

System integration of New Jersey immunization information and communicable disease surveillance systems

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By integrating their immunization information system and their communicable disease reporting and surveillance system, New Jersey Department of Health (NJDOH) significantly improved disease investigation efficiency. This has enabled public health agencies to make data-driven decisions, effectively allocate resources, address health disparities, and improve overall public health outcomes.

The “What”

This is a success story about how the integration of two different data sources – the New Jersey Immunization Information System (NJIS) and the New Jersey Communicable Disease Reporting and Surveillance System (CDRSS) – by the New Jersey Department of Health (NJDOH) has significantly improved disease investigation efficiency.

In the realm of public health surveillance, it is crucial to consider immunization status when evaluating disease incidences and outcomes, especially for vaccine-preventable communicable diseases. However, in New Jersey, obtaining timely, complete and accurate vaccine data has always been a challenge due to the separation of immunization data and case data in two independent surveillance systems.



Previously, case investigators had to spend a significant amount of time manually searching for individuals in the NJIS, extracting vaccine records, and entering the data into the CDRSS to complete the case profile. This laborious process required investigators to switch between two systems and often led to data entry errors. Moreover, during the COVID-19 pandemic and the mpox outbreak, where vaccine information was crucial for public health surveillance, relying on manual data extraction was impractical. Although patient interviews could provide some vaccine information, self-reported data are prone to recall bias and reporting errors.

To address these challenges, the NJDOH initiated the integration of the NJIS and CDRSS systems as part of the Centers for Disease Control and Prevention’s (CDC) Data Modernization Initiative (DMI) in the fall of 2022. This integration achieved three significant successes: first, it enhanced the NJ communicable disease surveillance system; second, it integrated the previously siloed vaccine and case information; and third, it improved the completeness, timeliness, and accuracy of vaccine information, enabling better evaluation of public health prevention strategies and informed decision-making.



The integration process began with conducting system gap analyses to identify critical immunization information that could be tracked in the CDRSS for surveillance purposes. Based on these findings, the CDRSS system was upgraded to include immunization history questions and additional data fields for collecting comprehensive vaccine information. These included details such as vaccine dose number, vaccine type, data source, brand name, vaccine manufacturer, and National Drug Code, most of which were required for CDC data transmission and useful for evaluating vaccine effectiveness.

The upgrade permitted patient records in the CDRSS to be matched with corresponding individuals in the NJIIS using demographic information or the master patient index (MPI). This allowed for the retrieval of NJIIS IDs, which facilitated the loading of NJIIS records into the CDRSS. Since the integration began last fall, New Jersey has successfully integrated the NJIIS and CDRSS for COVID-19 and mpox diseases. Over 75% of the three million COVID-19 cases and 800 mpox patients have obtained NJIIS IDs. As a result, more than four million COVID-19 vaccine records for over one million vaccine breakthrough cases have been automatically transferred from the NJIIS to the CDRSS. Additionally, approximately 500 mpox vaccine records, consisting of 120 cases and the remaining non-cases, have populated the CDRSS. The number of

CDRSS vaccine records continues to increase as real-time NJIIS data is directly integrated into the system.

Comparing the data available in the CDRSS before the system integration with the current state, there has been a substantial increase in the number of vaccine records, from less than two million to four million. The integration has provided more complete and accurate immunization information, surpassing the data collected solely through contact tracing efforts, which primarily focused on the COVID-19 primary series. The availability of information such as vaccine dates, dose numbers, boosters, and vaccine types has significantly improved. When comparing COVID-19 vaccine breakthrough cases using data directly from CDRSS with the Health Information Technology (HIT) Program's vaccine breakthrough report based on backend data extraction, the results are perfectly aligned. Therefore, CDC's COVID-19 message mapping guide data transmission will utilize the immunization information from CDRSS, eliminating the need for weekly backend data matching. Regarding mpox, the CDC Data Collation and Integration for Public Health Event Response (DCIPHER) Program case report now includes 113 cases with accurate vaccine date information, as opposed to the previous count of only 28 cases.

