



# Maximizing Healthcare's Full Potential

Immunization's vital role  
in preventing illness and  
improving lives

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Of the many lessons we gleaned from the COVID-19 pandemic, perhaps one of the most striking is the importance of immunization. Even more critical, we learned we must vastly improve the development and delivery of vaccines. As a result, state health entities, among others, are adopting innovative immunization solutions to better address current needs while preparing for the future. But we also have a long way to go.

The healthcare industry faces no shortage of challenges when it comes to immunizing large swaths of populations. Paradoxically, there is both a higher rate of vaccine-preventable diseases and lower rates of immunizations to combat them. As health and human services organizations work to address gaps in care for their patients and immunization programs strive to achieve high vaccine coverage for their districts, there is both a need and an opportunity to improve the exchange of information between these vital programs.

Globally, low immunization rates, particularly among children, are leading toward a health crisis. According to a report by the United Nations International Children's Emergency Fund

(UNICEF) and the World Health Organization (WHO) released during the pandemic, we are experiencing "the largest sustained decline in childhood vaccinations in approximately 30 years."<sup>1</sup>

What's more, agencies expected to see a rebound in vaccine uptake post-crisis, once health clinics and medical offices reopened and people returned to their normal routines. This, however, did not materialize.

In the report, UNICEF Executive Director Catherine Russell said:

This is a red alert for child health. We are witnessing the largest sustained drop in childhood immunization in a generation. The consequences will be measured in lives. While a pandemic hangover was expected... as a result of COVID-19 disruptions and lockdowns, what we are seeing now is a continued decline. COVID-19 is not an excuse. We need immunization catch-ups for the missing millions, or we will inevitably witness more outbreaks, more sick children, and greater pressure on already strained health systems.



<sup>1</sup>UNICEF, "COVID-19 pandemic fuels largest continued backslide in vaccinations in three decades," 2022.  
<https://www.unicef.org/rosa/press-releases/covid-19-pandemic-fuels-largest-continued-backslide-vaccinations-three-decades>.



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The UNICEF/WHO study determined there are more than 25 million unvaccinated children at risk of contracting preventable diseases such as diphtheria, tetanus, and pertussis (DPT3). Vaccinations against DPT3 dropped 5% between 2019 and 2022 to 81%, 13% lower than levels needed for herd immunity, when enough people in a group or area have achieved protection against a virus to make it very difficult for infection to spread. Globally in 2023, there were 14.5 million children missing out on any vaccination — so-called zero-dose children. Coverage of a third dose of vaccine protecting against diphtheria, tetanus, and pertussis (DTP3) was 84% in 2023.<sup>2</sup>

Dwindling vaccination rates can also lead to the return of diseases once considered eradicated or extinct. For example, the U.S. officially declared measles extinct in 2000. However, the disease has seen an increase since 2015,

with a growing number of new cases and outbreaks. In 2019 alone, there were 1,249 cases and 22 outbreaks — the highest in 30 years.<sup>3</sup>

Beyond the health risks associated with the immunization crisis, the financial burden is staggering. The cost of caring for and containing each individual measles case is about \$140,000. The total cost of treating adults for diseases that could be prevented through vaccinations tallies up to about \$27 billion a year.<sup>4</sup>

However, there are solutions now and on the horizon. For example, according to the U.S. Centers for Disease Control and Prevention, its Vaccines for Children (VFC) program can help prevent 419 million illnesses, avoid 936,000 deaths, and save almost \$1.9 trillion in costs associated with treating preventable diseases. Programs like these can be of great benefit around the globe.<sup>5</sup>

<sup>2</sup>World Health Organization, Immunization Coverage, <https://www.who.int/news-room/fact-sheets/detail/immunization-coverage>

<sup>3</sup>Centers for Disease Control and Prevention, “Advisory Committee on Immunization Practices recommended immunization schedule for adults,” Morbidity and Mortality Weekly Report, 2019. <https://cdc.gov/mmwr/volumes/68/wr/mm6840e2.htm>

<sup>4</sup>American Journal Of Managed Care, “Assessing the Cost of Vaccine-Preventable Diseases” <https://www.ajmc.com/view/assessing-the-cost-of-vaccinepreventable-diseases>

<sup>5</sup>Centers for Disease Control and Prevention, “Vaccines for Children Program,” 2023. <https://www.cdc.gov/vaccines-for-children/about/index.html>



# The Power — and Limits — of Immunization Information Systems (IIS)

Of the many challenges associated with immunization, information management hovers near the top. Keeping track of millions of immunization records — and keeping them up to date — has always been difficult.

