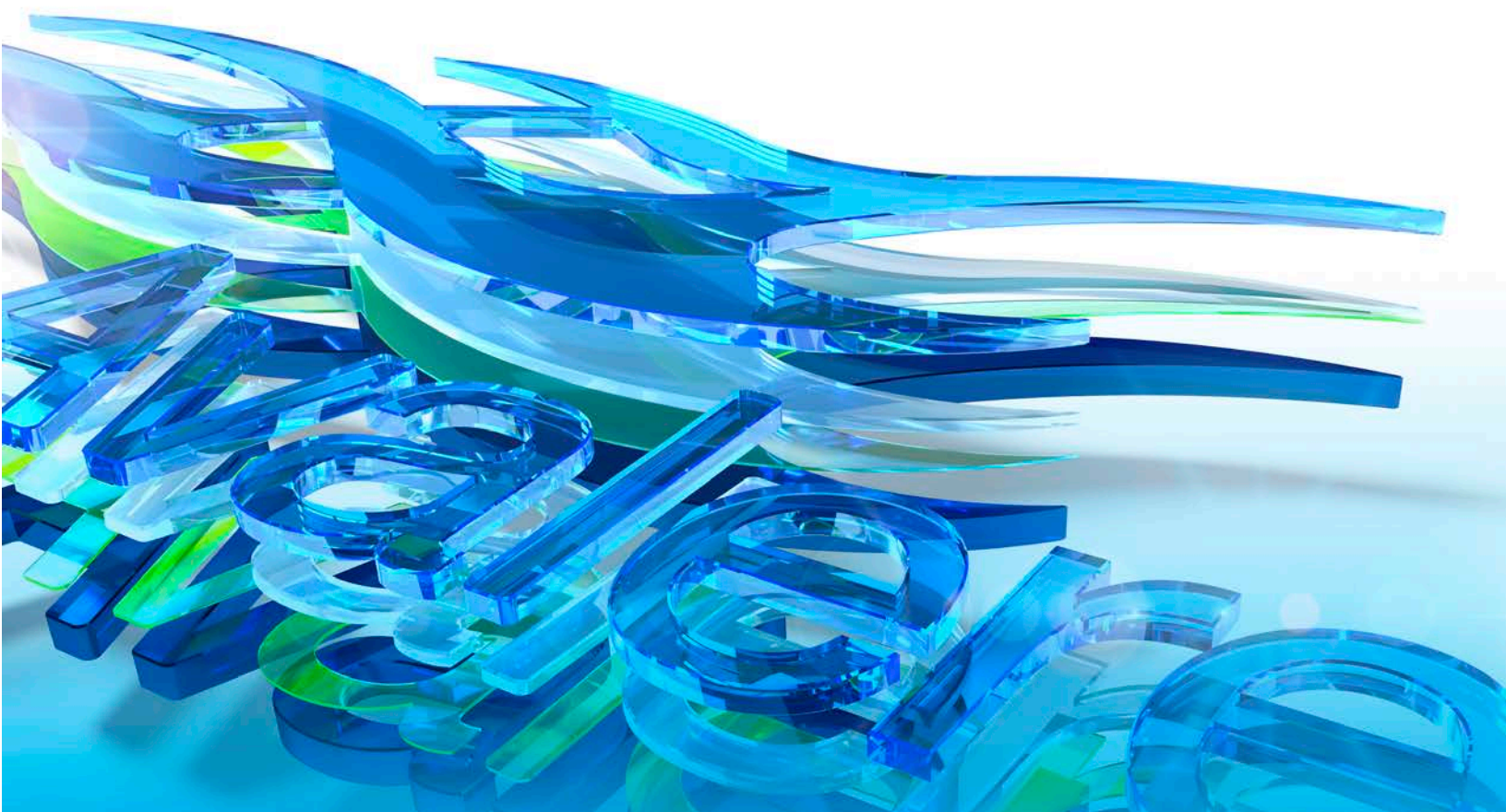


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# The COVID-19 Pandemic: Impact on US Adolescent and Adult Vaccine Utilization Across Markets



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## Executive Summary

Globally and in the US, widespread vaccination has demonstrated medical, economic, and social value to both individuals and public health<sup>1</sup> and has contributed to reductions in morbidity and mortality of certain diseases.