The “So What”

The integration of CDRSS and NJIIS has had a significant impact on public health surveillance and reporting, leading to tangible improvements in public health. By having real-time and complete immunization data within the state communicable disease surveillance system, public health agencies are now better equipped to understand health disparities while considering vaccine status. This integration has empowered public health agencies to make informed decisions regarding the allocation of resources and vaccines, with the goal of addressing these disparities based on both disease incidence and vaccine data. The practical implications of these improvements are noteworthy.

With the integration in place, NJDOH can now extract comprehensive, timely, and accurate immunization information directly from the CDRSS for CDC case reporting and internal surveillance reports. This not only streamlines the reporting process but also ensures that the data shared with the CDC and other stakeholders are reliable and up to date. By utilizing this data-driven



approach, public health agencies can take proactive measures to identify areas of concern, implement targeted interventions, and monitor the effectiveness of their public health initiatives.

It's important to highlight the practical impact of these improvements, even on a smaller scale. For instance, the integration of CDRSS and NJIS has played a crucial role in managing individual outbreaks. By promptly accessing comprehensive vaccine data, public health agencies can effectively identify and respond to outbreaks, ensuring timely interventions such as contact tracing, targeted vaccination campaigns, and appropriate public health messaging. The ability to swiftly and accurately link

cases to their immunization status has proven invaluable in preventing further transmission and mitigating the impact of outbreaks, even on a smaller scale.

Overall, the integration of CDRSS and NJIS has significantly enhanced public health surveillance and reporting capabilities. It has enabled public health agencies to make data-driven decisions, effectively allocate resources, address health disparities, and improve overall public health outcomes. These practical implications, supported by comprehensive and real-time data, ensure that public health initiatives are targeted, efficient, and impactful.

The “Now What”

The integration of NJIS and CDRSS has had a significant impact on epidemiology and lab surveillance activities that extends beyond COVID-19 and mpox surveillance. Currently, NJIS IDs are accessible for all patients across 137 reportable communicable disease conditions in the CDRSS. In fact, subject matter experts overseeing 14 other communicable diseases have expressed interest in retrieving relevant vaccine records from NJIS as well. As part of NJDOH's ongoing efforts, they are planning to incorporate flu vaccine information into the CDRSS this year, with plans to include other diseases in the future. The accomplishments achieved in the context of COVID-19 and mpox diseases have laid a strong foundation for future successes.

While the funding received from the CDC's Data Modernization Initiative has been instrumental in the success of the CDRSS and NJIS system integration, continued funding is essential to sustain and enhance these activities. With ongoing funding from DMI, NJDOH can further improve data quality and advance their system integration by transitioning from conventional demographic data matching to solely utilizing the MPI ID for matching purposes. The validation of the MPI ID will have a far-reaching impact on all health system integration projects in New Jersey, extending well beyond the scope of CDRSS and NJIS.

Beyond additional funding, other resources are required to support the modernization and continuity of epidemiology and laboratory activities. These resources include advanced technological infrastructure, robust data management systems, skilled personnel proficient in data analysis, and strong partnerships with relevant stakeholders. With these resources in place, NJDOH can ensure the sustained success and effectiveness of their efforts in public health surveillance and data-driven decision making.

However, it is crucial to acknowledge that if funding decreases and long-term sustainable funding is not available, certain epidemiology and lab activities will be at risk. These activities encompass crucial aspects such as timely disease surveillance, accurate data collection and analysis, effective monitoring and response to outbreaks, and the implementation of evidence-based public health interventions. Without adequate funding, the ability to carry out these essential activities may be compromised, hindering the ability to protect public health and respond to emerging threats effectively. Thus, securing long-term sustainable funding is vital for the continued success and impact of NJDOH's modernized epidemiology and laboratory activities.

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