AIRA
AMERICAN IMMUNIZATION REGISTRY ASSOCIATION

SEPTEMBER 2022 | ISSUE NUMBER 95

# SNAPSHOTS

IMMUNIZATION REGISTRY NEWS *from* AMERICAN IMMUNIZATION REGISTRY ASSOCIATION (AIRA)

## PRESIDENT'S REPORT

Dear Colleagues,

It's hard to believe that a new school year is here! I hope you were able to step away from your desk and spend some warm summer days with your loved ones. You may not have a school summer reading list anymore, but this edition of *SnapShots* includes articles you don't want to miss.

Kids are back in school, and so is our immunization data. Virginia shares how it is using a unique dashboard to display school immunization data. Read about the migration of the San Diego Immunization Registry to California's statewide IIS. What a feat! The Public Health Informatics Institute also shares what it is up to in the data modernization space and offers a few learning resources you may want to bookmark for later. And don't forget to read up on hash-based technology in this edition's Tech Corner.

Thank you to those who submitted articles for this edition of *SnapShots*. I'm so proud of the work our community has accomplished and know much more is in the works!

Lastly, it has been wonderful serving as your board president, and I am thrilled to welcome our new board members.

Wishing you a happy and healthy fall,

Regards,
**Christy Gray**
AIRA Board President
Director, Division of Immunization
Virginia Department of Health

## TABLE OF CONTENTS



Welcome to *SnapShots*, the American Immunization Registry Association's newsletter about the progress, best practices, and accomplishments of immunization information systems (IIS) across the country. We invite you to share news about your IIS. Email us at info@immregistries.org with information about a successful programmatic or technical innovation, major accomplishment, or milestone that your IIS has reached.

Subscribe to *SnapShots*. This information will remain confidential and will not be sold or passed on to other parties.
Editor: Katie Reed, N.Y. 
AIRA • 1717 Pennsylvania Avenue NW, Suite 1025 • Washington DC, 20006 • Phone: 202.552.0208 • www.immregistries.org • Email: info@immregistries.org

# MIGRATION OF SAN DIEGO IMMUNIZATION REGISTRY TO CALIFORNIA'S STATEWIDE IMMUNIZATION INFORMATION SYSTEM (IIS)

In September 2021, the County of San Diego announced that it was transitioning from the San Diego Immunization Registry (SDIR) to the statewide California Immunization Registry (CAIR2) system.

The transition occurred on April 25, 2022, and involved many months of preparation to train more than 1,200 front-end users, migrate more than 120 interfaces, and transition more than 44 million immunizations.

SDIR had been the Regional Immunization Registry in San Diego since the late 1990s. California had four separate registries since the inception of CAIR2 in the fall 2016. These were CAIR2, SDIR, ICIR (representing Imperial County), and RIDE (representing the greater San Joaquin Valley). Imperial County migrated to CAIR2 in the summer of 2018, leaving three separate registries in California.

CAIR2 is California's statewide IIS and is available to a wide range of health care providers, including local health departments, community clinics, private medical offices, hospitals, and other approved agencies (e.g., schools, child care facilities, foster care). CAIR2 provides a central location for health care providers and other approved entities to store and access a person's complete immunization and TB test history. It also assists with forecasting immunizations due and generating official immunization documentation, and it helps immunization providers manage vaccine inventory, generate practice-level reports, and conduct reminder/recall activities.

## Transition to CAIR2

There were many factors that went into the decision to migrate to the CAIR2 system, including:

- A collaborative benefit to be part of the statewide system with additional functionality
- Greater efficiencies for system administration
- Future interface onboarding opportunities for San Diego County to be part of a future CAIR3 system

## Benefits of CAIR2

CAIR2 offers the same functions as SDIR with several new features that will help clinics provide the best care for their patients:

- Consolidation of immunization records from all regional immunization registries across the state
- Provider access to more complete immunization histories even if a patient has visited multiple

*Continued on page 3*

# MIGRATION OF SAN DIEGO IMMUNIZATION REGISTRY TO CALIFORNIA'S STATEWIDE IMMUNIZATION INFORMATION SYSTEM (IIS)

*Continued from page 2*

The data migration team effort was extensive, including rounds of complete end-to-end testing of adding all doses from SDIR to a mirror of the CAIR2 environment. During the migration process, we assembled teams to address all possible duplicates to ensure the highest level of confidence in the data. The migration resulted in adding nearly 11 million patients and approximately 44 million doses to CAIR2. We continue to support activities to address any data anomalies that occurred during the migration, which have not been extensive.