Since the early 1990s, many states have been addressing the communications gap by adopting IIS. However, while these systems have increased the usefulness of patient immunization data, there is still more potential for them to deliver even greater value.

IIS allow coordinators to consolidate data into one record that providers, parents, and other authorized parties can easily access. This detailed level of recordkeeping helps avoid duplicate vaccinations, reduces administrative work tracking down immunization history from other providers, and makes it easy to provide required information to daycare, schools, and other institutions.

But these systems are capable of doing so much more — they offer the potential to act as powerful tools that can advance the quintuple aim of improving population health, enhancing the patient experience, lowering the cost of care, addressing clinician burnout, and advancing health equity.<sup>6</sup>

To accomplish these goals, however, IIS must overcome longstanding barriers. For example, most states and providers are using systems that were built more than 20 years ago and run outdated code and hardware. Machines with limited capacity sitting in a server room in a state office building can't compare to modern, fast, and secure cloud-based technology that can be easily expanded, has massive capacity, and can quickly be configured to exchange data with other systems.

Other challenges associated with immunization information management include:

- The requirement for additional servers to scale, including their configuration
- A single request relies on calls to multiple services
- Each data transfer process takes additional time and space, creating resource-intensive bottlenecks
- There is an increasing demand for accurate, accessible data at the patient, provider, health plan, health department, state, and federal levels

<sup>6</sup>Nundy S, Cooper LA, Mate KS. The Quintuple Aim for Health Care Improvement: A New Imperative to Advance Health Equity. JAMA. 2022;327(6):521–522. doi:10.1001/jama.2021.25181





Additionally, a lack of interoperability between state systems severely limits their potential value. For example, imagine a child is born in one state and then moves to another with their family. After several years the family relocates again. As the child grows up, they attend college in a third state and later move to a fourth for work. With each move, their medical records start anew, creating a fresh slate every time. Consequently, states should require a comprehensive record that captures data over the span of a person's entire life, no matter the state or place of service, from primary care provider to pharmacist to school.

Generally, IIS are very useful in identifying pockets and communities of under-vaccinated individuals. But modernizing these systems will enable them to operate at their full potential.

Through collaboration with state health authorities, IIS could help reveal social determinants of health impeding a patient, or a community, from receiving vaccinations. This could mitigate the barriers that are affecting not just immunization rates, but community health in general.

## Value Beyond Vaccinations

To be sure, IIS can be one very powerful tool in state and other entity arsenals to battle disease and — in the bigger picture — improve overall health outcomes. Beyond immunization, health organizations can adopt a holistic view of patient health. Today, we have the ability to capture nearly every area of human services and public health — tracking the birth to death cycle for individuals, applying insights at the population level, and predicting future health trends.

For example, providers and other entities can tie in additional sources of data and knowledge, such as Medicaid records, to increase immunization rates and incentives. By leveraging Medicaid data for insights into vaccination rates and trends, we can reveal new opportunities to look at children's health holistically, taking in the bigger, whole health picture through population health management, maternal health analytics, and other resources.

**These goals are attainable, and to accomplish them, entities require:**

1. A user-friendly interface that maintains control of security rights, supports mobility, and provides transparency into public information.
2. Simple configurability for federal and state business rules, including interoperability with other modules.
3. Actionable insights into vaccine coverage rates coupled with the ability to predict future coverage rates.
4. Insight into barriers indicating the need for greater protection and opportunities for improvement based on vaccine coverage versus reaction to outbreaks.

States can reap these benefits through widely available commercial off-the-shelf (COTS) solutions. Indeed, we have found organizations embracing true COTS products and next-generation technology for modernized user experiences stay up-to-date with industry standards and automation while reaping other benefits. This includes ensuring their systems are interoperable and preparing their IIS to be future-ready.



