

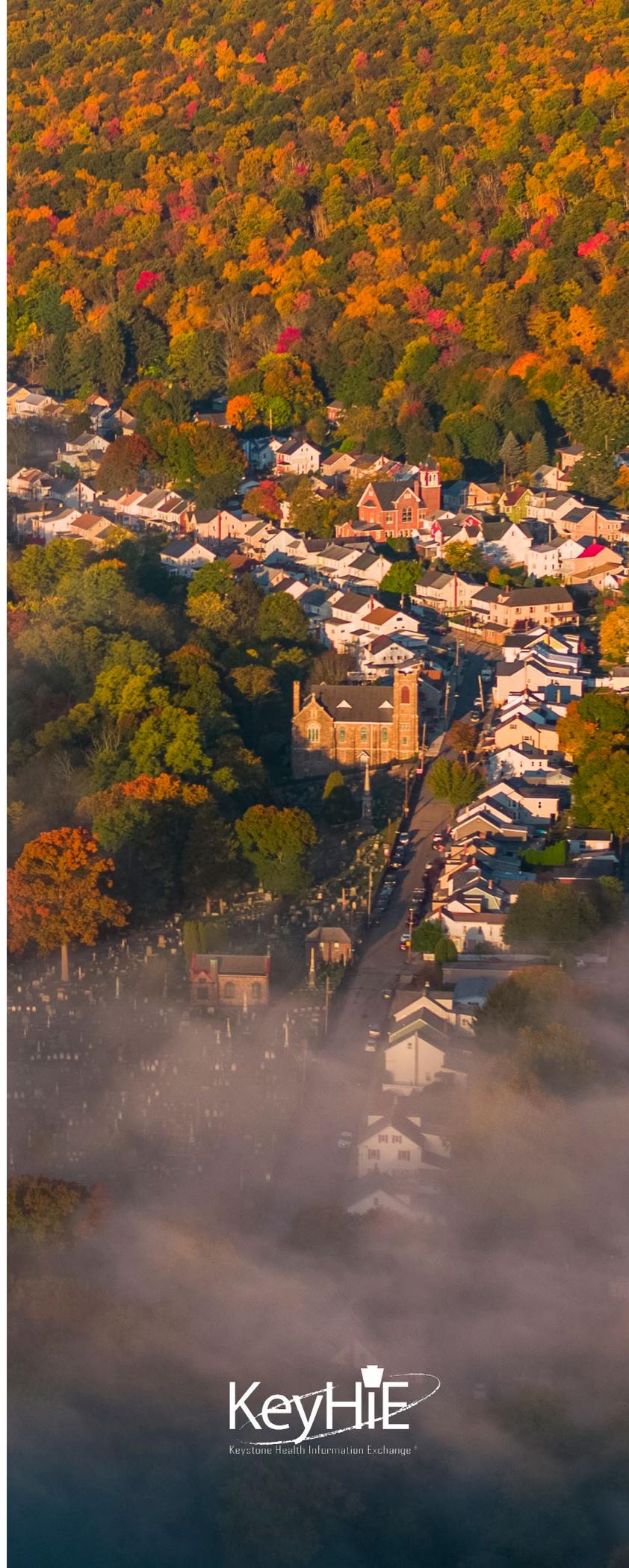
# Keystone Health Information Exchange's Agile COVID-19 Response

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Orion Health Case Study:  
Keystone Health  
Information Exchange

**Pennsylvania**

[keyhie.org](http://keyhie.org)



**Customer Name**

Keystone Health Information Exchange

**Location**

Pennsylvania, United States

**Population**

Over 8.3 million

**Organisation Type**

Health Information Exchange

**Products Implemented**

Orion Health Outbreak Management

**Key Benefits**

- Allows for fast, secure data exchange
- Quick implementation and go-live
- Streamlined System Architecture

## The Customer

The COVID-19 crisis has underscored the value proposition of state and regional Health Information Exchanges (HIE). As one analysis put it, the pandemic “spotlighted the importance of sharing population-level data quickly, with HIEs across the country crunching data to answer hospital capacity questions, predict the virus’ spread and determine vaccine allocation and eligibility.”<sup>1</sup>

A recent success story from the Keystone Health Information Exchange (KeyHIE®) provided solid evidence of that value. The HIE met an urgent call from the state of Pennsylvania to facilitate the population of provider vaccination records to the statewide database. This goal was accomplished using the HIE’s robust infrastructure developed with Orion Health.

