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MEDICAID

COVID-19 Vaccination Data Access and Strategies Used to Improve Immunization Rates

Why GAO Did This Study

Given the importance of COVID-19 vaccinations in preventing severe outcomes, such as hospitalizations and death, ensuring Medicaid beneficiaries receive the vaccine is important. However, state Medicaid programs did not always receive information on the vaccination status of beneficiaries directly from providers during the public health emergency. This was in part because vaccines were purchased by the federal government rather than by insurers like Medicaid.

GAO was asked to examine Medicaid programs' access to and use of data from immunization information systems to improve COVID-19 vaccination rates among beneficiaries, and factors contributing to data completeness. This report describes (1) the extent to which selected states' Medicaid programs obtained patient-level COVID-19 vaccination data, and any factors affecting data availability and quality; and (2) how that data helped inform selected states' strategies to improve COVID-19 vaccination rates, and information on the effectiveness of such strategies.

GAO reviewed relevant federal laws, interviewed federal agency officials, as well as reviewed information and interviewed officials from state public health departments and Medicaid programs in six states. The states were selected based on characteristics of their Medicaid and immunization programs, among other various factors. GAO also interviewed 10 stakeholder organizations, including those representing immunization managers and Medicaid directors.

View [GAO-24-106526](#). For more information, contact Catina B. Latham at (202) 512-7114 or lathamc@gao.gov.

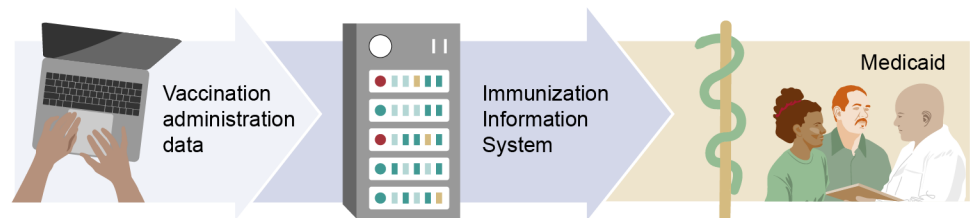
MEDICAID

COVID-19 Vaccination Data Access and Strategies Used to Improve Immunization Rates

What GAO Found

Six selected state Medicaid programs GAO reviewed varied in their ability to obtain data on beneficiaries with COVID-19 vaccinations from state immunization information systems during the COVID-19 public health emergency from 2020-2023. During the emergency, these systems—maintained by state public health departments—were the primary source of such data. This was because providers administering COVID-19 vaccinations were required to report to them. Specifically, state policies—which govern provider reporting requirements and data sharing—in effect prior to the emergency enabled Medicaid programs in four selected states to obtain patient-level vaccination data from state immunization information systems. In contrast, state policies in effect prior to the emergency in two selected states either did not specify or did not permit such data exchange.

COVID-19 Vaccination Data Collection and Transmission to Certain State Medicaid Programs



Source: GAO analysis of the Centers for Disease Control and Prevention documentation; GAO (illustrations). | GAO-24-106526

State officials and stakeholders described interoperability gaps between state immunization and Medicaid systems, the volume of vaccination data collected, and other factors as affecting the availability and quality of COVID-19 vaccination data collected by immunization information systems during the COVID-19 public health emergency. State officials described how some factors resulted from the public health emergency. They also noted solutions they implemented as the emergency progressed, such as using a temporary storage system for the increased volume of data. State and federal officials also identified state policies as continuing to be important drivers of vaccination data collection and data sharing with Medicaid programs after the public health emergency.

In the four selected states with access to patient-level data, GAO found that Medicaid programs used the data to implement two types of strategies to increase COVID-19 vaccination rates: incentives and targeted outreach. For example, one state awarded incentive payments to its 25 managed care organizations based on performance across 10 vaccination measures. Additionally, Medicaid and managed care officials in five of the six states described using data from other sources, such as Medicaid claims, to increase COVID-19 vaccination rates among high-risk and vulnerable populations. For example, Medicaid officials in these states told us Medicaid claims data helped them to identify and focus efforts on beneficiaries most at risk of adverse outcomes from COVID-19. Although states reported using various strategies to increase vaccinations, the effectiveness of their specific strategies is unclear due to the nature of the COVID-19 public health emergency. According to Medicaid officials, it is difficult to attribute changes in Medicaid beneficiaries' vaccination rates to a specific strategy, because the emergency required multiple concurrent strategies.

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Abbreviations

CDC	Centers for Disease Control and Prevention
CMS	Centers for Medicare & Medicaid Services
HHS	Department of Health and Human Services

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April 18, 2024

The Honorable Ron Wyden
Chair
Committee on Finance
United States Senate

The Honorable Robert P. Casey, Jr.
Chairman
Special Committee on Aging
United States Senate

Vaccination efforts were a critical and complex part of the response to the COVID-19 public health emergency. According to the Centers for Disease Control and Prevention (CDC), an estimated 81 percent of the U.S. population, or about 270 million people, received at least one dose of the COVID-19 vaccination as of May 11, 2023.¹ Yet, the public health emergency also highlighted disparities in vaccination rates among certain populations, including low-income and medically needy populations with health coverage provided by Medicaid, according to some sources. For example, a December 2021 publication noted that estimated COVID-19 vaccination rates for Medicaid beneficiaries in some states averaged 15 percent to 20 percent lower than estimates for people enrolled with other

¹On January 31, 2020, the Secretary of Health and Human Services declared a public health emergency for the United States, retroactive to January 27, 2020, and ended the public health emergency on May 11, 2023. The data represents CDC's reporting of COVID-19 vaccine administration for at least one dose of COVID-19 vaccine as of May 11, 2023. The CDC is an agency within the Department of Health and Human Services.

forms of health coverage.² Medicaid beneficiaries may have complex needs that could lead to poorer health outcomes due to COVID-19.³

Given the importance of COVID-19 vaccinations in preventing severe outcomes, such as hospitalizations and deaths, ensuring that Medicaid beneficiaries receive the vaccine is important. However, state Medicaid programs did not always have information on the vaccination status of their beneficiaries during the COVID-19 public health emergency. Health insurance claims did not fully capture information on COVID-19 vaccinations administered.⁴ This was, in part, because COVID-19 vaccinations were purchased and distributed by the federal government free of charge during the COVID-19 public health emergency.⁵

When vaccinations for COVID-19 became available in December 2020, the federal government required providers administering them to report relevant information, such as the individuals vaccinated, to immunization

²See Rebecca Cooper et al., “Strategies to Increase COVID-19 Vaccination Rates in Medicaid Enrollees: Considerations for State Leaders,” The National Academy for State Health Policy and Duke University, Margolis Center for Health Policy (2021). See also Sandhya Raman, “Medicaid Beneficiaries Less Likely to Get COVID-19 Shots,” *Roll Call*, (June 30, 2021); and Phil Galewitz, “Medicaid Vaccination Rates Founder as States Struggle to Immunize Their Poorest Residents,” *PBS* (Sept. 2, 2021).

³For example, according to a December 2022 analysis by the Medicaid and CHIP Payment and Access Commission, Medicaid beneficiaries are more likely to report having certain conditions, such as asthma, compared to individuals with private insurance (18.6 percent and 13.8 percent, respectively), and having fair or poor health (24.1 percent compared to 7.3 percent, respectively). See the Medicaid and CHIP Payment and Access Commission, “MACStats: Medicaid and CHIP Data Book” (Washington, D.C.: December 2022).

⁴For example, using data as of June 4, 2021, the Centers for Medicare & Medicaid Services (CMS) estimated the agency had a claim for about half of vaccinated Medicare beneficiaries, noting that was because many providers had administered vaccinations free of charge and did not submit claims to bill for that service. See Centers for Medicare & Medicaid Services, “Assessing the Completeness Of Medicare Claims Data For Measuring COVID-19 Vaccine Administration,” accessed January 11, 2024, <https://www.cms.gov/data-research/cms-covid-19-data-products/medicare-covid-19-vaccin-e-analysis>. See also Karen L. Schneider et al., “Use of Immunization Information Systems in Ascertainment of COVID-19 Vaccinations for Claims-Based Vaccine Safety and Effectiveness Studies,” *JAMA Network Open*, vol. 6, no. 5 (2023).

⁵CDC’s COVID-19 Vaccination Program ended as of October 3, 2023. However, most Medicaid beneficiaries continue to be eligible for the COVID-19 vaccination free of cost sharing. For example, Medicaid programs are required to cover and pay for COVID-19 vaccinations through September 30, 2024. Additionally, as of October 1, 2023, Medicaid programs are required to cover and pay for all vaccinations recommended by the Advisory Committee on Immunization Practices for most adult Medicaid beneficiaries, which includes the COVID-19 vaccination.

information systems. As a result, immunization information systems became a primary source of data for tracking COVID-19 vaccination rates and vaccination rate disparities—including among Medicaid beneficiaries—and for directing resources to help increase vaccination rates.⁶ These immunization information systems are primarily operated by states, with support from CDC, and their capabilities and data vary for a variety of reasons, including differences in state laws.⁷ Prior to the COVID-19 public health emergency, immunization information systems helped states and other entities track vaccination coverage in order to identify populations at risk of acquiring vaccine-preventable diseases, such as measles or influenza, and to respond to outbreaks. The scale of the COVID-19 vaccination effort highlighted existing challenges with immunization information systems, as well as questions about the completeness of the COVID-19 vaccination data they received.⁸

You asked us to examine Medicaid programs' access to and use of data from immunization information systems to improve COVID-19 vaccination rates among beneficiaries, and factors contributing to immunization data completeness. In this report we describe

1. the extent to which selected states' Medicaid programs obtained COVID-19 vaccination data through immunization information systems, and any factors that affected data availability and quality; and
2. how data from immunization information systems helped inform strategies by selected states' Medicaid programs to improve COVID-19 vaccination rates, and information on the effectiveness of such strategies.