# IIS Modernization in Action

The Maine IIS program received a government mandate to begin publishing its immunization data in 2020. As a result, the state needed to make information easily accessible so both IIS leadership and the public could understand how much of the population had been vaccinated against COVID-19. At the program level, this information would help enable targeted interventions to expand vaccine access in lower-vaccinated areas — for example, by deploying mobile vaccination units to areas most in need.

To meet its objectives, Maine IIS leadership created multi-user-friendly analytics dashboards — applying appropriate privacy masking controls to conceal potentially identifiable information. Prior-day data was made accessible within 24 hours, allowing program staff to closely monitor immunization activity and measure the impact of their efforts.

The new technology enabled Maine's IIS staff to understand which counties had higher vaccination rates than others. With that information, program leaders were able to work with other public health

stakeholders — hospital and health system leadership, EMS agencies, fire departments, and independent pharmacies — to better understand these trends and apply lessons learned to boost vaccination rates in lower-uptake areas.

From a surveillance perspective, by layering in COVID-19 outbreak data, case investigators could use the IIS dashboards to understand the effectiveness of vaccine distribution efforts and make informed decisions about how best to allocate the stock. This data also helped identify gaps in vaccine access and deploy targeted outreach based on specific barriers, such as transportation issues or the need for additional education in specific populations. For example, the IIS program was able to engage influential community partners to work with specific populations, such as densely populated islands off the coast of Maine.

On a national level, the Maine IIS program was able to leverage its immunization data and analytics tools to procure additional COVID-19 vaccine doses from other states with excess stock. The IIS dashboards allowed

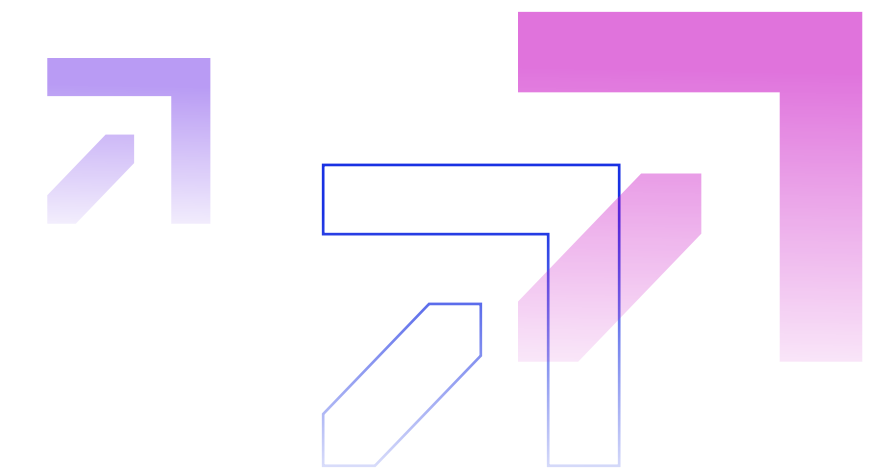
program staff to identify areas of need and make data-driven requests of the White House to address gaps in under-vaccinated communities. Beyond the COVID-19 pandemic, this approach has helped bolster Maine's preparedness for outbreaks of other vaccine-preventable diseases.

As Maine and other similar cases demonstrated, COVID-19 was the tipping point, highlighting the very real value of using a sophisticated IIS to record adult vaccinations. It also demonstrated that most current systems are overburdened, and they struggled to keep up with the additional load. In fact, every state currently operates an IIS that is capable of tracking adult immunizations, yet data is available for only about 60% of adults compared to 95% of children.<sup>7</sup>

<sup>7</sup>American Immunization Registry Association, "Landscape Analysis: IIS Adult Vaccination Data Capture and Data Utilization" [https://repository.immregistries.org/files/resources/60958446cdad0/adultlandscape\\_final.pdf](https://repository.immregistries.org/files/resources/60958446cdad0/adultlandscape_final.pdf)







The CDC is invested in ensuring state registries can track vaccination status for all Americans, young and old. They are working with the American Immunization Registry Association to address gaps in current systems and practices. One component of this partnership is the Landscape Analysis Report, which presents a comprehensive view of the current adult vaccination environment. It examines practices, policies, challenges, and successes. The report will help create a roadmap that will recommend strategies to improve IIS for adults.