## About KeyHIE

KeyHIE, a Geisinger corporation, is Pennsylvania’s longest-operating HIE. It serves approximately 8.3 million patients in Pennsylvania and New Jersey. KeyHIE connects an expanding array of organizations that includes:

- 40 hospitals
- 301 physician practices
- 86 long-term care facilities
- 25 home health agencies
- 19 Urgent Care facilities
- 18 pharmacies
- 3 EMS agencies
- 5 insurance companies

Guthrie Clinic and Penn State Health, two leading healthcare organizations, are recent additions. KeyHIE also supports the Pennsylvania Patient & Provider Network (P3N) state-wide data exchange and associated registries.

## The Challenge

During the COVID-19 crisis, the Governor’s office sought help from KeyHIE through the Pennsylvania Statewide Immunization Information System (PA-SIIS). A provider lacked the technological resources to transmit critical COVID-19 vaccination records directly from its internal immunization information system to PA-SIIS. The ramifications of a scenario such as this can be significant. One recent article noted that “quality data capture is a critical component of response efforts. Poor data can lead to gaps in communication between public health departments and healthcare organizations that can make it difficult to track cases and reduce infection rates.”<sup>2</sup> KeyHIE’s efforts demanded both speed and a standards-based approach.

<sup>1</sup> N. Tepper, “Momentum Returns for Health Information Exchanges,” Modern Healthcare, April 20, 2021.

<sup>2</sup> R. Leventhal, “In Pennsylvania, KeyHIE Empowers Real-Time COVID-19 Reporting,” Healthcare Innovation, July 28, 2020.

## A Strong Platform

Since 2015, KeyHIE has partnered with Orion Health to implement an integrated technology suite that enables KeyHIE to offer a range of services for its rapidly-growing participant base. The platform's foundational components are comprised of Orion Health's enterprise-grade interoperability software and Clinical Data Repository that consolidate and manage information at scale. Comprehensive functionality built on this strong base encompasses secure messaging, clinical document viewing, patient portal tools, a specific HIE module, and more.

## Health Information Exchange Organization Awarded Federal Funding to Expand COVID-19 Immunization Data Sharing

KeyHIE operating under Geisinger was awarded federal funding through the Strengthening the Technical Advancement and Readiness of Public Health via Health Information Exchange (The STAR HIE Program): Improving COVID-19 Vaccination Data: Connecting Immunization Information Systems (IIS) to Health Information Exchanges from the Office of the National Coordinator for Health Information Technology (ONC). The STAR HIE Program supports innovative health information exchange services that benefit public health agencies and improve the health information exchange services available to support communities disproportionately impacted by the COVID-19 pandemic. As a part of the program, KeyHIE's project is focused on increasing data sharing between Health Information Exchanges (HIEs) and IISs.

KeyHIE's infrastructure supports real-time COVID-19 reporting and data management, integrating with Pennsylvania's IIS through PA-SIIS. Orion Health's expertise in project management and interface services was also instrumental in helping the organization pivot to the pandemic's urgencies and fulfill the requirements of the STAR HIE Program.

## Solution: Rapid Response to Pennsylvania Request

Kim Chaundy, KeyHIE's Senior Director of Operations, observes, "We could not have reacted so expeditiously for PA-SIIS without the platform in place that we've built with Orion." The efficacy of KeyHIE's rapid mobilization to overcome the data exchange barriers can be seen in a review of the action sequence.



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**Kim Chaundy,**  
Senior Director of Operations KeyHIE

### CSV file decision and specification

Uploading a CSV file was quickly determined to be the best course of action. The participating provider immediately received KeyHIE's Immunization Interface Specification document containing CSV file requirements.

