had received an RSV vaccine.⁵ **We must increase immunization uptake to help protect vulnerable adults this RSV season.**

For young infants, CDC recommends maternal RSV vaccination with Abrysvo® at 32-36 weeks of pregnancy, or a dose of nirsevimab, a monoclonal antibody that provides 5 months of passive immunity against RSV, for infants during or entering their first RSV season. Nirsevimab is also recommended for some children 8-19 months at increased risk and entering their second RSV season. CDC viral surveillance networks during the 2023-2024 RSV season found that nirsevimab was 77% effective against RSV-associated ED visits, 89% against a medically attended RSV-associated respiratory illness, and 91-98% against RSV-associated hospitalization. Outside of the US, data from Spain and France across multiple studies showed 70-88% effectiveness for preventing RSV-associated hospitalization and 76-90% effectiveness for preventing RSV-associated ICU admission.⁶

Low uptake of the maternal Abrysvo® vaccine limited CDC's ability to study real world effectiveness last year. Initial clinical trial data, however, was promising with VE of 51% against any medically attended RSV lower respiratory tract illness (LRTI), 69% against severe medically attended RSV LRTI, and 57% against RSV-associated hospitalization in the 180 days after birth.⁷ Additionally, CDC Vaccine Safety Datalink (VSD) data from last year found similar rates of pre-term birth in vaccinated (4%) and unvaccinated (4.5%) pregnant persons, despite a pre-term birth signal during the initial clinical trial. Both maternal vaccination and nirsevimab are effective at preventing RSV disease in infants. Some considerations when choosing between them include cost, availability, and timing of response. Maternal vaccine provides protection at birth but relies on sufficient transplacental antibody transfer, which varies and can be affected by maternal disease or prematurity. Nirsevimab immunization is monoclonal while maternal vaccination is a polyclonal immune response which may be more resistant to significant RSV mutations as they occur.

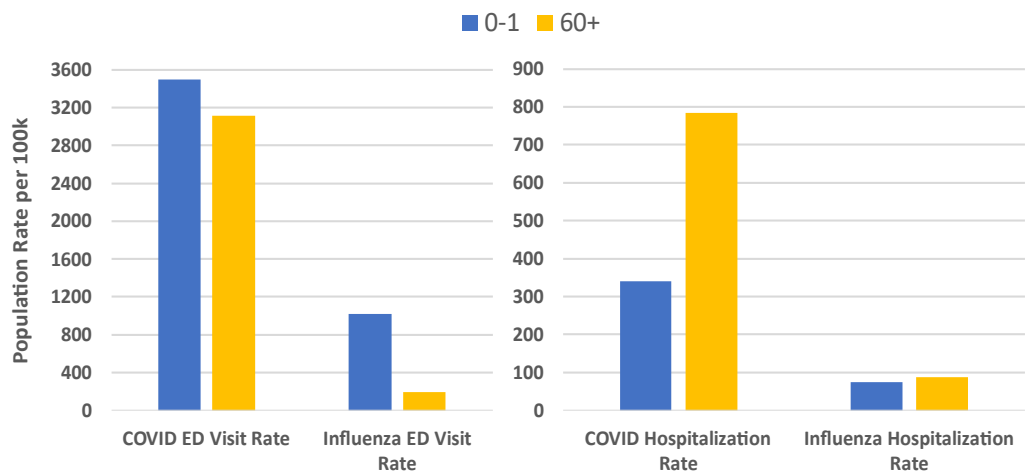
Despite demonstrated safety and efficacy, only 43% of eligible infants nationally (~31% in CO) received a nirsevimab dose during the 2023-24 season and only 18% of eligible pregnant persons nationally received the Abrysvo® vaccine. Taken together, only half (51%) of eligible US infants were protected from RSV with either maternal vaccination or nirsevimab.⁸

Given the increase of RSV cases in recent years and increased severity of infection, we must prioritize RSV immunization for vulnerable adults and young children alike in the 2024-2025 respiratory season and beyond.

For the first time in history, we have methods of immunizing infants and older adults against severe RSV illness and hospitalization. Very few Coloradans received them last winter.

COVID-19: COVID-19 (and associated illnesses like long COVID, multi-system inflammatory syndrome in adults and children) remained the most common VPD associated with hospitalization and ED visits in adults and the second most common among children in CO in 2023 (Appendix Table 1). Although COVID hospitalizations decreased across all age groups from 2022 to 2023, rates remain high among the most vulnerable populations: infants <1 year and adults >60 years of age (Figures 1-2; Appendix Table 1). Nearly 7% of all adults aged 80+ in CO had either a hospitalization or ED visit associated with COVID-19 in 2023. Despite the majority of COVID infections occurring in adults, infants are similarly vulnerable. 2023 hospitalization rates among infants <1 year were comparable to the 60+ demographic and infants *surpassed* older adults in rates of ED visits associated with COVID-19 (Figure 3). Despite similar rates of hospitalization and ED visits, as of December 2023 (last month of updated data), only 15% of CO children 0-4 years had received at least one COVID vaccine dose and only ~12% had completed the primary series. Comparatively, 99.9% of Coloradans ≥65 have received at least one dose and 99.9% completing the primary series.⁹ **In addition to broad population vaccination efforts, we must increase vaccine uptake among pregnant people and vulnerable infants who are still at higher risk of illness and hospitalization with COVID-19.**

Figure 3: 2023 COVID-19 and Influenza Hospitalization and ED Visit Rate by Age



In August of 2024, FDA approved and granted emergency use authorization (EUA) for updated Moderna and Pfizer COVID-19 monovalent mRNA vaccines for the 2024-2025 respiratory season that are targeted at the JN.1-lineage (specifically the KP.2 strain). These vaccines should be used as boosters for those previously vaccinated and as initial vaccines for those who are not. Those 65 years and older or immunocompromised of any age should receive a second dose of this vaccine six months after the first to be considered up to date.