To describe the extent to which selected states' Medicaid programs obtained COVID-19 vaccination data through immunization information systems, and which factors affected data availability and quality, we

⁶As of October 6, 2023, when COVID-19 vaccinations became available for purchase on the commercial market, CDC could no longer require providers to report COVID-19 vaccination administration information to immunization information systems.

⁷For example, according to the National Council of State Legislatures, 25 of 60 state and other jurisdictions (e.g., territories that submitted their policies to CDC) require that all providers report adult immunizations, and 28 jurisdictions have a reporting requirement in place that may vary based on vaccine provider, age of patient, type of vaccine or specific circumstance, such as a declared public health emergency.

⁸See Congressional Research Service, *Immunization Information System: Overview and Current Issues* (Washington, D.C.: Feb. 1, 2022).

reviewed relevant laws, regulations, and guidance. This included CDC guidance on immunization information systems and requirements for reporting COVID-19 vaccination data. We interviewed officials from CDC and the Centers for Medicare & Medicaid Services (CMS) regarding efforts supporting COVID-19 vaccination data sharing between Medicaid and public health entities, as well as vaccination data quality.⁹ We also reviewed documentation and conducted interviews with Medicaid and public health officials in a non-generalizable sample of six states (California, Connecticut, Georgia, Idaho, Maryland, and Michigan).

We selected the non-generalizable sample of six states based on variation across several criteria, including

- the share of adults residing in the state captured in the immunization information system as of December 2020 and 2021, as a proxy for data availability, based on CDC’s Immunization Information System Annual Report;
- state per-capita COVID-19 vaccination rates showing the proportion of individuals who had completed a vaccination series as of March 29, 2023, from CDC’s COVID-19 Data Tracker; and
- whether state immunization information systems shared data with their Medicaid programs, as reported by the Association of Immunization Managers’ 2019 Annual Survey.¹⁰

In selecting states, we also considered variation in different Medicaid program characteristics that could affect state Medicaid programs’ experiences using data. These characteristics included the state’s service delivery model (i.e., managed care or fee-for-service), Medicaid enrollment size, racial and ethnic distribution of the non-elderly Medicaid population, and Medicaid expansion status.¹¹

⁹CMS is an agency within the Department of Health and Human Services.

¹⁰The Association of Immunization Managers’ survey captures responses from state immunization program managers on “whether the immunization information system and Medicaid share data and/or Medicaid uses the immunization information system for reporting,” but does not describe the type or frequency of sharing that occurs.

¹¹States may provide Medicaid services under a managed care model, a fee-for-service model, or both. Under managed care, states pay managed care plans capitation payments, which are fixed periodic payments typically paid on a per enrolled Medicaid beneficiary basis. In turn, the managed care plans are responsible for paying providers for the services delivered to enrolled beneficiaries. Under fee-for-service, states make payments directly to providers for services provided.

In each of the six states, we reviewed relevant state laws and data use agreements, and interviewed state public health and Medicaid officials to understand the collection and sharing of immunization data before, during, and after the COVID-19 public health emergency. We also interviewed state public health and Medicaid officials regarding factors affecting immunization data collection, data sharing, and data quality. We also interviewed the health information exchange organization in Maryland, as it played a role in the exchange of immunization data between the state's immunization information system and its Medicaid program.¹² In addition, we interviewed officials at the Department of Health and Human Services' (HHS) Office of the National Coordinator for Health Information Technology to understand federal efforts related to data sharing, such as interoperability between immunization information systems and other health systems. We also interviewed officials from a non-generalizable sample of 10 stakeholder organizations, and reviewed reports, surveys, and fact sheets they developed.¹³

To describe how data from immunization information systems helped inform strategies selected states' Medicaid programs used to improve COVID-19 vaccination rates, and information on the effectiveness of such strategies, we reviewed relevant federal guidance and state policies. For example, we reviewed CMS guidance describing flexibilities available to state Medicaid programs to respond to the COVID-19 public health emergency and strategies for increasing COVID-19 vaccination rates

¹²Health information exchange organizations are organizations that electronically move data among health care stakeholders, such as laboratories, public health departments, hospitals, and physicians. Some states have one or more health information exchange organizations that facilitate health information exchange statewide or for specific areas of a state. A health information exchange organization may also facilitate exchange for multiple states in a region of the country.

¹³We interviewed officials from the following stakeholder organizations: AcademyHealth, American Immunization Registry Association, Association of Immunization Managers, the Association of State and Territorial Health Officials, Civitas Networks for Health, Duke Margolis Center for Health Policy, Medicaid and CHIP Payment and Access Commission, National Association for State Health Policy, National Association of County and City Health Officials, and the National Association of Medicaid Directors. We selected these organizations due to their familiarity with immunization information systems, vaccination data sharing between Medicaid and public health agencies, vaccination strategies, or because they had published research in this area. When characterizing the responses made by these organizations, we used the term "some" when mentioned by fewer than five stakeholders.

among the general population, including Medicaid beneficiaries.¹⁴ We also reviewed CDC guidance on barriers to vaccination and strategies for increasing access to and receipt of recommended vaccinations, including among vulnerable populations.¹⁵ We also reviewed relevant state policies and other documentation, and interviewed Medicaid officials in the six selected states about the strategies they used to increase COVID-19 vaccination rates, including among vulnerable and high-risk populations, and information on their effectiveness. We also reviewed documentation and interviewed officials from the largest Medicaid managed care organization, based on enrollment, in the four selected states with this type of delivery system (California, Georgia, Maryland, and Michigan), as well as officials with Connecticut’s medical administrative services organization, which provides administrative services to support the state Medicaid program in processing provider claims. Also, to better understand strategies to improve COVID-19 vaccination rates and their effectiveness, we interviewed officials from 10 stakeholder organizations, and reviewed articles identified from a search of various databases such as Scopus, ProQuest Health & Medical Collection, MEDLINE, and ProQuest COVID-19 Research.¹⁶

We conducted this performance audit from January 2023 to April 2024 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Immunization information systems play a vital role in public health officials’ efforts to monitor vaccination coverage for routine vaccinations and to identify areas of low vaccination, which may be more likely to

¹⁴See appendix I for information on flexibilities that were available to state Medicaid programs during the public health emergency to support them in their efforts to ensure beneficiaries had access to COVID-19 vaccinations.

¹⁵See appendix II for information on barriers to COVID-19 vaccination and strategies for addressing them, including strategies used by the six selected state Medicaid programs to increase vaccination rates that were not informed by data from immunization information systems.

¹⁶Our literature search covered scholarly articles, conference papers, government reports, and non-profit materials published from 2020 to 2023. Through this review, we identified 12 articles that contained information on barriers and strategies to improve COVID-19 vaccination rates more broadly.

experience outbreaks of vaccine-preventable diseases, such as measles and influenza. Immunization information systems collect a variety of information on vaccines administered, such as the name and date of birth for individuals who received a vaccine, and the type of vaccination administered. State public health departments initially developed immunization information systems to capture routine childhood vaccinations, but many states use them to collect information on vaccinations administered to adults as well.¹⁷

In general, state policies govern provider reporting requirements and data sharing, and those policies vary by state.¹⁸ For instance, state policies may vary in terms of the type of providers required to report immunization data, and in the consent policies that allow immunization information systems to collect and store patients' vaccination records.¹⁹ In addition, state policies may determine whether immunization information systems share or exchange patient-level data—that is, the individual immunization records recorded for each patient that contain identifiable demographic information—with other entities, including other jurisdictions or state agencies.

Specifically, depending on the state, immunization information systems may share patient-level vaccination data with

¹⁷For example, as of 2020, these systems were estimated to capture immunization data for 68 percent of adults, nationally, compared to 84 percent of 11- to 17-year-olds, and 94 percent of less than 6-year-olds. See Centers for Disease Control and Prevention, "2020 IISAR Data Participation Rates," accessed January 29, 2024, <https://archive.cdc.gov/#/details?url=https://www.cdc.gov/vaccines/programs/iis/annual-report-iisar/2020-data.html>. More recent estimates indicate increases in the percentage of adults captured in immunization information systems since the start of the COVID-19 public health emergency. For example, adult participation data as of 2022 indicate immunization data are captured for 94 percent of adults, nationally.

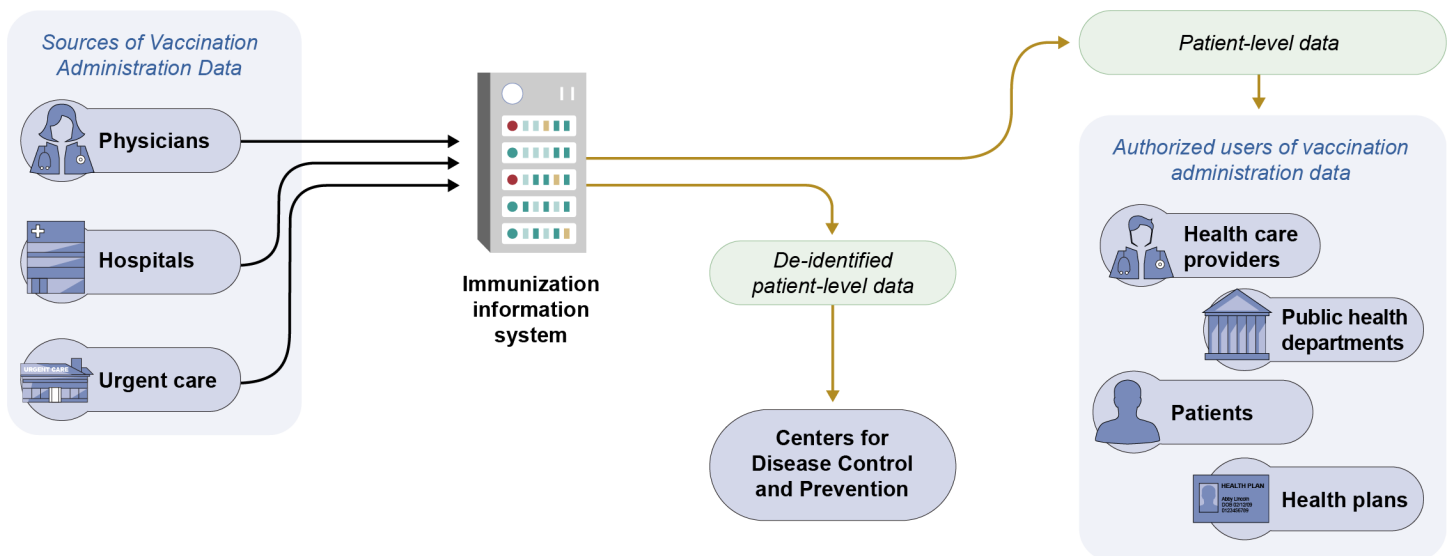
¹⁸COVID-19 vaccination reporting differed substantially during the public health emergency. Specifically, to be permitted to administer the COVID-19 vaccination through CDC's COVID-19 Vaccination Program, CDC required providers to report information about vaccinated individuals. Additionally, similar to routine immunization data, CDC encouraged providers to report demographic information about vaccinated individuals, such as race and ethnicity, to immunization information systems to assist with vaccination monitoring efforts during the COVID-19 public health emergency.