Over the past 20 years in the US, estimates suggest that childhood vaccinations have prevented approximately 322 million illnesses, 21 million hospitalizations and averted 732,000 deaths, as well as save over \$295 billion in direct costs and \$1.38 trillion in total societal costs.<sup>2</sup> Adolescent and adult vaccination rates have not achieved the same level of success and remain below national targets,<sup>3</sup> despite long standing recommendations from the Centers for Disease Control and Prevention (CDC)'s Advisory Committee on Immunization Practices (ACIP).

Prior to the emergence of the COVID-19 pandemic, vaccination coverage had begun to stagnate globally;<sup>4</sup> COVID-19 pandemic response and related disruption to healthcare delivery has potentially exacerbated this issue. In the US, over 80% of surveyed payers noted decreases in immunizations, as well as screenings for cancer, hypertension, and diabetes.<sup>5</sup>

To better understand the impact of the COVID-19 pandemic on adolescent and adult vaccination in the US, Avalere conducted an analysis of 2019 and 2020 claims submissions. Across commercial, Medicaid managed care, Medicare Advantage (MA), and Medicare fee-for-service (FFS), vaccination services for adolescent and adults substantially decreased at the beginning of the pandemic and have not rebounded since.

### Key Takeaways

While the impact of the COVID-19 pandemic on childhood immunization has been documented, few analyses have quantified the impact on adolescent and adult immunizations.

Aggregate claims for all vaccine products for adults and adolescents declined between 41%-53% across markets from March-August 2019 to March-August 2020.

While there is not a direct correlation between the number of new COVID-19 cases and reductions in claims, claims declined and stagnated across all markets following the Public Health Emergency (PHE).

Claim trends for influenza vaccines indicate that more beneficiaries are being vaccinated earlier in the 2020-21 season than 2019-20 season, which may reflect multi-stakeholder influenza-related messaging efforts and could inform public health approaches to other routine vaccines.

1 Rodrigues, C., & Plotkin, S. A. (2020). Impact of Vaccines; Health, Economic and Social Perspectives. *Frontiers in microbiology*, 11, 1526. <https://doi.org/10.3389/fmicb.2020.01526>

2 Whitney, C., Zhou, F., Singleton, J., Schuchat, A. "Benefits from Immunization During the Vaccines for Children Program Era — United States, 1994–2013." *April 25, 2014.* <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6316a4.htm>.

3 "Immunization and Infectious Diseases." ODPHP. <https://www.healthypeople.gov/2020/topics-objectives/topic/immunization-and-infectious-diseases/objectives>

4 Anna N. Chard, Marta Gacic-Dobo,; Mamadou S. Diallo, Samir V. Sodha,; Aaron S. Wallace. "Routine Vaccination Coverage- Worldwide, 2019". *CDC MMWR Vol. 69 (November 2020).* <https://www.cdc.gov/mmwr/volumes/69/wr/pdfs/mm6945a7-H.pdf>

5 Kristin F. "Payer Experiences with COVID-19," November 20, 2020. <https://avalere.com/insights/payer-experiences-with-covid-19>

## Introduction

On January 31, 2020, the US Department of Health and Human Services (HHS) issued a Public Health Emergency (PHE) following the first confirmed cases of COVID-19 in the US. A National Emergency was later declared by the President on March 13. Early in the pandemic, the CDC began issuing guidance to reduce COVID-19 transmission in healthcare settings.<sup>6</sup> Measures to reduce exposure and transmission, including social-distancing protocols and expansion of telehealth, have broadly impacted patient access to essential and routine healthcare services. Healthcare practices have adapted by increasing utilization of telehealth services which, along with patient hesitancy to enter healthcare settings (e.g., physician offices, retail drug stores, and pharmacies) for non-essential in-person visits, ultimately reduced in-person visits, which serve as opportunities for screenings, diagnostics, treatments, and vaccine administration, by up to 69% in early April.<sup>7</sup>

The COVID-19 pandemic has had a noticeable impact on healthcare overall. The economic downturn has resulted in over 50 million people receiving unemployment for at least one week since February 2020,<sup>8</sup> following unprecedented business layoffs and closures, shifting some employees out of employer-sponsored insurance and driving rates of uninsured, underinsured, and Medicaid enrolled persons, which could significantly alter access to services and products, including telehealth and vaccines. In October 2020, the Centers for Medicare and Medicaid Services (CMS) reported that 21% of Medicare beneficiaries have forgone care in 2020 due to the COVID-19 pandemic.<sup>9</sup>