**The migration resulted in adding nearly 11 million patients and approximately 44 million doses to CAIR2.**

The transition to CAIR2 also included a major collaborative communication effort to providers and users who were transitioned. There were 6,366 providers added to CAIR2, including 5,945 data exchange providers. In addition, nearly 70 user training sessions were conducted, and over 4,000 unique users were added to CAIR2 during the transition.

The transition to CAIR2 was completed in spring 2022. The County of San Diego Immunization Unit is grateful for the many years that the current SDIR system has supported the region. We're optimistic that the future beyond COVID-19 will result in a stronger, more robust, and integrated IIS for San Diego County and California.

***- Submitted by Danelle Wallace, MPH,*** County of San Diego Health & Human Services Agency,
***and Michael S. Powell, MSc,*** California Immunization Registry (CAIR2)

# VISUALIZING SCHOOL IMMUNIZATION DATA: A NON-COVID DASHBOARD!

The need for IIS to use their data to identify pockets of need and to share such data in compelling, interactive, and visually appealing ways continues to grow.

AIRA's Tableau and Power BI User Groups are two outlets for IIS to share their Tableau and Power BI successes and lessons learned, help members troubleshoot issues specific to each platform, and encourage the implementation of data visualization tools. During the July Tableau User Group meeting, Erica Hunter, PhD, MPH, CHES, immunization data manager, and Sam Miller, MS, information technology specialist, from the Virginia Department of Health shared tips and tricks for creating the Virginia Student Immunization Survey (SIS) Dashboard.

Virginia's SIS was created internally by the Office of Information Management (OIM). The survey site is editable by administrators, and school immunization data is extracted from this site into a spreadsheet.

Virginia's SIS data includes the total number of students who are adequately immunized according to school immunization requirements, medically exempt, and religiously exempt. Students are assessed at kindergarten, 7th grade, and 12th grade levels. Specific-antigen information is also requested for students in 7th and 12th grades. Validations in the system are used for data quality control and to prevent errors. Data is stored in an SQL server database.

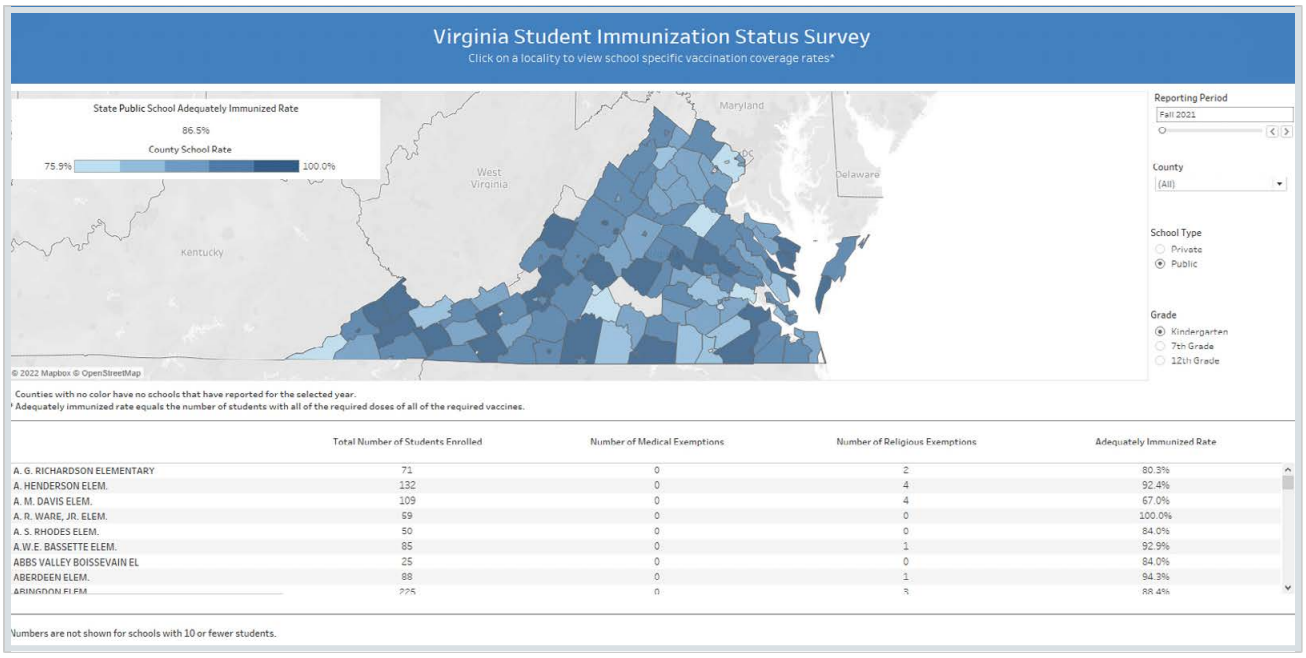
To create the data visualization, staff use an SQL script to extract the data from the SQL server database and move to the Tableau Data Store. Tableau generates latitude and longitude based on Federal Information Processing Standard (FIPS) county codes. Once latitude and longitude are marked on the Virginia map, Tableau displays vaccination rates for each county by aggregating data from schools within that county.