### Data exchange testing

Following testing coordination calls between KeyHIE and PA-SIIS, KeyHIE obtained a CSV sample file from the provider. Within an hour of file receipt, KeyHIE completed testing and notified the provider of errors found. Updated files were sent shortly thereafter, and a second testing round was finished in short order.

### Validation of standards compliance

KeyHIE's testing protocol also involves validating two key elements of the data message structure and message content. First, conversion from CSV file to an HL7 Vaccine Update Information (VXU) message was tested. KeyHIE indicated to the client that CSV-to-VXU would not occur if any fields or segments required by CDC and PA-SIIS VXU criteria were missing. Second, KeyHIE validated the VXU against NIST standards, utilizing Pennsylvania's customized version of the NIST Tool for conformance testing of HL7 v2 messages. Once validated, 10 immunization messages were transmitted to PA-SIIS. Receipt and correct posting to the test environment were quickly confirmed.

### Production environment testing

The next day KeyHIE obtained production files from the provider and minutes later uploaded some files to PA-SIIS to conduct a full test suite in the actual production environment. Within hours, approval was granted to begin sending all records.

### Go-live

The same day that transmission was authorized, KeyHIE began full continuous sending of the vaccination records to PA-SIIS. By early morning the following day, file transfer was complete.

## Results and Benefits Achieved

The swift turnaround effort generated impressive results:

- 52 hours from sharing the CSV file specification to first HL7 VXU message transmitted to the PA-SIIS production environment.
- 81,196 COVID-19 vaccination records received, converted, and transferred. Upload completed within hours.
- First Pennsylvania HIE to accomplish CSV transfer to PA-SIIS.
- Full adherence to standards-based, secure data exchange. No "workarounds."

Beyond populating the state registry with vital, time-sensitive COVID-19 information, KeyHIE's success produced notable additional benefits:

- Established ready solution for other providers unable to send immunization and other records to PA-SIIS. Kim Chaundy observes that "the range of healthcare organizations creates a highly variable situation regarding data management capabilities." As a result, "too much white space remains in the data landscape."
- Furthered Pennsylvania's accurate, timely, complete public health reporting.
- Enabled caregiver inquiries into patient vaccination status.

## Streamlined System Architecture

Figure 1 displays the core system architecture and process flows. The Orion integration engine accepts, converts, and transmits the original CSV files. Once a participant has an HL7 VXU interface with KeyHIE, the streamlined, closed-loop system shown in Figure 2 can be invoked. While straightforward in architecture, this solution is backed by Orion Health technology built for data management at high velocity and large scale. Orion’s platform is also compliant with HITRUST, NIST 800-53, and other standards.

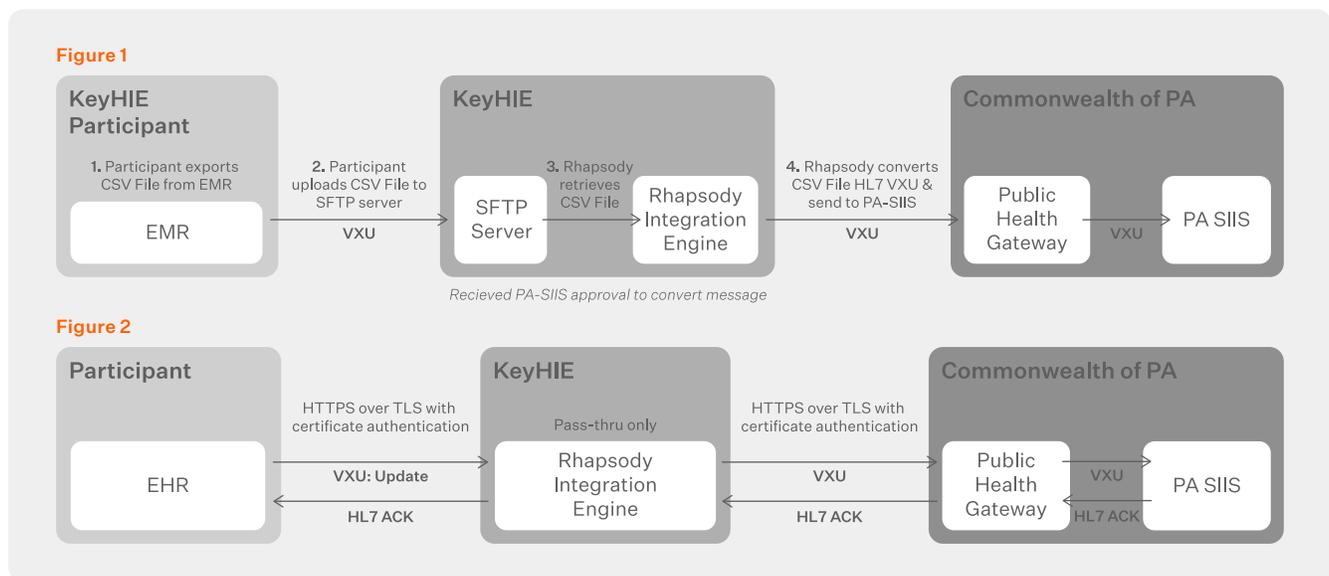
Bringing this solution to fruition resulted from what Chaundy describes as a “true team relationship. Orion’s experienced professionals follow a meticulous process in implementation, testing, and ongoing management of our platform and applications.”