Reports from CDC,<sup>10</sup> Michigan,<sup>11</sup> New York City,<sup>12</sup> and Miami-Dade County<sup>13</sup> demonstrated significant declines in childhood vaccination claims and rates; CDC estimates that 9 million doses of public sector childhood vaccines could be missed due to the pandemic.<sup>14</sup> While the impact of the COVID-19 pandemic on childhood immunization has been documented, few analyses have systematically quantified the impact on adolescent and adult immunizations. To address this gap, Avalere compared adolescent and adult vaccine billing patterns in commercial, Medicaid managed care,\* Medicare FFS, and MA markets from January-August 2019 to vaccine billing patterns during the same months in 2020 (e.g., March 2019 to March 2020), represented as a percent change between years. For the purposes of this analysis, adolescents are defined as ages 7-18 to capture catch-up vaccination of the routine childhood schedule and early vaccination against Tdap and HPV, and adults are defined as  $\geq 19$  years of age.

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\*Due to variability across states in billing requirements for vaccines provided through the Vaccines for Children program, this analysis may not fully capture adolescent vaccine utilization in the Managed Medicaid market.

6 CDC. "Coronavirus Disease 2019 (COVID-19)." Centers for Disease Control and Prevention, February 11, 2020. <https://www.cdc.gov/coronavirus/2019-ncov/hcp/guidance-hcf.html>.

7 "The Impact of the COVID-19 Pandemic on Outpatient Care: Visits Return to Prepandemic Levels, but Not for All Providers and Patients." October 15, 2020. <https://doi.org/10.26099/41xy-9m57>.

8 Health Management Associates. "Estimated Health Insurance Impact of COVID-19 Economic Downturn." September, 2020. <https://www.healthmanagement.com/wp-content/uploads/COVID-19-Economic-Impact-on-Health-Insurance-September-2020.pdf>

9 "Press Release CMS Survey Data Illustrates Impact of COVID-19 on Medicare Beneficiaries' Daily Life and Experiences." CMS, October 16, 2020. <https://www.cms.gov/newsroom/press-releases/cms-survey-data-illustrates-impact-covid-19-medicare-beneficiaries-daily-life-and-experiences>.

10 "Effects of the COVID-19 Pandemic on Routine Pediatric Vaccine Ordering and Administration - United States, 2020." Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, May 14, 2020. <https://www.cdc.gov/mmwr/volumes/69/wr/mm6919e2.htm>.

11 Bramer, Cristi A. "Decline in Child Vaccination Coverage During the COVID-19 Pandemic — Michigan Care Improvement Registry, May 2016–May 2020." MMWR. Morbidity and Mortality Weekly Report 69 (2020). <https://doi.org/10.15585/mmwr.mm6920e1>.

12 Shapiro, Eliza. "Childhood Vaccinations Plummet 63%, a New Hurdle for NYC Schools." The New York Times. The New York Times, May 20, 2020.

13 Lerner, Haley. "Recipe for Disaster: COVID-19 Leads to Kids' Vaccine Rates Falling, Risking Other Outbreaks." Miami Herald, July 10, 2020.

14 "Effects of the COVID-19 Pandemic on Routine Pediatric Vaccine Ordering and Administration - United States, 2020." Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, May 14, 2020. <https://www.cdc.gov/mmwr/volumes/69/wr/mm6919e2.htm>.