Below are example snapshots of Virginia's interactive dashboards. Examples are shown for public and private schools, along with county-level data. When viewing the Dashboards online, the data in the bottom section changes dynamically, based on the selection from the top section (county, school type, and grade).

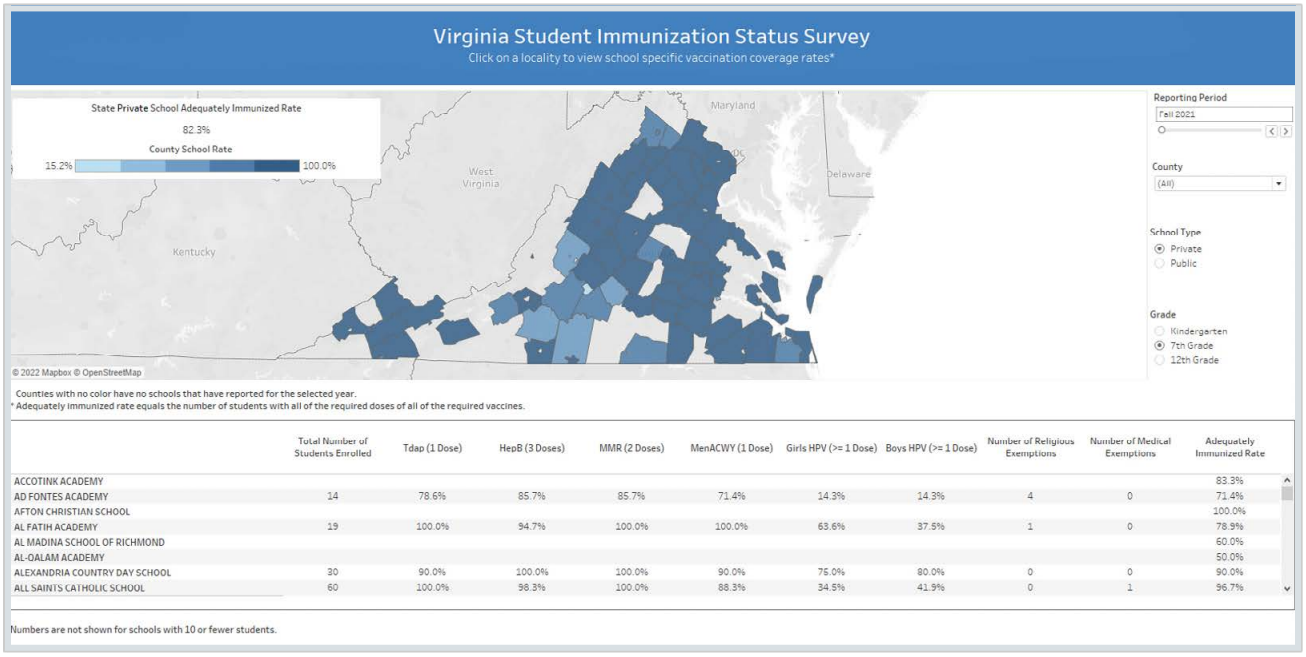
*Continued on page 5*

# VISUALIZING SCHOOL IMMUNIZATION DATA:
## A NON-COVID DASHBOARD! *Continued from page 4*

### Figure 1. SIS dashboard – public schools, kindergarten



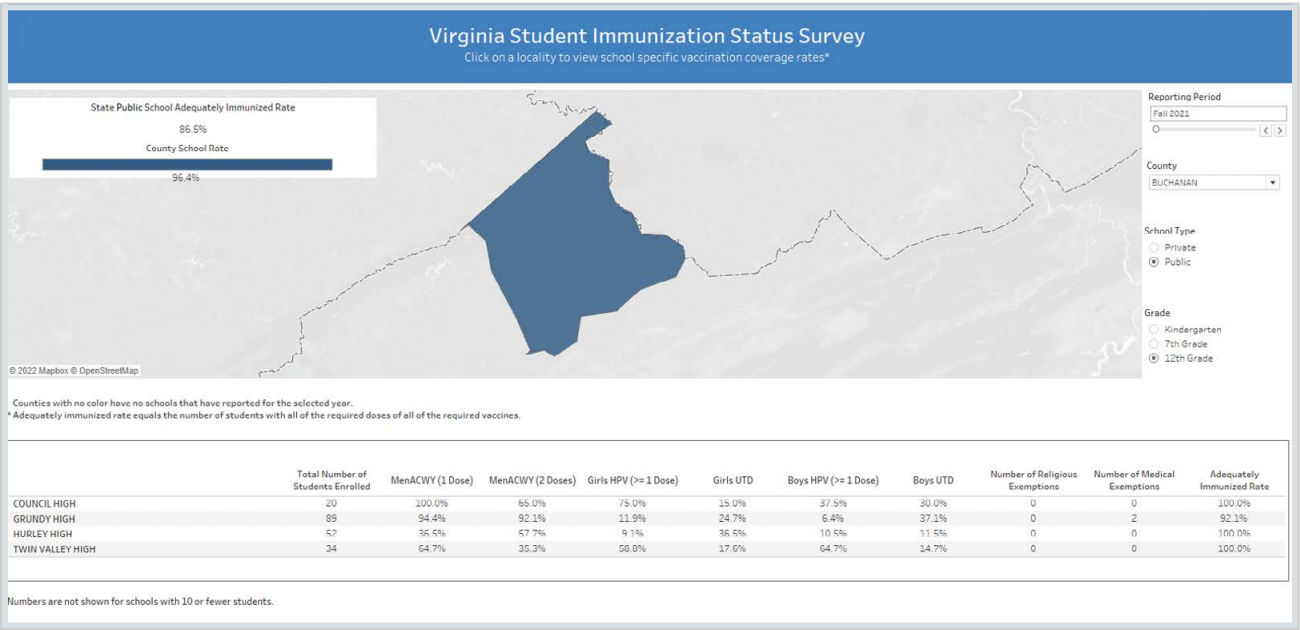

### Figure 2. SIS dashboard – public schools, kindergarten




*Continued on page 6*

# VISUALIZING SCHOOL IMMUNIZATION DATA: A NON-COVID DASHBOARD! *Continued from page 5*

**Figure 3. SIS dashboard – public schools, 12th grade, Buchanan County**




| | Total Number of Students Enrolled | MenACWY (1 Dose) | MenACWY (2 Doses) | Girls HPV (>= 1 Dose) | Girls UTD | Boys HPV (>= 1 Dose) | Boys UTD | Number of Religious Exemptions | Number of Medical Exemptions | Adequately Immunized Rate |
|---|---|---|---|---|---|---|---|---|---|---|
| COUNCIL HIGH | 20 | 100.0% | 65.0% | 75.0% | 15.0% | 37.5% | 30.0% | 0 | 0 | 100.0% |
| GRUNDY HIGH | 89 | 94.4% | 92.1% | 11.9% | 24.7% | 6.4% | 37.1% | 0 | 2 | 92.1% |
| HURLEY HIGH | 57 | 36.5% | 57.7% | 9.1% | 36.5% | 10.5% | 11.5% | 0 | 0 | 100.0% |
| TWIN VALLEY HIGH | 34 | 64.7% | 35.3% | 58.8% | 17.6% | 64.7% | 14.7% | 0 | 0 | 100.0% |

While Virginia's school immunization data is entered via a web-based application, some jurisdictions use their IIS to collect school immunization data. Regardless of reporting format, using school immunization data to create visuals that are engaging, interactive, and easy to understand is a great