## Expanding Pandemic-Related Services

KeyHIE is working with Orion Health on two initiatives that extend its recent success and add further value to the state’s and participant providers’ COVID-19 efforts.

### Care team notifications

The first program sends COVID-19 vaccination information to appropriate care team members anywhere in the participant network. KeyHIE can provide real-time notification to a caregiver when patient receives the vaccine or related action. The inbound VXU or CSV containing vaccination information triggers the notification. This solution greatly assists ability to deliver more personalized care and fulfill COVID-19 mandates.



## Producing heat maps

The genesis of the second initiative was recognition that KeyHIE, with Orion's help, could use its trove of patient data and its analytics capabilities to create COVID-19 geographical heat maps for its member organizations. Chaundy observes that the HIE "started identifying potential and actual virus exposure through lab results and CPT/ICD codes, creating a map we updated every two hours." That proved so illuminating to the members that they sought more information. "Our database could easily supply desired demographic data, enabling members to predict local hotspots and respond with appropriate pop-up or other care facilities," notes Chaundy.

KeyHIE has also teamed with PA-SIIS to generate statewide vaccination heat maps having twin objectives: monitoring vaccine distribution progress and helping prevent potential health inequities in COVID-19 response. Constructing the state map entails parsing de-identified PA-SIIS files that conform to the CDC COVID-19 Vaccine Reporting Specification (CVRS). KeyHIE can extract and analyze relevant patient information, feeding a dashboard displaying geographic concentration of completed COVID-19 vaccinations with associated demographics.

Combatting inequities includes querying the KeyHIE database to search for potential at-risk individuals. KeyHIE can enhance its heat maps with risk-identifying factors such as race, ethnic group, age, gender, and language.

## Future Directions

KeyHIE's COVID-19 data management success models future solutions promising major impact on disease surveillance and preparedness for public health crises. The organization has already assisted with state opioid addiction efforts such as the Pennsylvania Coordinated Medication Assisted Treatment (PacMAT) program. "The key is data," asserts Chaundy. "The magnitude of many of these challenges requires information that is comprehensive, real-time, structured to relevant standards, and managed at scale." HIEs are particularly well positioned for this effort. KeyHIE and Orion Health are committed to leading the way. Referrals within the hospital are fully integrated in the clinical record, allowing users to view the referral within the clinical workstation, and manage the referral workflow while in patient context.

## Orion Health

At Orion Health, we are building thinking software for life. Our new generation health software provides an open platform that seamlessly integrates local, regional, and national data, making it more readily available to doctors, pharmacists, nurses, specialists and patients themselves. We believe that our software, built on new generation technology, will give everyone healthier, happier and longer lives.

**Find out more at: [orionhealth.com](https://www.orionhealth.com)**