¹⁹According to stakeholders and for the purposes of this report, state patient consent policies are policies in certain states that may allow patients the right to opt-out of or opt-in to sharing their vaccination data with the immunization system (i.e., remove or exclude vaccination data in the immunization information system).

- providers to help them ensure that their patients are up-to-date on their vaccinations,
- patients to help them manage their health care, and
- health plans or state Medicaid agencies to help support quality improvement efforts.²⁰

In situations where identifiable data are not necessary or permitted to be shared, immunization information systems may instead share de-identified or aggregate data, such as the vaccination rate for a given area or population. This type of data may be reported to CDC or included as part of public data dashboards to support routine vaccination efforts or disease surveillance activities, as was the case during the COVID-19 public health emergency. (See fig. 1.)

Figure 1: Example of Routine Immunization Data Exchange with Immunization Information Systems



Source: GAO analysis of the Centers for Disease Control and Prevention documentation; GAO (illustrations). | GAO-24-106526

²⁰As part of its responsibility to oversee states' efforts to ensure the quality of services provided to Medicaid beneficiaries, CMS collects, assesses, and reports on standardized measures of quality of care. CMS does this primarily through the Child and Adult Core Sets, which include quality measures related to primary and preventive care, behavioral health care, and patients' experiences of care. For example, states may report on the percentage of children in the Medicaid program that are up-to-date on their immunizations. States report measure results to CMS annually, and while state reporting had been voluntary, reporting for most measures became mandatory in fiscal year 2024.

Although states are responsible for maintaining their immunization information systems, CDC provides funding and technical assistance to support system infrastructure, data storage and sharing, as well as workforce support.²¹ CDC also develops functional standards for the various operations, data quality, and technological capabilities for immunization information systems. CDC encourages states to adopt the functional standards, but states can implement or customize them. For example, CDC's functional standards suggest that immunization information systems be capable of sharing data with other health systems, but a state has flexibility in determining how to implement data sharing.²² CDC also encourages, but does not require, states to collect certain data elements in their immunization information systems, such as race or ethnicity when reporting routine vaccination data.

²¹While CDC does not have a dedicated source of funding for immunization information systems, the following CDC programs and cooperative agreements, among others, can be used to support immunization information systems: the Epidemiology and Laboratory Capacity for Prevention and Control of Emerging Infectious Diseases Program, Section 317 Immunization Program funding, and the Vaccines for Children Program. During the COVID-19 public health emergency, CDC provided \$3 billion in supplemental funding to support various vaccination-related activities, including expanding the existing immunization information system infrastructure.

²²For instance, a state may choose to implement one-way sharing, which allows the immunization information system only to receive vaccination data, or two-way (i.e., bidirectional) sharing, which also allows the immunization information system to send as well as receive vaccination data from the other organization.

Selected States
Varied in Obtaining
COVID-19
Vaccination Data;
System
Interoperability
Among Factors that
Affected Data
Availability and
Quality

Four of Six Selected
States' Medicaid Programs
Obtained Patient-Level
COVID-19 Vaccination
Data from Immunization
Information Systems
During the Public Health
Emergency

Medicaid programs in our six selected states varied in their ability to obtain patient-level COVID-19 vaccination data from state immunization information systems. Specifically, the Medicaid programs in four of the six states (California, Georgia, Maryland, and Michigan) obtained patient-level COVID-19 vaccination data from their state immunization information systems during the public health emergency. Prior to the COVID-19 public health emergency, officials in these four states reported having laws that authorized their Medicaid programs to obtain immunization data from the public health department.

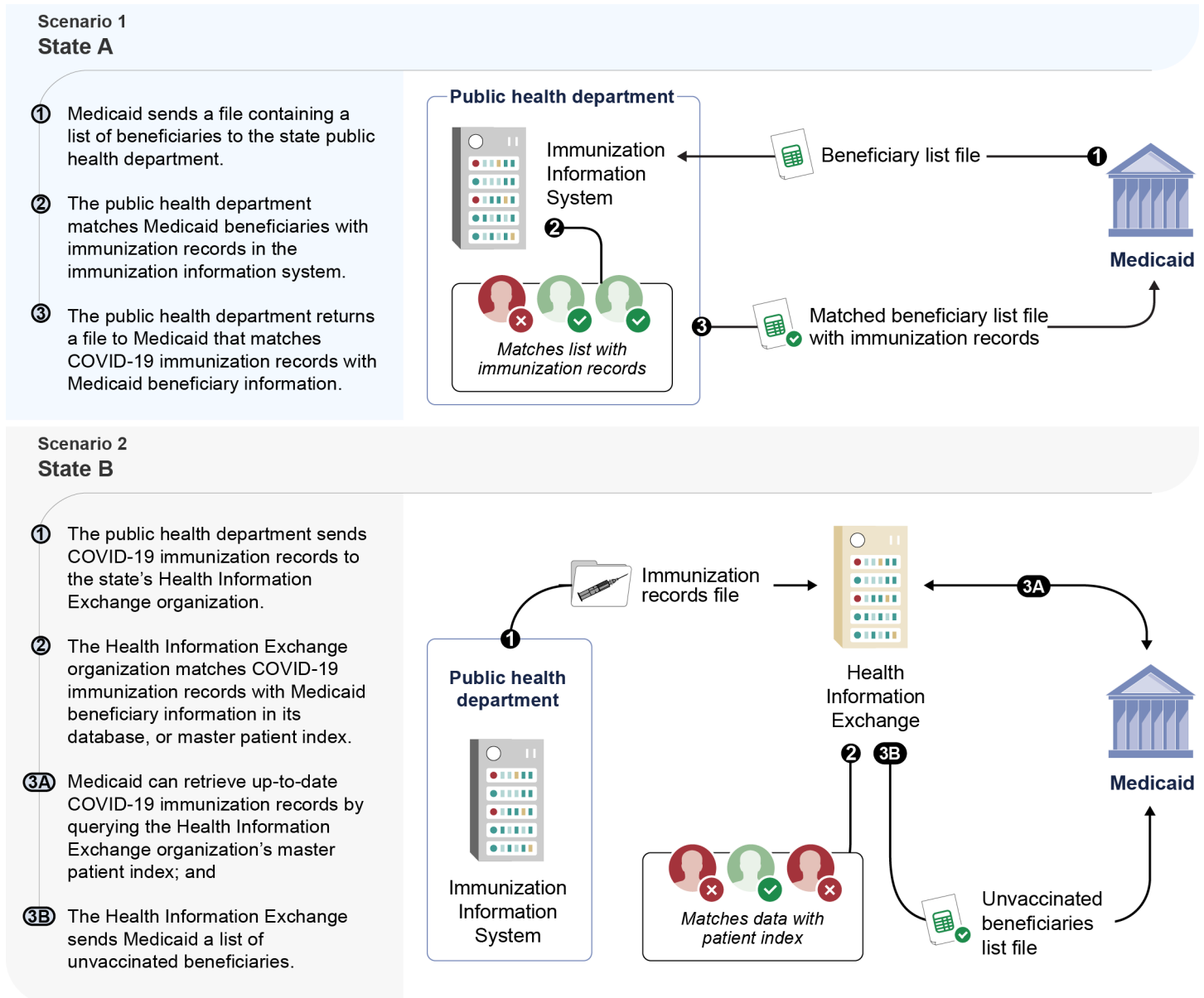
In addition, the processes for exchanging patient-level COVID-19 vaccination data between immunization information systems and the Medicaid programs varied among the four states. (See fig. 2.) For example, in Maryland, the state health information exchange organization helped facilitate the exchange, while in California and Michigan these organizations were not part of the process.²³ Specifically, Maryland's health information exchange organization gathered and compiled data from different sources, such as hospitals, Medicaid, and the immunization information system, into a database that the state public health department and Medicaid could query to retrieve information on the vaccination status of certain individuals. Additionally, the four states

²³While Georgia's health information exchange organization did not facilitate the exchange of COVID-19 vaccination data between the state public health department and Medicaid, Georgia Medicaid officials told us the health information exchange organization shared any hospital or provider records that contained data related to COVID-19 with both departments to help them to supplement their records.

varied in whether the Medicaid program had the ability to query immunization data directly or needed assistance from the state public health department in order to match beneficiary files with data from the immunization information system. For example:

- California public health officials told us the state Medicaid program provided their department with files listing Medicaid beneficiaries, which public health officials then matched to immunization data from their own system before sending files back with immunization records added.
- Georgia Medicaid officials told us the state public health department provided the state Medicaid program files containing all immunization records, which they then matched to Medicaid beneficiary records.
- Maryland and Michigan officials told us they were able to identify Medicaid beneficiaries' immunization records in a repository that merged data from the immunization information system and other data sources operated by the health information exchange organization or the state health department, respectively.