Infants <1 year of age are hospitalized and treated in the ED with COVID-19 at similar rates to adults ≥60 but are vaccinated at a fraction of the rate.

Influenza: Influenza hospitalizations decreased from 2022 to 2023 (Figures 1-2). Despite this decrease, influenza led to more hospitalizations and ED visits than all other VPDs except COVID-19 among CO adults in 2023. For children, although influenza ranked 3rd among VPDs in hospitalizations and ED visits in 2023, the 2023-2024 flu season nationally recorded the highest national number of pediatric flu-related deaths in a non-pandemic flu season ever in the US (206 deaths). The groups at highest risk of ED visits and hospitalization in CO are infants <1 year and adults in the 60+ demographic. Hospitalization rates are similar between these two high risk groups and, as with COVID-19, infant ED visit rates outnumber those of 60+ year old adults (Figure 3). Despite uniquely higher risk in these age groups, vaccination rates in both groups have waned from 82.5% in 2019-2020 to 71% in 2023-2024 for children 6 months-4 years and 76.2% to 72.9% in adults ≥65 over the same time frame.¹⁰ This decline is in line with national trends for nearly all vaccines, although decreased uptake for other vaccines nationally (i.e. HPV or vaccines for school entry), have been smaller than those noted for the flu shot. **After an especially deadly flu season for children last year and waning vaccine rates in our most vulnerable populations, we must increase flu vaccine uptake in CO moving forward to ensure protection from severe illness and hospitalization for everyone.** The 2024/2025 flu shot is a trivalent vaccine that will protect against H1N1, H3N2, and a B/Victoria lineage virus and is recommended for everyone 6 months and older.

Pneumococcus: Infections with *Streptococcus pneumoniae* (pneumococcus), the most common bacterial cause of community acquired pneumonia, have been on the rise in the years following the pandemic. Hospitalizations from pneumococcal infection have nearly doubled in CO children 0-5 years and nearly tripled in adults 80+ years from 2021 to 2023 (Figures 1-2). This surge comes after a global decrease in pneumococcal incidence during the pandemic that was thought to be mediated by a decrease in circulating respiratory viruses (specifically RSV and flu). As RSV and flu rates have increased post-pandemic, so have rates of pneumococcus across similar time periods and age groups. For the 2023-2024 school year, pneumococcal protection among CO students pre-school to 12th grade remained strong with 94% fully immunized. Still, pneumococcal vaccine exemptions from 2021-2024 have increased by 0.6%, representing ~6600 CO children who were voluntarily unprotected against pneumococcal pneumonia, sepsis, and meningitis.⁶ Pneumococcal coverage estimates among Coloradans ≥65 as of 2022 are 77% which, while better than the national average, is still far below the CDC Healthy People 2020 target of 90%.

[CDC recommendations for pneumococcal vaccination](#) are based on age and risk assessment. The most updated pneumococcal vaccine (PCV21) was included in recommendations by ACIP to be utilized for certain high-risk groups in need of updated pneumococcal coverage; PCV21 covers serotypes that were responsible for 84% of invasive pneumococcal disease in adults from 2018-2022.

With pneumococcal cases rising, we must increase protection among children and older adults by increasing uptake of the most updated pneumococcal vaccines as well as immunizations that protect against circulating respiratory viruses (RSV, COVID-19, and influenza) that are likely pathogenically related to invasive pneumococcal infection.

Methods: VPD hospitalizations and ED visit data were sourced from the CO Hospital Association datasets with VPD-associated encounters identified using ICD-10 codes. Population data from the CO Department of Local Affairs were used to calculate hospitalization and ED visit rates. In 2023, there were 23,057 hospitalizations associated with a respiratory VPD in CO and >120,000 ED visits.

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Appendix and References

Table 1 shows hospitalizations and ED visits associated with respiratory VPDs in Colorado in 2023 [Colorado Hospital Association data]. Diagnoses identified using ICD-10 codes. Population estimates from the Colorado Department of Local Affairs State Demography Office are used to calculate incidence rates.

VPD by age group	Hospitalized Cases	Rate per 100,000	ED Cases	Rate per 100,000
COVID				
0-1	426	340.3	4378	3496.9
2-5	160	62.9	1374	540.6
6-19	355	34.5	4435	431.6
20-39	3389	196.9	20686	1201.7
40-59	2762	190.3	25315	1743.9
60-79	6429	578.2	31839	2863.4
80+	3843	1933.6	8940	4498.1
Influenza				
0-1	92	73.5	1279	1021.6
2-5	99	38.9	2478	974.9
6-19	159	15.5	5103	496.6
20-39	286	16.6	4469	259.6
40-59	420	28.9	2963	204.1
60-79	801	72.0	2012	180.9
80+	352	177.1	475	239.0
Pneumococcus				
0-1	24	19.2	20	16.0
2-5	39	15.3	36	14.2
6-19	30	2.9	15	1.5
20-39	168	9.8	16	0.9
40-59	265	18.3	51	3.5
60-79	381	34.3	133	12.0
80+	104	52.3	23	11.6
RSV				
0-1	1265	1010.4	2484	1984.1
2-5	475	186.9	1439	566.1
6-19	70	6.8	341	33.2
20-39	50	2.9	369	21.4
40-59	124	8.5	376	25.9
60-79	310	27.9	569	51.2
80+	179	90.1	221	111.2

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