#### **The report recommends:**

- Capturing adult data must be a priority from the national level to the clinical setting, with adequate funding and staffing.
- Providers need motivation to comply with adult requirements. This could come from mandates, fiscal incentives, information campaigns, pressure from patients and peers, and tools that make reporting a part of their daily workflow.
- There must be automated data exchange between IIS and EHRs, without opt-in requirements.
- Entities must build confidence among providers regarding data accuracy and quality.<sup>8</sup>

## The Global Picture

Beyond U.S. states and local jurisdictions, immunization is a critical global health concern. As such, every health organization — from providers to administrators — has a stake in helping ensure immunizations are available, up to date, and carefully recorded and monitored.

There has never been greater urgency around the issue. According to the World Health Organization, as of 2023, there were 14.5 million children who had no vaccination of any kind. What's more, WHO said, the proportion of children receiving a first dose of measles vaccine was 83% in 2023, well below the 2019 level of 86%. And vaccination rates against certain diseases have dropped significantly. For example, countries at risk of yellow fever have only 50% coverage against it, according to WHO.<sup>9</sup>

Numbers like these point to the larger challenges of vaccinating underserved populations, such as refugees. Indeed, people seeking refuge in safer countries than their own often lack medical records, let alone updated immunizations.

To address this challenge in the U.S., the CDC created the Refugee Immunization Information Systems Exchange

(RIISE) Project. Among its chief functions, the RIISE Project makes refugee vaccination records readily available for local medical providers caring for refugees. Additionally, RIISE supports transferring refugee vaccination data from the Electronic Disease Notification (EDN) System into IIS.

According to RIISE, "This project enables providers to better assess immunization coverage rates among refugees, thereby ensuring more complete vaccine uptake among refugee communities."

#### **Among the many benefits the RIISE program offers:**

- Helping ensure children meet local vaccination requirements for school
- Adequately vaccinating refugees
- Moving vaccination records more quickly and with fewer data quality errors
- Streamlining electronic vaccination record transfer between health information systems
- Integrating more refugee vaccination records into health information systems, which may lead to better immunization coverage for the community<sup>10</sup>

American Immunization Registry Association, "Landscape Analysis: IIS Adult Vaccination Data Capture and Data Utilization," 2021. [https://repository.immregistries.org/files/resources/60958446cdad0/adultlandscape\\_final.pdf](https://repository.immregistries.org/files/resources/60958446cdad0/adultlandscape_final.pdf)

World Health Organization, "Immunization Coverage," 2023. <https://www.who.int/news-room/fact-sheets/detail/immunization-coverage>

Centers for Disease Control and Prevention, "Refugee and Immigrant Health: RIISE Project," 2023. <https://www.cdc.gov/immigrant-refugee-health/hcp/riise-project/index.html>



# Thinking Broadly

It's time to think about ways to make immunizations more convenient and efficient while improving the patient and provider experience — better tracking vaccine management and enhancing process workflows, among other vital elements. Thanks to their universality and broad reach, immunizations are accessible inroads toward engaging people in their own care. They are uniquely positioned to connect care across patients, providers, health plans, health departments, and other entities at the state and federal levels, making them potential healthcare game-changers.

Immunizations and screenings reduce infectious, life-threatening diseases and drive effective public health programs to ensure populations get the preventive care they need. Achieving these critical healthcare goals requires accurate immunization data, complying with industry requirements, and giving providers and health departments the tools to make data-driven decisions. Success requires real-time immunization data at the point of care and throughout an individual's lifetime. States and other entities can raise immunization rates, ensure

equitable delivery, and improve health outcomes.