Figure 2: COVID-19 Vaccination Data Exchange Scenarios



Source: GAO analysis of interviews with two selected states; GAO (illustrations). | GAO-24-106526

Note: This figure depicts two examples of the exchange of COVID-19 vaccination data exchange between state immunization information systems and Medicaid programs during the COVID-19 public health emergency.

Medicaid or public health officials from California, Georgia, and Maryland also noted their Medicaid programs and state public health departments exchanged COVID-19 vaccination data more often than they had exchanged routine vaccination data prior to the COVID-19 public health emergency. For example, Medicaid and public health officials from Georgia and Maryland said they shared COVID-19 data weekly, while they shared routine vaccination (e.g., influenza, measles) data less frequently or as needed.²⁴

In contrast, Medicaid programs in the remaining two selected states (Connecticut and Idaho) did not obtain patient-level COVID-19 vaccination data from their state immunization information systems.

- In Connecticut, state Medicaid and public health officials said the state regulation in effect prior to the COVID-19 public health emergency did not specify Medicaid as an authorized user; thus, the Medicaid program did not obtain vaccination data from the immunization information system. Although a new state law enacted in July 2022 expanded the types of entities explicitly permitted access to immunization data, Medicaid and state public health officials told us the issue of Medicaid’s access to the data was not resolved by the end of the COVID-19 public health emergency.²⁵
- In Idaho, Medicaid officials told us that by state law their agency did not have access to patient-level vaccination data, but obtained aggregate COVID-19 vaccination data for adults from the immunization information system.²⁶ Using these data, Medicaid officials told us they were able to assess the extent to which Medicaid claims data reflected vaccination information for beneficiaries. As a result, they told us they were confident that Medicaid claims data

²⁴Routine vaccinations are those recommended for adults, adolescents, and children in the United States, depending on age and vaccine history. Routine vaccinations could include vaccines for influenza, measles, mumps, or other vaccine preventable diseases.

²⁵Because of the change to Connecticut law, public health officials told us they were working to amend their data use agreement to enable them to share patient-level vaccination data with the Medicaid program. See Connecticut House Bill 5506 § 493, Pub. Act No. 22-118 (2022); CONN. GEN. STAT. ANN. § 19a-25 (2022).

²⁶According to public health officials, Idaho state law does not allow the sharing of patient-level vaccination data for children from the immunization information system, including with the Medicaid program. The statute prohibits sharing patient-level information about children with any entity not named in statute. Aggregate data for children can be provided and de-identified information may be shared for adults 18 years and older. See ID. CODE ANN. § 39-4803 (2023).

accurately reflected information on vaccinated and unvaccinated adult beneficiaries during the COVID-19 public health emergency.

Selected States and Stakeholders Described How Interoperability Gaps and Other Factors Affected COVID-19 Vaccination Data Availability and Quality, Including for Medicaid Programs

State officials and stakeholders we interviewed described factors that affected the availability and quality of COVID-19 vaccination data during the public health emergency, including for Medicaid programs. These factors had the potential to make the vaccination data Medicaid programs received from immunization information systems less usable or reliable when integrated into their data. Public health officials in some of the six selected states also provided examples of how they addressed challenges as the COVID-19 public health emergency progressed.

Interoperability gaps between systems. State Medicaid and public health officials from three of the four selected states that exchanged COVID-19 vaccination data between Medicaid and their state immunization information system (California, Georgia, and Michigan) indicated that gaps in interoperability between older immunization information systems and Medicaid systems affected the availability of timely and complete vaccination data.²⁷ Furthermore, according to some selected stakeholders, such as the American Immunization Registry Association and the Association of Immunization Managers, challenges in capturing COVID-19 vaccination data highlighted longstanding concerns about interoperability and data sharing between aging immunization information systems and other data systems.²⁸

Public health or Medicaid officials from three states (California, Georgia, and Michigan) told us they had difficulty merging information from Medicaid and public health sources, in part, because there are very few data fields that are collected by both immunization information systems and Medicaid programs due to the different needs of each program. For

²⁷Conversely, Maryland officials told us that they did not have difficulty merging information from Medicaid and public health sources because the state health information exchange had the capability to consolidate data from different sources.

²⁸See American Immunization Registry Association, *Talking Points for IIS Regarding COVID-19 Data Quality* (Washington, D.C.: Feb. 19, 2021); and Association of Immunization Managers, *Collaborating with Medicaid: Immunization Programs Observations* (Rockville, Md.: July 30, 2021). Our prior work has also highlighted similar challenges and concerns around interoperability in health information technology systems. In June 2022, we reported state public health officials most often identified gaps in interoperability among state systems as one of their top challenges related to the management of public health information during the public health emergency. See GAO, *COVID-19: Pandemic Lessons Highlight Need for Public Health Situational Awareness Network*, [GAO-22-104600](#) (Washington, D.C.: June 23, 2022).

example, immunization information systems generally track vaccination coverage and outbreak surveillance; however, Medicaid systems are used to manage Medicaid patients' care and bill for services. Public health officials in Michigan told us that their inability to automate the process of merging Medicaid and public health data meant staff manually conducted data pulls, shared data, and matched patient records, which increased the burden on staff and led to human error.

Medicaid Enterprise Systems Funding

Centers for Medicare & Medicaid Services' (CMS) Medicaid Enterprise Systems funding may be used to support state Medicaid programs' information technology systems. This funding is available for a range of technology-related system activities, including developing and implementing technology supporting immunization information systems, as well as the maintenance and operations of these systems.

Specifically, state Medicaid programs may request approval to receive an enhanced federal matching rate of 90 percent (i.e., \$90 in federal funds for every \$10 spent by the state) for the design, development, and implementation of their proposed project. To obtain approval, CMS requires states to submit planning documentation that outlines project goals and an implementation timeline. According to CMS officials, these plans undergo a review to determine if the projects meet specific criteria—such as, seamless coordination and integration between systems—and will demonstrate measurable outcomes and improvements to the state Medicaid program. State Medicaid programs may also request a 75 percent enhanced matching rate to support ongoing operations of CMS-approved systems.

Source: CMS documentation. | GAO-24-106526

Moreover, they noted that COVID-19 supplemental funding from CDC supported upkeep of the state's aging immunization information system, but did not enable them to fully modernize it.

To counter interoperability challenges and improve data access, state public health and state Medicaid officials in these three selected states described using data use agreements to outline the formats for exchanging data. These data use agreements specifically outline the data elements that are exchanged and the formats for doing so. Additionally, public health officials in California shared that they planned to seek CMS Medicaid Enterprise System funding to help improve their ability to match immunization information system data with Medicaid records in the future and are considering a unique Medicaid identifier to improve their ability to match data between Medicaid and public health systems.²⁹

Public health officials in our selected states also described varying degrees of participation in CDC's Immunization Gateway during the COVID-19 public health emergency. CDC developed the Immunization Gateway—a data system intended to facilitate vaccination data exchange both among states and between federal agencies (e.g., Department of Veterans Affairs) and states—in part to help address interoperability challenges related to the exchange of information across these different

²⁹In addition to Medicaid Enterprise System funding, Helios—a jointly funded effort by CDC and the Office of the National Coordinator for Health Information Technology to use data exchange standards to promote more flexible and effective data exchanges between public health departments and other entities—may make it easier to leverage and share vaccination data in immunization information systems. According to CDC officials, as the standards developed through Helios mature, state Medicaid programs, where permitted, will have access to modern methods for receiving the immunization histories of their covered patients. In addition to Helios, CDC officials said they continue to support efforts to improve the quality and completeness of vaccination data collected in immunization information systems. According to CDC's congressional budget justification for fiscal year 2024, the agency requested \$1.2 billion to support its Immunization and Respiratory Diseases Program to fund several activities, including continued efforts to modernize immunization information systems.

systems.³⁰ Three states (Connecticut, Maryland, and Michigan) used the Immunization Gateway to exchange immunization data with some other states during the COVID-19 public health emergency, but also used other state-to-state data sharing arrangements, according to state public health officials.³¹ For example, Maryland officials reported they established a connection through the Immunization Gateway with the District of Columbia, which allowed them to add information to the state immunization information system on more than 225,000 COVID-19 doses administered to Maryland residents. The remaining three selected states (California, Georgia, and Idaho) either did not exchange data with other states using the Immunization Gateway during the COVID-19 public health emergency or could not exchange immunization data with other states due to state level policies restricting such exchange.³²

Patient matching. In three of the four selected states that exchanged patient-level vaccination data (Georgia, Maryland, and Michigan) between their state immunization information system and Medicaid, Medicaid and public health officials identified challenges matching patient vaccination records with Medicaid records, which is necessary to determine if the

³⁰For example, when a patient crosses jurisdictional borders to receive a vaccination, their vaccination record is reported to the state where the vaccine was administered. Unless the record is subsequently shared with and integrated into the patient's home state's immunization information system, that state will have missing data, as would any downstream users of the data, such as Medicaid.

According to CDC officials, as of February 2023, most jurisdictions with immunization information systems planned to participate in the Immunization Gateway, which became operational in October 2021, with almost half having exchanged data with at least one other immunization information system.

³¹In Connecticut, state public health officials told us that although the ability to share data with the Medicaid program was unclear, state law in effect prior to May 2022 permitted the state immunization information system to share data with federal partners and other states' immunization information systems. Thus, according to officials, data sharing through the Immunization Gateway was also permitted.