way to move beyond COVID-19 dashboards and share other important immunization information. Seasonal flu and routine immunization data are areas ripe with opportunity for creating interactive data visualizations. Kudos to the Virginia Department of Health team on their unique dashboard!

**Regardless of reporting format, using school immunization data to create visuals that are engaging, interactive, and easy to understand is a great way to move beyond COVID-19 dashboards and share other important immunization information.**

# DATA MODERNIZATION, THE FUTURE OF IIS AND MORE

The Task Force for Global Health recently interviewed Vijay Pathangi, IIS team lead for the Public Health Informatics Institute, on the importance of IIS in the wider landscape of modern public health.

The resulting article delves into the history, challenges, and future opportunities of IIS. Vijay provides an overview of IIS in the context of COVID-19, sharing the history of IIS, and the remarkable progress made by immunization registries over the years. He highlights innovations like the IZ Gateway's enabling of interjurisdictional exchange during the COVID-19 pandemic.

Vijay goes on to share his thoughts on the future of IIS and the ways in which the pandemic threw into stark relief the gaps in public health information infrastructure. He outlines opportunities for the future of IIS that include improving scalability, data quality, and consumer access. Vijay also touches on the need for increasing modernization in how these systems connect, advising that jurisdictions continue to learn from initiatives like the work PHII is doing with the CDC's Data Modernization Initiative.