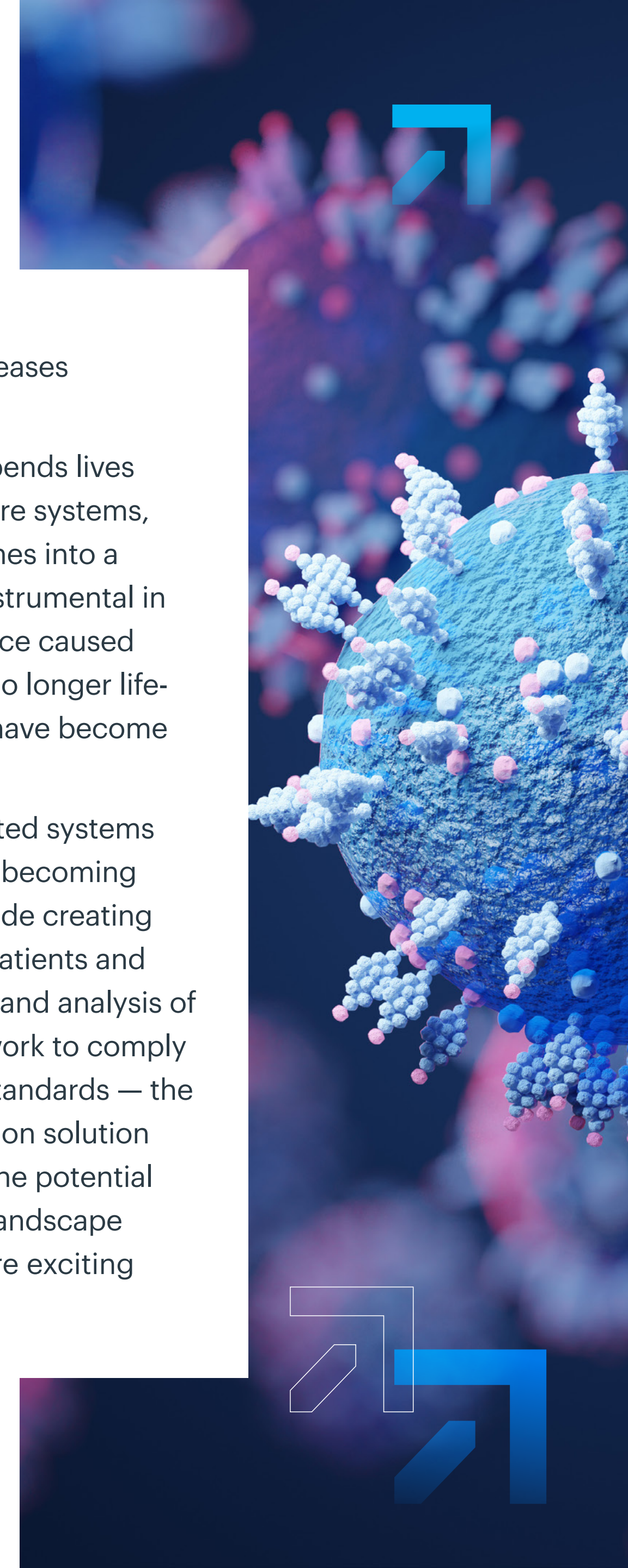
**To help immunization live up to its full potential, organizations need tools in five important areas:**

- 1. Population Management:** Providing accurate immunization data for pattern identification and informed decision-making.
- 2. Forecasting and Clinical Decision Support:** Informing clinicians of which immunizations are due and the recommended doses for patients.
- 3. Interoperability:** Enabling real-time data exchange and interacting with electronic medical record systems, hospital systems, and providers for visibility into a consolidated immunization record.
- 4. Vaccine Inventory Management and Accountability:** Allowing for tracking and ordering of doses for VFC and non-VFC-eligible populations with other funding sources and ensuring accountability reporting.
- 5. Coverage Reports and Analytics:** Delivering reporting capabilities by patient, organization, zip code, county, and state to outline coverage

rates for vaccine-preventable diseases accurately.

When a disease such as COVID-19 upends lives and severely disrupts entire healthcare systems, the vital role immunizations play comes into a sharper light. Vaccines have been instrumental in making many of the diseases that once caused severe, long-term illness and death no longer life-threatening. Many diseases, in fact, have become all but extinct.