³²Five of the six selected states also reported using the Immunization Gateway to obtain immunization data from the Department of Veterans Affairs during some of the COVID-19 public health emergency. States began exchanging through the Immunization Gateway at different times with different entities. Establishing a connection through the Immunization Gateway can take time and resources, according to public health officials in two selected states. Michigan officials reported other barriers to fully utilizing the Immunization Gateway, including earlier during the public health emergency, such as the readiness of other states to connect to it.

records refer to the same patient.³³ According to Georgia Medicaid officials, patient matching errors meant that the program lacked information on some Medicaid patients' COVID-19 vaccinations, so vaccination rates appeared lower than they were. Public health officials in Michigan said that the COVID-19 vaccine rollout caused an unprecedented number of duplicate records in Michigan's immunization information system, which they were able to resolve. Additionally, officials noted they have multiple ongoing data modernization efforts that include updates to the algorithms and processes they use to conduct patient matching, which will further improve accuracy and data quality.³⁴

Volume of data. The increase in reporting volume associated with the COVID-19 public health emergency overwhelmed the capacity of immunization information systems to capture vaccination records when COVID-19 vaccines first became available, according to public health officials in two selected states (California and Idaho) and some stakeholders we interviewed. For example, public health officials in California noted they went from receiving up to 800,000 messages daily—that is, vaccination records and queries requesting an individual's vaccination status—before the COVID-19 public health emergency to 4 million such messages during the public health emergency. According to the officials, the outdated immunization information system was initially unable to capture and store the large volume of vaccination data received. As a result, the state stored vaccination data in a cloud-based system until the public health department could build capacity in its immunization information system.

In contrast, officials in Maryland told us they did not encounter capacity challenges, because they relied on the state health information exchange organization—which had sufficient capacity—to lead their COVID-19 data collection effort. According to officials at the state's health information exchange, the immunization information system received tens of thousands of submissions each day, which would not have been feasible

³³Patient matching generally relies on the use of demographic information such as a patient's name, date of birth, sex, Social Security number, or address, among other information. Officials from California, Georgia, and Michigan told us they used a process known as probabilistic matching when merging data from immunization information systems and Medicaid. Probabilistic matching is an analysis to determine the overall likelihood that two records are matches.

³⁴The challenges of patient matching are not unique to the COVID-19 public health emergency. See [GAO-23-105540](#); and GAO, *Health Information Technology: Approaches and Challenges to Electronically Matching Patients' Records across Providers*, [GAO-19-197](#) (Washington, D.C.: Jan. 15, 2019).

for the immunization information system to handle. As a result, state public health and Medicaid officials said they created processes to direct immunization submissions through the state's health information exchange organization instead, which was accustomed to processing large volumes of data prior to the public health emergency.

Inconsistent data capture. The large influx of new users submitting vaccination data to immunization information systems also created inconsistencies and challenges with the quality of vaccination data, according to three selected states (Connecticut, Georgia, and Michigan), and other reports.³⁵ For instance, providers approved to administer the vaccination, such as paramedics and medical and nursing students, may not have had prior experience submitting vaccination data to the immunization information system, because they were not previously required to do so. For example, among our selected states,

- Michigan public health officials said that members of the National Guard helped enter data into the immunization information system, but their lack of familiarity with the system led to errors.
- Georgia public health officials told us that records for some individuals vaccinated at a mass vaccination site had the same date of birth, which they believed to be incorrect as the date was also the default date for the field. This made it challenging to match these data to the state's vaccination records.

Additionally, as we reported in March 2021, several factors contributed to missing information on race and ethnicity in immunization information systems' COVID-19 vaccination records early in the COVID-19 vaccine rollout.³⁶ Contributing factors included the lack of consistent collection and reporting of this information by providers, and patient refusal to provide

³⁵For example, according to the HHS Office of the Inspector General, state immunization programs experienced challenges obtaining timely and complete vaccine administration data from providers, which they attributed to having limited resources to sufficiently train providers on how to use their data systems, including how to input data in the data systems (e.g., immunization information systems) in a timely and accurate way. Further, state immunization program officials reported that the immunization information system onboarding process was particularly challenging and burdensome when some providers had minimal to no prior vaccine experience. See Department of Health and Human Services, Office of the Inspector General, *Early Challenges Highlight Areas for Improvement in COVID-19 Vaccination Programs*, OEI-04-21-00190 (Washington, D.C.: Jan. 31, 2023).

³⁶Specifically, data collected from states and jurisdictions on race and ethnicity for COVID-19 vaccine recipients as of March 8, 2021, were missing for almost half (46.7 percent) of recipients who received at least one dose. See [GAO-21-387](#).

the information, according to CDC officials and stakeholders.³⁷ These challenges affected the quality of race and ethnicity data available in immunization information systems, but did not affect Medicaid programs' data in our selected states, according to our review. Medicaid officials we interviewed said they generally relied on their own demographic data. Specifically, Medicaid officials in California, Georgia, Maryland, and Michigan told us that when demographic data (e.g., race or ethnicity) differs between Medicaid and the immunization information system, they use Medicaid data (e.g., from Medicaid enrollment data). Medicaid officials in some selected states said they have found their demographic data to be more reliable than that captured by the immunization information system.³⁸

Selected States and Federal Officials Identified State Policies as Continuing to Influence Vaccination Data Available to Medicaid Programs After the Public Health Emergency

State and federal officials we interviewed underscored that, following the COVID-19 public health emergency, state policies remain important drivers of vaccination data availability. That is, in part, because the federal requirement for reporting COVID-19 vaccinations to immunization information systems—which increased the availability of vaccination data that could be shared by public health departments with other entities, such as Medicaid programs—is no longer in effect.³⁹

More specifically, officials from four of the six selected states (California, Connecticut, Georgia, and Maryland) told us their state policies continue

³⁷CDC reported steps it took to work with states to improve demographic data completeness, including sending weekly data quality reports to jurisdictions beginning in February 2021. In April 2022, CDC reported that the percentage of COVID-19 vaccinations with known ethnicity had increased from 79 percent to 87 percent between February and December of 2021.

³⁸We and others have reported gaps in race and ethnicity data collected by state Medicaid programs. For example, in April 2023, we reported that five of our six selected states had unreliable data on the race and ethnicity of beneficiaries with intellectual and developmental disabilities, limiting our ability to analyze the distribution of beneficiaries. See GAO, *Medicaid: Characteristics of and Expenditures for Adults with Intellectual or Developmental Disabilities*, [GAO-23-105457](#) (Washington, D.C.: Apr. 24, 2023). See also Medicaid and CHIP Payment and Access Commission, *March 2023 Report to Congress on Medicaid and CHIP* (Washington D.C., March 2023). CMS is taking some steps to improve Medicaid data quality. For example, CMS assesses the quality of race and ethnicity data states collect through eligibility determinations and report to CMS's Transformed Medicaid Statistical Information System. The Transformed Medicaid Statistical Information System captures a variety of data from state Medicaid programs to support federal and state program management, financial management, and program integrity activities.

³⁹As previously noted, the federal requirement mandating providers administering COVID-19 vaccinations to report COVID-19 vaccination data to immunization systems ended on October 6, 2023, with the commercialization of the COVID-19 vaccine.

to require providers to report all COVID-19 vaccination records to immunization information systems following the conclusion of the COVID-19 public health emergency. In contrast, officials from the remaining two selected states (Idaho and Michigan) told us they have policies that only require reporting by certain providers for children’s vaccines (which apply to COVID-19 vaccinations for children, as well as to other types of vaccinations for children).⁴⁰ Therefore, in these states providers are not required to report on most COVID-19 vaccinations for adults. Officials from both states said they continue to encourage providers to report COVID-19 vaccinations for adults to the immunization information system even though such reporting is no longer required.⁴¹

Of the four selected states that require providers to submit vaccination records for all age groups, officials from three states told us they expanded their immunization reporting requirements—which apply to all types of vaccinations—as a result of their experiences responding to the COVID-19 public health emergency.

- Maryland expanded its immunization reporting requirements in April 2022 to include providers who were previously exempt from reporting to the state’s immunization information system, such as those working in nursing homes or long-term care facilities.⁴² According to Medicaid and public health officials, the state immunization information system now requires reporting from all providers and health care settings for all vaccinations.
- Connecticut enacted a state law in May 2022 requiring providers to report all vaccinations, regardless of age, to the state immunization

⁴⁰According to Idaho officials, providers participating in the Vaccine for Children program are required to report vaccination administration data to the immunization information system for all children through 18-years of age. In contrast, in Michigan, all providers are required to report vaccinations administered to children 20-years of age or younger, according to state documentation.

⁴¹Although some states do not have policies requiring providers to report routine vaccination data for adults to the immunization information system, providers may choose to do so. For example, CMS and the Office of the National Coordinator for Health Information Technology have encouraged providers to report this information to immunization information systems through the development of certification standards for electronic health records, which was incentivized through the implementation of the Health Information Technology for Economic and Clinical Health Act.

⁴²See MD. CODE HEALTH - GEN §18–109(d)(6)(I)3 (2022).

information system.⁴³ State officials told us that previously, providers were only required to report vaccination data for children 7 years of age and under. Additionally, as previously noted, this law permits the public health department to share patient-level immunization and other data with the Medicaid program, according to public health officials.

- California enacted a state law requiring all providers beginning in January 2023 to report all vaccinations for all age groups to the state immunization information system.⁴⁴ According to public health officials, this law also requires providers to report race and ethnicity data and will help improve the quality of demographic information in vaccination records.

Because these changes involve increased reporting requirements, they should increase the amount of vaccination data captured going forward, compared to what was reported before the public health emergency, as well as what may be shared with Medicaid programs. However, public health officials in California and Maryland also noted their requirements do not include any specific enforcement mechanisms, which may make it challenging to obtain immunization data from some providers. California public health officials noted that the COVID-19 public health emergency made them more aware of the various types of providers in the state that administer vaccines, which will help the state ensure these providers continue to report to the immunization information system, as required.

⁴³See Connecticut House Bill 5506 § 493, Pub. Act No. 22-118 (2022); CONN. GEN. STAT. ANN. § 19a-25 (2022).

⁴⁴See California Assembly Bill 1797, (2021) codified at CAL. HEALTH SAFETY CODE § 120440 (2022).