**Read the full interview >**

## More on the Data Modernization Initiative

In recognition of the ongoing challenges health departments face regarding data exchange and use, CDC recently embarked on a multi-year, billion-plus dollar effort to enable state, tribal, local, and territorial health agencies to modernize core data and surveillance infrastructure.

**PHII recently concluded the 2022 Data Modernization Workshop, which brought over 300 participants from public health jurisdictions across the country.**

PHII is pleased to be a part of this ongoing work and recently concluded the 2022 Data Modernization Workshop, which brought over 300 participants from public health jurisdictions across the country to learn and exchange ideas on the following topics:

- Data exchange and interoperability
- Data system architecture and design
- Transforming data into information

Learn more about the Data Modernization Initiative. Explore PHII's Data Modernization Planning Toolkit for more context on ensuring that IIS capacity-building is considered and included in jurisdictional modernization planning.

*Continued on page 8*

# DATA MODERNIZATION, THE FUTURE OF IIS AND MORE

*Continued from page 7*

## More learning resources for IIS

PHII has a variety of free resources available through its IIS Learning Hub. Resources include guidance, toolkits, and trainings on developing and using an IIS, ranging from step-by-step instructions on specialized topics like migrating a system, to general guidance on day-to-day IIS operations and management.

The IIS Learning Hub regularly undergoes updates and refreshes to remain current and relevant in a rapidly evolving immunization world. PHII is grateful for ongoing collaborations with CDC, AIRA, and IIS teams from around the United States in developing and refining these tools.