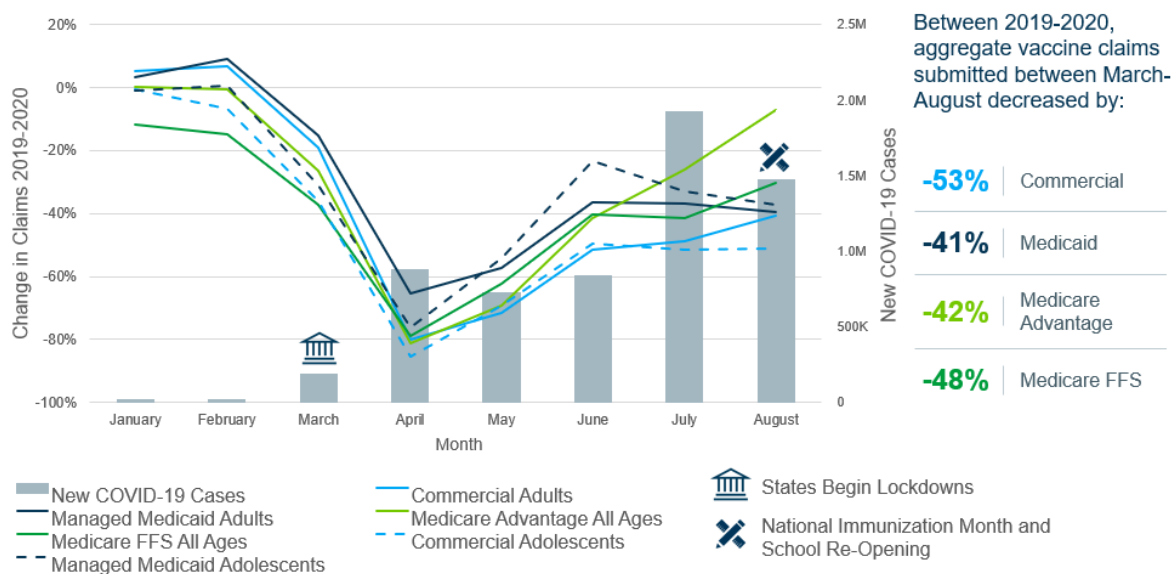
# Effects of the COVID-19 Pandemic on Adolescent and Adult Vaccination

The analysis found significant changes in vaccine billing patterns between the same months in 2019 and 2020 across all analyzed markets and vaccines (Box 1). Following 66%-86% year-over-year declines in April, the first full month of population-level pandemic response, the difference between rates in 2019 and 2020 for all ages started to rebound in May as states began to lift stay-at-home orders following initial restrictions (Figure 1). However, aggregate claims submissions for all vaccines from March to August 2020 remained lower than the same months in 2019 across markets.

## Box 1. Vaccines included in the analysis:

- Influenza
- Haemophilus influenzae (Hib)
- Hepatitis A
- Hepatitis B
- Human Papillomavirus (HPV)
- Meningococcal ACWY
- Meningococcal B
- Measles, Mumps, and Rubella (MMR)
- Pneumococcal
- Tetanus, Diphtheria, and Pertussis (Tdap)
- Varicella Zoster (Chickenpox)
- Herpes Zoster (Shingles)

**Figure 1: Aggregate Changes in Claims for All Vaccine Products Across Markets\* Adolescents and Adults, January-August 2019 vs January-August 2020**