Selected States Used
COVID-19
Vaccination and Other
Data to Inform
Vaccination
Incentives and
Outreach Efforts, but
Effectiveness of
Individual Strategies
is Unclear

Selected States' Medicaid
Programs Used Patient-
Level COVID-19
Vaccination Data for
Vaccine Incentive Efforts
and Targeted Outreach

Medicaid officials in our four selected states with access to patient-level COVID-19 vaccination data from immunization information systems (California, Georgia, Maryland, and Michigan) described ways they used those data during the public health emergency. For example, state Medicaid officials in three of the four states described using patient-level vaccination data to implement two types of strategies: incentives and targeted outreach.⁴⁵ The strategies targeted different groups, such as managed care organizations, providers, or Medicaid beneficiaries.

Vaccination Incentives

State Medicaid officials in California, Maryland, and Michigan told us that patient-level vaccination data helped them set COVID-19 vaccination targets and financially reward managed care organizations that improved vaccination rates. These states implemented incentive programs, with various approaches, for managed care organizations to improve vaccination rates, in cases when there was a lower than anticipated vaccination rate. (See table 1.) For example, California developed its incentive program because of disparities it identified in the vaccination rate between Medicaid beneficiaries and the non-Medicaid population in California. Specifically, California Medicaid reported that as of August 8, 2021, 48.7 percent of Medicaid beneficiaries aged 12 years and older had received one COVID-19 vaccination dose, compared to 73.7 percent of all

⁴⁵State Medicaid program and managed care organization officials described other strategies they implemented that did not involve the use of patient-level COVID-19 vaccination data from immunization information systems. See appendix II for a description of those strategies used.

Californians of the same age group.⁴⁶ In response, the state’s incentive program established vaccination targets to increase the overall vaccination rate among Medicaid beneficiaries, as well as vaccination rates within certain Medicaid subpopulations.

Table 1: Selected State Medicaid COVID-19 Vaccination Incentive Programs for Managed Care Organizations

State	Description	Performance period	Awards
California	<p>Program designed to increase first dosage of COVID-19 vaccine among unvaccinated beneficiaries aged 12 years and older.</p> <p>Managed care organizations could earn full or partial payments based on performance across 10 performance measures, and for developing a vaccination response plan. Measures focused on individuals by age group, as well as certain vulnerable populations.^a</p>	9/1/2021–2/28/2022 (6 months)	\$187.5 million to all 25 organizations, ranging between \$24,800 and \$45.1 million per organization.
Maryland	<p>Program designed to increase full COVID-19 vaccination (one or two doses, depending upon the vaccine manufacturer) among unvaccinated beneficiaries aged 12 years and older.</p> <p>Managed care organizations received a fixed amount, \$100 for each member vaccinated, within a set number of members that varied by the organization’s enrollment size.</p>	1/2022–3/2022 (3 months)	\$4 million to all nine organizations, ranging between \$105,600 and \$945,000 per organization.
Michigan	<p>Program designed to increase first dosage of COVID-19 vaccine among unvaccinated beneficiaries aged 16 years and older (fiscal year 2021) or 12 years and older (fiscal year 2022).</p> <p>Managed care organizations could earn payment for reaching established vaccination benchmarks aligned with the state public health department’s April 2021 vaccination response plan:</p> <ul style="list-style-type: none"> • Tier 1: 55 percent of beneficiaries resulted in 30 percent of award.^b • Tier 2: 70 percent of beneficiaries resulted in 70 percent of award. 	<p>10/2020 – 9/2021 (fiscal year 2021) and</p> <p>10/2021–9/2022 (fiscal year 2022)</p>	<p>Fiscal year 2021: \$0 awarded (no managed care organization met Tier 1 or Tier 2 benchmarks).^c</p> <p>Fiscal year 2022: \$53.9 million awarded to one of nine organizations.</p>

Source: GAO analysis of state documentation and interviews with state Medicaid officials. | GAO-24-106526

Note: State officials reported using different strategies to fund the incentive programs. California Medicaid officials said they claimed a 50 percent federal match rate, and an additional 6.2 percent for certain medical services that was available due to enhanced federal matching authorized under federal law. Maryland Medicaid officials said they claimed the federal match rate of 50 percent for administrative services. Michigan Medicaid officials said they claimed the federal match rate of 100 percent for COVID-19 vaccination administration that was available during the COVID-19 public health emergency. Medicaid officials in each state noted that the total awards fell within the

⁴⁶See State of California, Department of Health Care Services, “Medi-Cal COVID-19 Vaccination Incentive Program,” *All Plan Letter 21-010 (Revised)* (Sacramento, Calif.: Mar. 7, 2022).

permissible payment limit for Medicaid managed care for incentive payments (i.e., up to 5 percent above the capitation payment).

^aFor example, managed care organizations had to report on two of the following three measures: percent of homebound beneficiaries who received at least one dose of a COVID-19 vaccine; percent of beneficiaries 50-64 years old with one or more chronic conditions; and percent of primary care providers who provided COVID-19 vaccines in their office. Additionally, two measures focused on increasing vaccinations among the race and ethnicity groups with the lowest and second-lowest baseline vaccination rates.

^bThe award was based on an incentive pool funded by monies the state recouped from managed care organizations that did not spend projected COVID-19 vaccination administration funding. Managed care plans were also required to submit a vaccination response plan to be eligible for an award.

^cIn fiscal year 2021, Michigan Medicaid officials said \$40.4 million was recouped from managed care organizations and returned to the federal government.

According to California Medicaid officials, their program resulted in improvements to vaccination rates among Medicaid beneficiaries. However, California Medicaid officials also said that disparities in vaccination rates between Medicaid beneficiaries and the general population remained. State officials indicated that these continuing disparities may, in part, be related to the short time frame that the incentive program was in effect (6 months), vaccination hesitancy, and longstanding barriers, such as lack of transportation and difficulty taking time off work, that Medicaid beneficiaries face in accessing vaccinations. Officials in Maryland and Michigan indicated their programs had less of an effect on COVID-19 vaccination rates than they had hoped, noting similar reasons as California officials.

Selected managed care organizations in these three states also developed incentive programs directed toward providers, beneficiaries, or both. For example, according to Michigan Medicaid officials, all managed care organizations offered provider incentives. Documentation for the managed care organization in Michigan we interviewed indicated they paid providers \$10 to \$100 per eligible beneficiary vaccinated, depending on the overall vaccination rate for the provider's eligible patients.⁴⁷

Additionally, most managed care organizations in all three states (California, Maryland, and Michigan) offered beneficiaries incentives, according to state officials. For example, California reimbursed 22 of its 25 managed care organizations because they opted to provide incentives

⁴⁷Under this program, the managed care organization paid providers an incentive for each eligible member that received at least one dose of the COVID-19 vaccine. For example, providers with less than 55 percent of members vaccinated received \$10 per member vaccinated, and providers with at least 70 percent of members vaccinated received \$100 per member vaccinated. To receive the incentive, providers were required to submit vaccination data to the immunization information system within 3-days of administration.

to beneficiaries, such as \$50 gift cards.⁴⁸ Offering beneficiary incentives was an effective strategy, according to managed care organization officials in Michigan. In contrast, officials with a managed care organization in Maryland told us they did not find this strategy effective because of vaccine hesitancy among members. Findings in research studies we identified also suggested that incentives can be helpful, but are not particularly effective among the vaccine hesitant.⁴⁹

Targeted Outreach

Medicaid programs in California, Maryland, and Michigan also used patient-level vaccination data to support efforts to target outreach to Medicaid beneficiaries who had not yet received a vaccination or were due for an additional vaccination. For example, Medicaid officials in two states (California and Maryland) told us they provided patient-level data to managed care organizations regarding their plan members to enable those organizations to target outreach to and engage in one-on-one conversations with beneficiaries to encourage vaccination. For instance, officials from the California Medicaid managed care organization we interviewed said they used that information to identify providers with the highest percentage of unvaccinated beneficiaries. The officials said they then sent these providers toolkits to help combat misinformation that included posters, post cards for beneficiaries, and a script to use when talking with patients.

Additionally, officials from the managed care organizations in all three states said that patient-level data helped them determine which beneficiaries to contact through text message campaigns or other targeted communication, like email or mailings, to remind them to get vaccinated or share information about the benefits of vaccination. For instance, officials from the Michigan managed care organization said they sent unvaccinated beneficiaries text messages containing information on nearby clinics or CDC information about the vaccination, depending on the beneficiaries' responses to prompts in the text. These officials also reported that their use of texting was more successful than phone call

⁴⁸While the California Medicaid program did not provide direct incentives to beneficiaries, managed care organizations could opt to provide non-monetary incentives (e.g., gift cards) that did not exceed \$50 in value per member. According to data provided by California Medicaid officials, the state reimbursed these organizations for a total of \$36 million, ranging from \$2,400 to \$12 million per organization.

⁴⁹See Neil K.R. Sehgal, "Impact of Vax-a-Million Lottery on COVID-19 Vaccination Rates in Ohio," *The American Journal of Medicine*, vol. 134, no. 11 (2021); and Mireille Jacobson et al., "Can Financial Incentives and Other Nudges Increase COVID-19 Vaccinations Among the Vaccine Hesitant? A Randomized Trial," *Vaccine*, vol. 40, no. 43 (2022).

outreach, and they plan to incorporate texting campaigns into future efforts. One study we reviewed also identified text messaging and digital communication as an effective strategy for reaching unvaccinated individuals during the COVID-19 public health emergency.⁵⁰

In addition to incentives and targeted outreach, Medicaid officials in the four selected states with access to patient-level COVID-19 vaccination data from immunization information systems (California, Georgia, Maryland, and Michigan) reported using that data to develop tools to track vaccination rates. For example, Michigan officials told us they developed an internal dashboard that tracked COVID-19 vaccination status for beneficiaries in managed care plans across different demographics, such as race and ethnicity, age, and geographic area. The dashboard provided aggregate data on vaccination rates to help managed care organizations monitor and improve vaccination rates.