At the same time, many of the outdated systems for managing immunization data are becoming extinct, with legacy hardware and code creating silos and bottlenecks across IIS. As patients and providers demand greater access to and analysis of immunization data — and as states work to comply with changing system certification standards — the need for an integrated, next-generation solution has never been more pronounced. The potential to vastly improve the immunization landscape is great. There has never been a more exciting opportunity for positive change.





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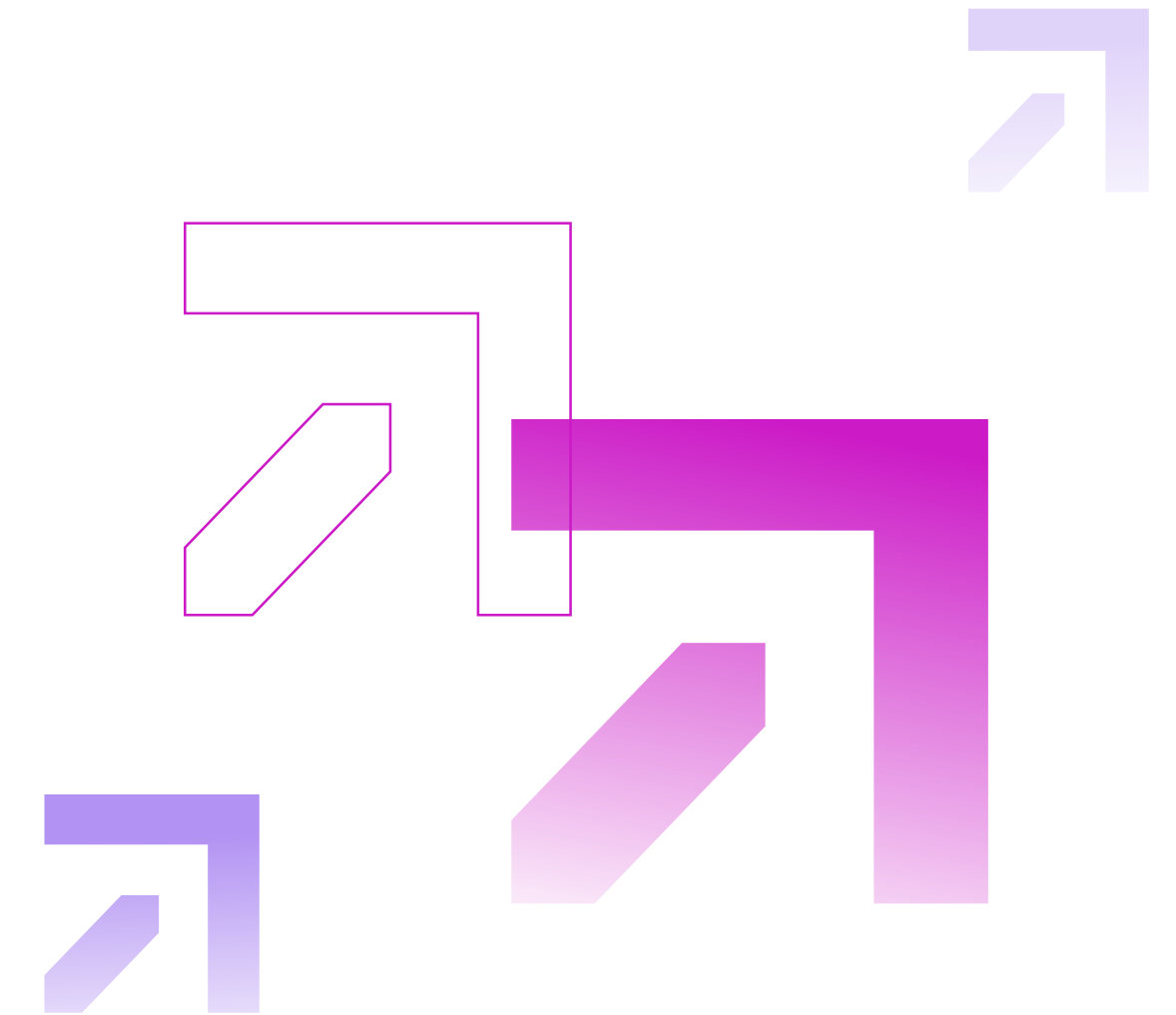
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