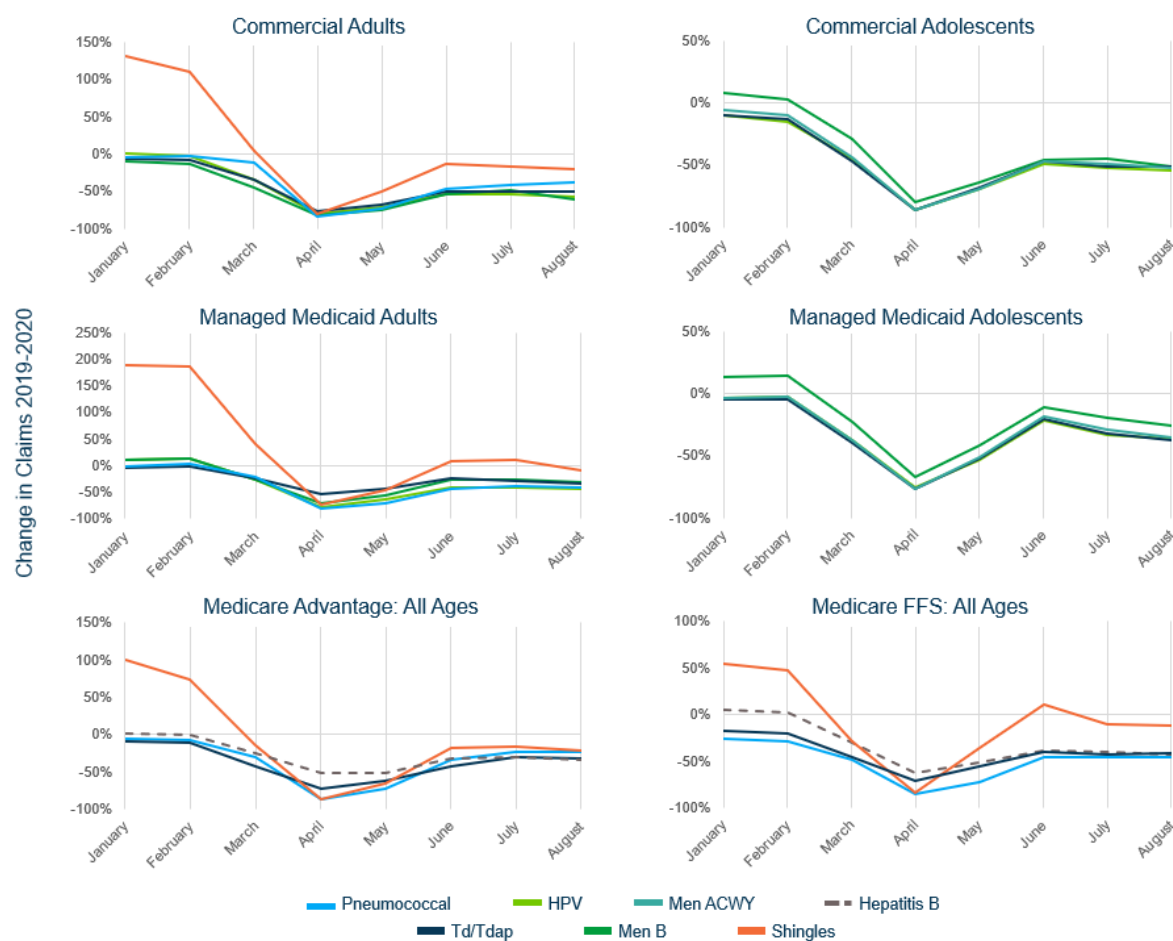


\*The analysis used two different data sources, reflecting different claim types and sample sizes across payer markets. In addition, while both data sources are nationally representative, there are likely different geographies reflected in the analysis of each market. Further, cross-payer population shifts between 2019 and 2020 due to insurance coverage changes were not controlled for; changes in vaccine utilization may be driven by underlying volume of patients enrolled in a given plan/program, in addition to access and clinical practice patterns.

There is not a direct correlation between the number of new COVID-19 cases<sup>15</sup> and reductions in claims for vaccines. However, claims did stagnate in the June to July time period in most markets, where July had the greatest number of new COVID-19 cases at that point in the pandemic. Additionally, adolescents in Medicaid managed care plans tended to experience fewer decreases in claims for vaccination than adults between April and August.

Claims submissions for most vaccines in Medicaid managed care, commercial, and Medicare markets remained lower in 2020 than 2019. For most vaccines recommended by CDC’s ACIP on an age or shared clinical decision-making (SCDM) basis, claims billed in 2020 decreased early in the COVID-19 pandemic and remained low when compared to 2019 (Figure 2).

**Figure 2: Percent Change in Claims for Vaccines with Age or SCDM ACIP Recommendations\* January-August 2019 vs January-August 2020**

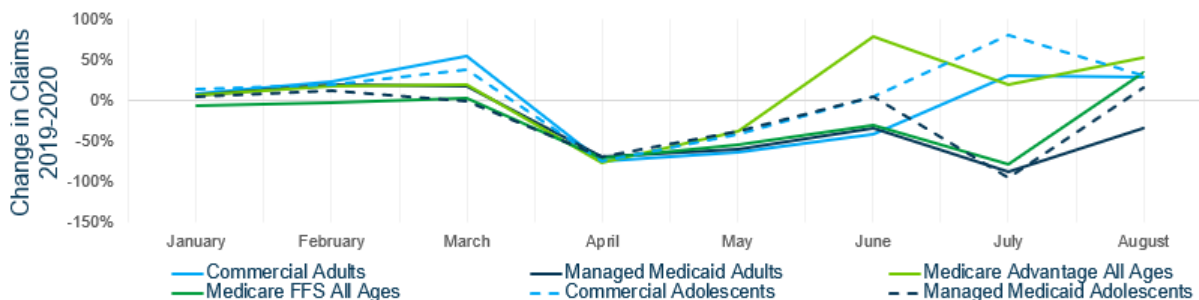


In most markets, claims submissions for few vaccines exceeded 2019 submissions during one or more months in 2020, particularly between March-August. For instance, shingles claims were 8%-