Selected States' Medicaid Programs Used Medicaid Claims and Other Data to Increase Vaccination Rates Among High-Risk and Vulnerable Populations

Medicaid officials in five of our six selected states (California, Connecticut, Idaho, Maryland, and Michigan) also described using data other than, or in addition to, immunization information system data to increase vaccination rates among high-risk and vulnerable Medicaid beneficiaries, who are most at risk of adverse outcomes from COVID-19 complications. According to CMS officials, the agency encouraged state Medicaid programs to use all available data to help inform approaches for vaccinating beneficiaries, and states used a variety of approaches.⁵¹

Medicaid officials in five of the six selected states (California, Connecticut, Idaho, Maryland, and Michigan) told us Medicaid claims data helped them to identify high-risk beneficiaries, including those with existing medical conditions or comorbidities, who were more likely to face hospitalization from COVID-19. For instance, Connecticut Medicaid and managed care organization officials told us they used this approach to focus efforts on improving vaccination rates among high-risk groups. Michigan Medicaid officials said claims data helped them identify and target efforts for homebound individuals.

⁵⁰See Lynett Ford et al., "Personalized Digital Health Communications to Increase COVID-19 Vaccination in Underserved Populations: A Double Diamond Approach to Behavioral Design," *Frontiers in Digital Health*, vol. 4 (2022).

⁵¹For example, CMS's COVID-19 Toolkit provided guidance and high-level recommendations to state Medicaid programs, and recommended state Medicaid programs collaborate with public health departments to increase COVID-19 immunization rates and obtain immunization data.

In three of the six selected states (California, Connecticut, and Michigan), Medicaid or managed care organization officials described using health indexes, such as CDC's Social Vulnerability Index or other state-specific health indexes, to identify vulnerable populations and determine where to target vaccination efforts.⁵² For example, in Connecticut, officials from a managed care organization told us that social vulnerability index data helped them target communication about the vaccine to specific zip codes with high vulnerability.

Effectiveness of Specific COVID-19 Vaccination Strategies Used by Selected States is Unclear; COVID-19 Vaccination Efforts Affirmed Importance of Collaboration

While selected states implemented several strategies to increase vaccination rates among Medicaid beneficiaries, state Medicaid officials said that the nature of the COVID-19 public health emergency caused challenges assessing the effectiveness of any specific strategies they implemented. As a result, the effectiveness of any specific strategy remains unclear. For example, officials stated

- it was necessary to implement multiple efforts concurrently to increase vaccinations, so it is difficult to attribute changes in vaccination rates to any one effort;
- many efforts (e.g., mobile clinics) were focused on increasing vaccinations in communities at-large, not just among Medicaid beneficiaries; and
- some states did not have complete data on Medicaid beneficiaries who received the COVID-19 vaccine.⁵³

Due to these challenges, several state Medicaid officials and CMS officials told us they do not plan to assess the relative effectiveness of

⁵²CDC's social vulnerability index collects data on 16 social factors, including high poverty, low percentage of vehicle access, or crowded households, to rank the social vulnerability of geographic areas and to identify communities that might need additional support during emergencies, including the COVID-19 pandemic. California used the Healthy Places Index, developed by the Public Health Alliance of Southern California, to identify vulnerable communities.

⁵³Because the federal government purchased and distributed COVID-19 vaccines free of charge during the COVID-19 public health emergency, Medicaid claims do not capture the scope of all COVID-19 vaccines administered to Medicaid beneficiaries. According to CMS officials, although the agency requires Medicaid programs to collect and report claims data for instances in which Medicaid provided reimbursement for vaccination administration, it does not require Medicaid programs to report such data when vaccinations are administered or paid for by other entities. As such, according to CMS officials, it is not possible for CMS to estimate vaccination rates during the COVID-19 public health emergency for Medicaid beneficiaries. CMS officials told us that now that COVID-19 vaccines are paid for by Medicaid, there should be more consistency in the capture of vaccination data in claims across states, which will in turn be reported to CMS.

state strategies on COVID-19 vaccination rates for Medicaid beneficiaries.⁵⁴

Among the four selected states that had access to patient-level COVID-19 vaccination data from immunization information systems (California, Georgia, Maryland, and Michigan), available data show disparities persisted between vaccination rates for Medicaid beneficiaries and the statewide population during the COVID-19 public health emergency. Specifically, our review of state-reported data among these four states—which vary by time period and age group—generally show between a 16 and 35 percentage point difference between the vaccination rate for the Medicaid population and the rate for the statewide population.

State officials noted that various factors may have contributed to such disparities. For example, Michigan officials noted that Medicaid beneficiaries often are, in general, vaccinated at lower rates for other types of vaccinations compared to the general population. According to Medicaid officials in Michigan, this may be due, in part, to barriers noted earlier, such as transportation challenges and vaccine hesitancy. According to analysis conducted by the Medicaid and CHIP Payment and Access Commission, in general, vaccination rates for influenza, tetanus, and most other vaccines were lower for adult Medicaid beneficiaries than for adults with private health insurance.⁵⁵

Although the effectiveness of specific strategies on improving COVID-19 vaccination rates among Medicaid beneficiaries is unclear, state and federal officials told us the COVID-19 public health emergency affirmed the importance of strong, collaborative relationships between state Medicaid and public health departments to better leverage available data, as well as ensure access to vaccinations and reduce barriers.⁵⁶ According

⁵⁴California Medicaid officials told us they are in the process of evaluating their incentive program for managed care organizations, which will include a review of managed care organizations' successes and challenges in meeting the program's goals. Officials said they anticipate that this evaluation may help to inform ongoing and future vaccination efforts.

⁵⁵See Medicaid and CHIP Payment and Access Commission, "*Report to Congress on Medicaid and CHIP*" (Washington, D.C.: March 2022), chapter 2.

⁵⁶The Association of Immunization Managers emphasized the value of collaboration between Medicaid and immunization programs—including to overcome barriers related to COVID-19—in its November 2020 checklist identifying ways to improve data exchange between public health and Medicaid. See Association of Immunization Managers, "*Collaborating with Medicaid to Improve Vaccination Rates: A Checklist for Immunization Program Managers*" (Rockville, Md.: Nov. 21, 2020).

to CDC and CMS officials, strong, collaborative relationships between programs are important for the ongoing exchange and use of vaccination data. Similarly, such relationships would be crucial during any future public health emergency involving an infectious disease.

Medicaid officials in three selected states (Georgia, Idaho, and Michigan) told us increased collaboration during the public health emergency fostered more discussions with public health officials, including discussions about data sharing and data use going forward. For example, Georgia Medicaid officials told us the COVID-19 public health emergency demonstrated how both Medicaid and the public health agency could benefit from accessing one another's data and noted that both agencies are interested in exchanging data for other uses, such as addressing maternal mortality.

Additionally, CDC and CMS officials noted that the COVID-19 public health emergency amplified the importance of collaboration between state Medicaid programs and public health departments to ensure Medicaid beneficiaries obtain recommended vaccinations, and officials from both agencies told us they continue to emphasize the value of such relationships in their interactions with state officials.⁵⁷ In support of such relationships, CDC funds a cooperative agreement focused on creating collaborations between public health departments and Medicaid to better understand barriers to immunization for Medicaid-enrolled populations

⁵⁷The Medicaid and CHIP Payment and Access Commission also noted that COVID-19 highlighted existing limitations related to immunization information systems and data sharing, and identified interoperability, data quality, and timeliness as some of the barriers contributing to lower vaccination rates among adults enrolled in Medicaid compared to the general population. They made several recommendations to address barriers, including that Congress provide additional federal funds to improve immunization information systems and require CMS, CDC, and other relevant agencies within HHS to release federal guidance and implement standards to improve immunization information system data collection and interoperability with state Medicaid data systems as well as electronic health records. See Medicaid and CHIP Payment and Access Commission, "*Report to Congress on Medicaid and CHIP*" (Washington, D.C.: June 2022), chapter 3.

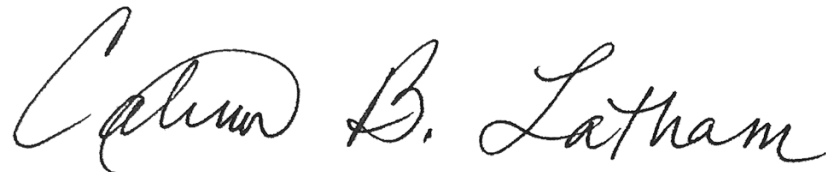
and improve immunization rates.⁵⁸ In September 2023, CDC awarded additional funds under the cooperative agreement, which will run through September 2026. According to CDC, this effort will also facilitate a broader learning network consisting of Medicaid and public health officials to help share promising and best practices for improving vaccination rates.

Agency Comments

We provided a draft of this report to HHS for review and comment. HHS provided technical comments, which we incorporated as appropriate.

We are sending copies of this report to the Secretary of Health and Human Services, the appropriate congressional committees, and other interested parties. In addition, this report will be available at no charge on the GAO website at <http://www.gao.gov>.

If you or your staff members have any questions about this report, please contact me at (202) 512-7114 or lathamc@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Major contributors to this report are listed in appendix III.



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⁵⁸Under the first iteration of the CDC-funded cooperative agreement, which began in 2017, five states (Colorado, Hawaii, Kentucky, Montana, and New Mexico) participated. The second iteration began in 2020 and included six states (Louisiana, Michigan, Texas, Washington, Wisconsin, and Wyoming). Documentation describing outcomes from the second iteration indicate regular collaboration between Medicaid and immunization programs was a successful outcome in three states (Michigan, Texas, and Washington) and resulted in joint guidance and updates to health plans and beneficiaries. Additionally, four state public health departments (Louisiana, Michigan, Texas, and Washington) noted they improved their ability to regularly share immunization data with the Medicaid program, and a fifth state's public health agency (Wyoming) began the process of setting up such data sharing.