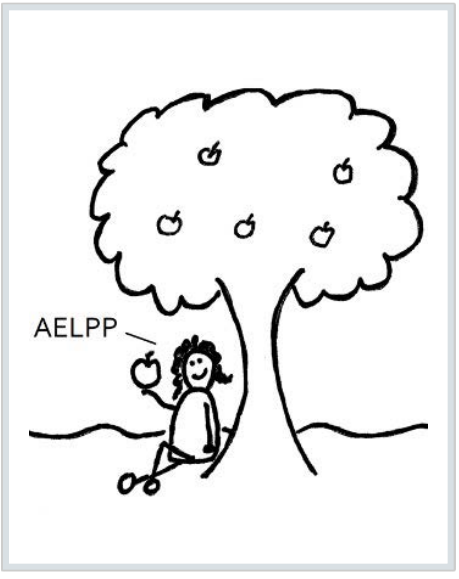
**TECH CORNER** | PROVIDING PUBLIC HEALTH EXPERTS WITH PRAGMATIC EXPLANATIONS OF TECHNICAL CONCEPTS

# WHAT IS A HASH-BASED TECHNOLOGY?

IIS have used hash-based technology for years to secure their systems. This technology needs to be considered for new IIS functions to protect patient privacy and link records across systems.

A hash function can convert a piece of data into a new form that represents the original data. A hash function is easy to calculate in one direction but very difficult to reverse. This means that it is easy to hash data but almost impossible to reverse a hash and determine the original data. The "hashed" data can then be used for situations where the original data cannot be stored or disclosed. Most hash functions use complicated math, but we can demonstrate hash functions with anagrams. Anagrams are easy to make but can be very difficult to figure out, especially for longer words and phrases. For this example, we create a hash function that takes a written phrase and reorders the letters alphabetically:

| Original Phrase | Hashed Phrase |
|---|---|
| HELLO | EHLLO |
| CAT | ACT |
| CAT IN THE HAT | AACEHHINTTT |
| MICKEY MOUSE | CIEEKMMOUSY |




The method above may seem trivial, but it was put to serious use by Sir Isaac Newton, who wished to publish his discoveries in science without disclosing the details to his rivals. He published a summary of his discovery as a long anagram, which was impossible to decipher, and then years later he disclosed the original version to prove the date of his discovery. Newton used a hash function to disclose he knew something without disclosing what he knew.

## How are hash functions used today?

Websites, such as your IIS, do not store user passwords and yet can verify passwords during login. To do this, websites use the hash function to convert plain text passwords into their hashed equivalent. The plain text password is promptly thrown away, and only the hashed version is stored permanently.

*Continued on page 10*

The "AIRA Tech Corner" is published as a blog. Read more on the AIRA website.

**TECH CORNER** | PROVIDING PUBLIC HEALTH EXPERTS WITH PRAGMATIC EXPLANATIONS OF TECHNICAL CONCEPTS

# WHAT IS A HASH-BASED TECHNOLOGY?

*Continued from page 9*

To verify logins, the website must convert the password entered in using the same hash function and compare the results with what is stored. If they match, the website knows the same password was used and can authorize the user. If they do not match, the website knows the password is wrong but does not know what the correct password should be nor even how close the user was from getting it correct.

For those of you who are curious about what real hashed data might look like, here is the same list above hashed using the SHA-1 hash function:

| Original Phrase | SHA1 Hashed Data |
|---|---|
| HELLO | c65f99f8c5376adadddc46d5cbcf5762f9e55eb7 |
| CAT | cf9b775c2c444520178d30c267440066c6eff6e8 |
| CAT IN THE HAT | d231656c174333cf944a2d820e3006ed870de7e6 |
| MICKEY MOUSE | 3b565973c9c2acebe01f28751f1dfdcfa33bf07a |

## How might IIS use hash functions in the future?

Hash-based technology could help IIS:

- **To link patient data from different organizations.** Privacy Preserving Record Linkage (PPRL) technology uses hashed values to characterize patient records so that they can be matched across organizations without sharing sensitive patient information.

It is important for IIS to understand the benefits and limitations of hash-based technology and be ready to use it to improve data quality and security as they work to modernize their systems.

**It is important for IIS to understand the benefits and limitations of hash-based technology and be ready to use it to improve data quality and security as they work to modernize their systems.**

The "AIRA Tech Corner" is published as a blog. Read more on the AIRA website.