\* Vaccines with risk-based recommendations or limited applicability to adolescents and adults (e.g. chickenpox, Hib, hepatitis A, and MMR) are included in the aggregate estimate in Figure 1 but excluded from Figure 2. Although hepatitis B has a risk-based recommendation, it is displayed in Figure 2 for Medicare plans, which cover hepatitis B for beneficiaries at increased risk. 15 CDC. 2020. "COVID-19 Cases, Deaths, and Trends in the US | CDC COVID Data Tracker." Centers for Disease Control and Prevention. March 28, 2020. <https://covid.cdc.gov/covid-data-tracker>.

11% higher for Medicaid managed care adults in June and July 2020 compared to 2019, and 11% higher in June 2020 among Medicare FFS, following declines in April-May. Claims for influenza vaccines increased in most markets during the first quarter of 2020, as well as in August, were higher in 2020 than in 2019 in commercial and Medicare plans and among adolescents in Medicaid managed care (Figure 3). However, 12% fewer claims were billed for adults covered under Medicaid managed care during the same timeframe.

**Figure 3: Percent Change in Claims for Influenza Vaccines\***  
*January-August 2019 vs January-August 2020*



\*Due to the seasonality of influenza, influenza vaccine claims in May-July are based on a smaller sample size than other months.

## Discussion and Conclusion

This analysis found significant year-over-year decreases in vaccine claims for adolescents and adults in Medicare, Medicaid managed care, and commercial markets over the March through August 2020 time period, during which reported COVID-19 cases increased in the US. While there was variation in the degree of decrease, changes in claims trended similarly across vaccines, markets, and ages. The largest declines in vaccine claims submissions occurred in April 2020 compared to April 2019 following the PHE declaration, and although claims in the following months appear to rebound, most submissions remained below 2019 submissions.

CDC, states, and other vaccine stakeholders developed messaging and policy approaches (e.g., state-level school entry mandates<sup>16</sup>) in 2020 to reduce influenza burden and preserve healthcare resources and capacity for COVID-19 response efforts.<sup>17</sup> The increases in influenza vaccine billing from 2019 to 2020 demonstrated in this analysis, and within CDC data,<sup>18</sup> may reflect the multi-stakeholder influenza-related messaging and could inform public health approaches to increasing other routine vaccine rebounds.

CDC guidance recommends that persons across the life-course continue routine vaccination during the COVID-19 pandemic to reduce future vaccine-preventable disease (VPD) outbreaks

<sup>16</sup> "Flu Vaccine Now Required for All Massachusetts School Students Enrolled in Child Care, Pre-School, K-12, and Post-Secondary Institutions." Mass.gov, August 19, 2020. <https://www.mass.gov/news/flu-vaccine-now-required-for-all-massachusetts-school-students-enrolled-in-child-care-pre>.

<sup>17</sup> "Communicating the Benefits of Seasonal Influenza Vaccine during COVID-19." Immunize.org. Immunization Action Coalition, 2020. <https://www.immunize.org/catg.d/p31115.pdf>.

<sup>18</sup> "Influenza Vaccinations Administered to Adults in Pharmacies and Physician Medical Offices, United States | FluVaxView | Seasonal Influenza (Flu) | CDC," January 13, 2021. <https://www.cdc.gov/flu/fluview/dashboard/vaccination-administered.html>.

and overall strain on the healthcare system.<sup>19</sup> Reemergence of previously controlled VPDs in unvaccinated populations could potentially increase disease burden and patient volume, particularly should low recognition of the symptoms of uncommon or eliminated VPDs (e.g., measles<sup>20</sup>) delay diagnosis and disease containment. CDC's guidance further encourages providers to administer any necessary or missed vaccines to patients during face-to-face interactions, including primary care and pharmacy visits, while maintaining proper social distancing and COVID-19 safety protocols; CDC currently recommends administration of routine vaccines at least 14 days before or after COVID-19 vaccination.<sup>21</sup>

Assessing the impact of the COVID-19 pandemic on utilization of healthcare services, including vaccination across the life-course, can support immunization stakeholders and policymakers in developing and expanding vaccination policy, outreach, and support programs. Data, including the analysis and findings reported here, can be used to inform collective efforts articulated in Healthy People 2030 and the 2021-2025 Vaccines National Strategic Plan.<sup>22</sup> Additional research is needed to further understand the impact of the pandemic on public health and adolescent and adult vaccination, including shifts in sites of administration and to address potential disparities in immunization rates given the disproportionate impact of COVID-19 and VPDs on racial and ethnic minorities and lower income households.