Appendix I: Medicaid Program Changes to Support COVID-19 Vaccination Activities

Congress and the Centers for Medicare & Medicaid Services (CMS) made temporary changes to the Medicaid program during the public health emergency to help ensure beneficiaries had access to COVID-19 vaccinations.¹ For example, to incentivize providers to administer the COVID-19 vaccination to Medicaid beneficiaries, states were permitted to increase the provider reimbursement for that service. (See table 2.) These changes were permitted through a period of time after the end of the public health emergency, depending on the specific flexibility.

Table 2: Examples of Medicaid Program Changes to Respond to the COVID-19 Public Health Emergency

Description	Rationale
Federal law required states to provide and administer COVID-19 vaccines to Medicaid beneficiaries free of cost.	Eliminated cost as a barrier to vaccination.
Federal law provided enhanced federal matching rate to cover costs associated with COVID-19 vaccines and administration.	Reduced the costs to states in increasing vaccination rates among Medicaid beneficiaries.
CMS allowed states to align fees paid to Medicaid providers to administer the vaccine with Medicare payments rates. ^a	Incentivized providers who do not generally administer vaccinations to Medicaid beneficiaries.
Federal law made it possible for states to permit additional categories of providers (e.g., pharmacists, pharmacy technicians) to administer the COVID-19 vaccination in states where they did not already have authority. ^b	Increased range of providers that can be reimbursed for administering vaccinations to Medicaid beneficiaries.
CMS provided coverage and payment at an enhanced federal matching rate for health care providers to provide patients or caregivers counseling about the COVID-19 vaccination when this counseling is covered for Medicaid beneficiaries under the age of 21.	Helped address vaccine hesitancy by helping beneficiaries and their families learn about vaccines from trusted health care providers.
CMS allowed states to provide vaccination coverage to Medicaid beneficiaries in limited coverage groups, such as individuals only eligible for family planning benefits. ^c	Increased types of individuals eligible to obtain COVID-19 vaccinations free of charge through Medicaid.

Source: GAO analysis of Centers for Medicare & Medicaid Services (CMS) COVID-19 guidance. | GAO-24-106526

^aCMS established reimbursement rates under the Medicare program for costs associated with administering the COVID-19 vaccination at \$40 and permitted state Medicaid programs to apply for approval to adopt the same reimbursement rates to offset higher administration costs, such as to offset costs for providers in rural areas or transportation costs.

^bSee, e.g., Pub. L. No. 109-148, Division C, 119 Stat. 2680, 2818 (2005) and declarations issued thereunder.

^cFederal law typically limits states to providing limited benefits to these beneficiaries. See Centers for Medicare & Medicaid Services, Center for Medicaid and CHIP Services, Medicaid, Children’s Health Insurance Program (CHIP), and Basic Health Program (BHP) Related Provisions in the American Rescue Plan Act of 2021, Informational Bulletin (Baltimore, Md.: June 2021).

¹Medicaid allows significant flexibility for states to design and implement their programs. For example, states can request waivers of certain federal requirements to target certain populations or test new or innovative approaches for managing the health care needs of beneficiaries. In addition to its normal authority to approve these state waiver applications, CMS has additional authorities to waive Medicaid requirements to help ensure the availability of care in certain emergency circumstances.

Appendix II: Barriers to COVID-19 Vaccination and Strategies to Address Them

According to the Centers for Disease Control and Prevention (CDC), barriers can hinder access to and receipt of vaccinations within certain communities. To increase COVID-19 vaccination rates, CDC encouraged state and local jurisdictions to use a variety of strategies to help improve COVID-19 vaccination rates.¹

According to CDC, barriers to COVID-19 vaccination include the following:

- Some individuals may face challenges traveling to a provider administering vaccinations due to lack of transportation or inability to take time off work. Additionally, people with disabilities, homebound individuals, or individuals who reside in long-term care facilities may not be able to travel to get a vaccine. An individual may also lack internet access or the technical skills required to search online for vaccination sites or appointments.
- Some individuals lack the information they need to understand the risks, benefits, and background of vaccine development to make an informed decision about getting vaccinated.
- Some individuals may have mistrust of certain institutions including government, medical institutions, and media, which can affect decisions about vaccination.²

CDC guidance suggests that states consider implementing the following strategies to help address barriers:

- Support school- and work-based vaccination clinics to help reach individuals with limited availability to seek out vaccination.
- Provide community- or neighborhood-based vaccination clinics to help to reach individuals who are homebound or specific neighborhoods with low vaccination rates.
- Partner with trusted community members (e.g., faith leaders) or trusted messengers (e.g., experts or health care providers) to help share important health information.

¹For example, see Centers for Disease Control and Prevention, *COVID-19 Vaccination Field Guide: 12 Strategies for Your Community* (August 2021).

²See GAO, *COVID-19: Federal Efforts to Provide Vaccines to Racial and Ethnic Groups*, [GAO-22-105079](#) (Washington, D.C.: Feb. 7, 2022).

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- Offer vaccinations during routine patient visits or reminding individuals of upcoming vaccination appointments through phone calls or text messaging using appropriate language-based or translation services.

Medicaid and managed care officials in our six selected states (California, Connecticut, Georgia, Idaho, Maryland, and Michigan) described various strategies they used to help improve COVID-19 vaccination rates. These strategies did not involve the use of patient-level COVID-19 vaccination data from immunization information systems. (See table 3.)

Table 3: Examples of Strategies to Improve COVID-19 Vaccination Rates Used by Medicaid Programs in Six Selected States

State	Strategy
California	<p>Medicaid officials told us that they sent newsletters to beneficiaries' households, which included information about the COVID-19 vaccination.</p> <p>Officials at one of the state's managed care organizations described implementing a number of strategies. The managed care organization</p> <ul style="list-style-type: none"> • provided newsletters to members to combat misinformation about the vaccine; • partnered with over 40 community-based, education, public health, and faith-based organizations to sponsor over 50 vaccination events in vaccine-hesitant neighborhoods experiencing low vaccination rates, primarily targeting Black and Latino communities; • shared information about the vaccine at events and through social media; • partnered with other health plans, health departments, local sports teams, social media influencers, and celebrities to encourage vaccination; • coordinated with a transportation vendor to schedule transportation for COVID-19 testing and vaccination, and to waive the 2-day appointment scheduling requirement for transport; and • coupled vaccination clinics with other services such as food pantries or back-to-school giveaways.
Connecticut	<p>Medicaid officials told us they</p> <ul style="list-style-type: none"> • covered the cost of transportation to vaccination sites, transportation that would ordinarily not be reimbursable; • partnered with the state public health department to sponsor vaccination clinics and develop community-based strategies to conduct outreach to populations disproportionately impacted by COVID-19 (e.g., partnered with barber shops, hairdressers, and other places frequented by members of the Black and Hispanic communities); and • partnered with the state public health department to notify communities where mobile vans were administering COVID-19 vaccinations. <p>Officials at the state's managed care organizations described implementing a number of strategies:</p> <ul style="list-style-type: none"> • Assisted beneficiaries in scheduling COVID-19 vaccination appointments. • Conducted outreach to beneficiaries through phone calls and text. • Partnered with the state public health department, as well as social services in the state, to provide information about the vaccine. • Conducted general outreach to providers and provided information about the COVID-19 vaccine through newsletters. • Provided vaccination information more broadly through social media, webinars, and townhall events.

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State	Strategy
Georgia	<p>Officials at one of the state’s managed care organizations described that their organization</p> <ul style="list-style-type: none"> • broadly shared information about the vaccine with beneficiaries; and • partnered with community organizations, local sports teams, and local influencers to encourage vaccinations.
Idaho	<p>Medicaid officials told us they</p> <ul style="list-style-type: none"> • sent postcards to households with vaccine-eligible members that provided information on the COVID-19 vaccine, and • shared information about the vaccine with providers through newsletters and other communications.
Maryland	<p>Medicaid officials told us they</p> <ul style="list-style-type: none"> • collaborated with school-based health centers, federally qualified health centers, local health departments, as well as providers in target areas to improve vaccination rates; • partnered with the state’s call center to conduct outreach and encourage vaccination in certain geographic regions; and • developed partnerships with the NAACP and Casa de Maryland to address vaccine hesitancy. <p>Officials at one of the state’s managed care organizations described that they</p> <ul style="list-style-type: none"> • conducted outreach to beneficiaries through phone calls and texts; • shared vaccination information with providers; • partnered with the state public health department, as well as other managed care organizations in the state, to provide information about the vaccine at events; • partnered with a local sports team to encourage vaccinations; and • partnered with a local organization to conduct community-based outreach to share information with beneficiaries, including QR codes that members could scan to get vaccination information.
Michigan	<p>Medicaid officials told us they</p> <ul style="list-style-type: none"> • partnered with the state public health department to sponsor vaccination clinics and develop community-based strategies; and • provided vaccination information to beneficiaries to combat misinformation about the vaccine. <p>Officials at one of the state’s managed care organizations described that their organization</p> <ul style="list-style-type: none"> • used a texting campaign to share vaccination information with beneficiaries; • assisted with scheduling transportation to vaccination appointments; • partnered with pharmacies to set aside special vaccination appointment times to allow individuals more flexibility to schedule appointments; • used a consumer advisory committee to better understand and identify trusted individuals within the community; and • developed partnerships with trusted individuals, such as those in churches or community centers, to share information about the vaccine.

Source: GAO review of information collected from Medicaid programs and managed care officials in selected states. | GAO-24-106526

Appendix III: GAO Contact and Staff Acknowledgments

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In addition to the contact named above, Shannon Legeer (Assistant Director), Kimberly Lloyd Perrault (Analyst-in-Charge), Benjamin T. Feldman, Joy Grossman, Emma Hultgren, Drew Long, Monica Perez-Nelson, Andrea E. Richardson, and Ethiene Salgado-Rodriguez made key contributions to this report.

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