## Methodology

Avalere analyzed changes in administration of ACIP-recommended adult ( $\geq 19$  years of age) and adolescent (7-18 years of age) vaccines using pre-adjudicated medical benefit Medicare fee-for-service (FFS) claims from a provider clearinghouse dataset maintained by Inovalon, Avalere's parent company, as well the Inovalon MORE<sup>2</sup> Registry®, a large scale, real-world multi-payer dataset consisting of medical, pharmacy, and lab claims as well as clinical data on more than 324 million de-identified patients. The dataset contains claims across commercial markets (group, individual and Exchanges), Medicaid managed care, and Medicare Advantage (MA).

Specifically, Avalere compared billing for vaccine products, defined by Healthcare Common Procedure Coding System (HCPCS) codes, from 2019 to 2020 to illustrate the potential impact of the COVID-19 pandemic on vaccine administration, represented as a percent change between years. Avalere adjusted the analysis to account for any changes in claim sources within the data by employing a "same store" analysis that requires same providers and/or health plans to have submitted claims in both 2019 and 2020 to ensure that reported vaccine utilization changes are not driven by the addition or subtraction of claim sources over time. While true vaccine coverage rates for these vaccines cannot be calculated with claims data because of the lack of long-term longitudinal follow-up data over adulthood, this analysis estimates the impact of COVID-19 on the volume of claims submitted by payers.

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19 "Interim Guidance for Routine and Influenza Immunization Services During the COVID-19 Pandemic." Centers for Disease Control and Prevention. October 20, 2020. <https://www.cdc.gov/vaccines/pandemic-guidance/index.html>.

20 McGuinness, Catherine Balderston, Jerrold Hill, Eileen Fonseca, Gregory Hess, William Hitchcock, and Girishanthy Krishnarajah. "The Disease Burden of Pertussis in Adults 50 Years Old and Older in the United States: A Retrospective Study." *BMC Infectious Diseases* 13, no. 1 (2013). <https://doi.org/10.1186/1471-2334-13-32>. 462721

21 "Interim Clinical Considerations for Use of Pfizer-BioNTech COVID-19 Vaccine." Centers for Disease Control and Prevention. January 6, 2021. <https://www.cdc.gov/vaccines/covid-19/info-by-product/clinical-considerations.html>.

22 HHS. 2021. Vaccines National Strategic Plan. <https://www.hhs.gov/sites/default/files/HHS-Vaccines-Report.pdf>



## Limitations

The vaccine utilization analysis used two different data sources, reflecting different claim types and different sample sizes across payer markets. For Medicare FFS, Avalere leveraged a clearinghouse dataset that captures pre-adjudicated claims submitted by institutional and non-institutional providers for payment and represents 5-7% of Medicare FFS claims volume nationally. Not all of the submitted claims volume result in full adjudication and reimbursement from Medicare FFS. For other markets, Avalere used the Inovalon MORE<sup>2</sup> Registry®, which includes roughly a 42% sample of the national commercially insured population, a 69% sample of the national Medicaid managed care population, and a 25% sample of the national Medicare Advantage population. Due to variability across states in billing requirements for vaccines provided through the Vaccines for Children program, this analysis may not fully capture adolescent vaccine utilization in the Managed Medicaid market.

While both data sources are nationally representative, there are likely different geographies reflected in the analysis of each market. Further, Avalere did not control for the cross-payer population shifts between 2019 and 2020 due to the insurance coverage changes; while payers captured in the analysis were the same between 2019 and 2020, changes in the vaccine utilization may be driven by underlying volume of patients enrolled in a given plan/program, in addition to access and clinical practice patterns.

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Avalere is a vibrant community of innovative thinkers dedicated to solving the challenges of the healthcare system. We deliver a comprehensive perspective, compelling substance, and creative solutions to help you make better business decisions. As an Inovalon company, we prize insights and strategies driven by robust data to achieve meaningful results. For more information, please contact [info@avalere.com](mailto:info@avalere.com). You can also visit us at [avalere.com](https://avalere.com).

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