



Data Collection and Reporting Best Practices

**As Required by
Senate Bill 969, Section 4(c)
87th Legislature, Regular Session, 2021**



TEXAS
Health and Human
Services

Texas Department of
State Health Services

September 1, 2022

Table of Contents

Executive Summary	1
1. Introduction	2
2. Background	3
3. Electronic Laboratory Data	5
Barriers to Electronic Laboratory Reporting	5
Best Practices for Electronic Laboratory Reporting.....	6
4. Hospital Capacity Data	9
Barriers to Hospital Capacity Data	10
Best Practices for Hospital Capacity Data	10
5. Immunization Administration Data.....	13
Barriers to Immunization Administration Data	13
Best Practices for Immunization Administration Data	14
6. Data Analytics and Sharing.....	16
Barriers to Data Analytics and Sharing	16
Best Practices to Data Analytics and Sharing.....	17
7. Vaccine and Therapeutics Tracking	19
Barriers to Vaccine and Therapeutics Tracking.....	19
Best Practices for Vaccine and Therapeutics Tracking	20
8. Conclusion.....	21
List of Acronyms	22

Executive Summary

Effective public health operations depend on accurate and useable data. The need for quality public health data is heightened during a public health disaster or response, as exemplified over the course of the COVID-19 pandemic. National and state policy makers, public health and emergency response decision makers, and the general public had a critical demand for data points that included disease spread, immunization rates, hospital capacity, and disease severity. COVID-19 data sets informed critical decision points throughout the pandemic and contributed to Texans' ability to make choices about their individual response to COVID-19.

The demand for complex and voluminous data during the COVID-19 pandemic strained Texas systems that were outdated, designed for low volume, manual, or simply did not exist. At the same time, the processing power and enhanced analytics required to manage such data sets necessitated a large public health and technical work force that did not exist at a sufficient level before the pandemic.

The demands for data impacted not only the Department of State Health Services (DSHS), but also created significant new burdens for many public health, health care, and emergency response partners. These partners included local health departments (LHDs), hospitals and health care facilities, regional advisory councils, and testing laboratories. Throughout the pandemic, DSHS has worked with these partners to continuously improve COVID-19 data submission, uniformity, and quality, and to create automated processes for receiving and sharing data. In addition, significant federal funding has allowed DSHS to procure new systems, perform systems upgrades, and hire a temporary workforce to support the data demands of the COVID-19 pandemic.

While the COVID-19 pandemic was unique in the volume and speed at which data was required, it was everyday public health data systems that largely supported collection and dissemination of COVID-19 data. As the COVID-19 emergency response tapers down, the ongoing maintenance of these everyday data systems will be a key consideration for decision makers. To continue the capabilities and best practices achieved during the COVID-19 response, and to maintain flexible preparedness for any future pandemics or statewide responses, ongoing support for maintenance of these systems will be necessary.

1. Introduction

[Senate Bill 969, Section 4\(c\), 87th Legislature, 2021](#), directs DSHS to improve standardized data collection and reporting by the department, laboratories, health care facilities, LHDs, and other entities as appropriate during a declared public health disaster. SB 969 also directs the department to identify current processes for and barriers to standardized, regular, and consistent reporting and to collaborate on best practices to ensure that data collection and reporting are consistent across state, regional, and local levels. Finally, SB 969 directs the department to coordinate its analysis with regional advisory councils, LHDs, laboratories, healthcare facilities, and the Public Health Funding and Policy Committee. The department was directed to implement best practices and report its findings to the legislature no later than September 1, 2022.

Throughout the COVID-19 pandemic response and since the passage of SB 969, DSHS has collaborated with laboratories, health care facilities, LHDs, and other reporting entities to implement best practices to improve and standardize the collection and reporting of critical data. These improvements will help ensure uniformity of data submitted to the agency during any future infectious disease event. At the same time, many of these improvements were possible due to significant federal funding received during the pandemic. To continue the capabilities and best practices achieved during the COVID-19 response, ongoing support for maintenance of these systems will be necessary.

2. Background

DSHS reporting requirements during an infectious disease event or public health response typically stem from state and federal requirements, including requirements associated with federal grants. In the case of the COVID-19 pandemic, DSHS collected and reported data to comply with federal requirements, Texas statute, and state level executive orders. Given the breadth of the pandemic, these data reporting expectations have been expansive and include:

- Hospital bed capacity per Texas Governor Abbott's Executive Order [GA-38](#) and per Centers for Medicare and Medicaid Services (CMS) rules¹
- Diagnostic laboratory data reporting per Texas Governor Abbott's Executive Order [GA-38](#) and the federal Coronavirus Aid, Relief, and Economic Security (CARES) Act (2020)²
- Routine notifiable disease reporting per [Texas Health and Safety Code, Section 81.041](#) and [Chapter 97, Title 25, Texas Administrative Code](#)
- Case information reporting to the Centers for Disease Control and Prevention (CDC) in alignment with federal epidemiological and laboratory capacity grant funding requirements
- Immunization and antiviral administration data reporting into the Texas Immunization Registry per [Texas Health and Safety Code, Section 161.00705](#) and in alignment with federal expectations to receive federally-purchased COVID-19 vaccine
- Coding of COVID-19 fatalities in death certificates based on the CDC's National Center for Health Statistics (NCHS) Vital Statistics Reporting Guidance³

Throughout the pandemic DSHS daily reported case counts, testing data, fatalities, hospital capacity, and immunization coverage data to the public through its external-facing website. DSHS also provided data and analysis to fellow emergency

¹ Interim Final Rule (IFC), CMS-3401-IFC; Requirements and Enforcement Process for Reporting of COVID-19 Data Elements for Hospitals and Critical Access Hospitals.

² Public Law 116-136; 15 USC 9001, *et seq.*

³ <https://www.cdc.gov/nchs/covid19/coding-and-reporting.htm>

response agencies and local jurisdiction partners. DSHS only shares public health data in accordance with state and federal privacy laws.

This report will use the COVID-19 response effort to illustrate barriers and best practices implemented to improve public health data. Specifically, the report will cover the following public health data areas that have been key during the COVID-19 response:

- Electronic laboratory data
- Hospital capacity data
- Immunization administration data
- Data analytics and sharing
- Vaccine and therapeutics tracking

While different public health disasters or events may require varying specific data points, the data areas above are expected to be important during everyday public health operations and during most types of disasters. DSHS invested significantly in each of these data areas using federal COVID-19 grant funds, an effort which demonstrates the progress that can be made with investment and collaboration.

3. Electronic Laboratory Data

Many key COVID-19 metrics stemmed from electronic laboratory data: positive and negative COVID-19 testing laboratory results, as well as positivity rates. Electronic laboratory data is collected by the Texas National Electronic Disease Surveillance System (NEDSS), a statewide centralized and integrated public health surveillance system that acts as the state's primary infectious disease surveillance system and serves most regional and local health departments across the state of Texas. NEDSS is the repository by which local and regional staff monitor, detect, manage, and mitigate infectious diseases in their communities. NEDSS processes and distributes electronic laboratory reports (ELRs), which are often the first triggers to begin a disease investigation. Case investigations of diseases are entered and managed in NEDSS. NEDSS essentially serves as the foundational core of public health surveillance in Texas.

The Centers for Disease Control and Prevention (CDC) first developed NEDSS in 2001 and offers the software free of charge to all states. However, states that participate in NEDSS are expected to cover routine maintenance and upkeep. DSHS first acquired NEDSS in 2004. DSHS received an appropriation to begin modernizing NEDSS during the 86th Legislature, Regular Session, 2019.

Barriers to Electronic Laboratory Reporting

NEDSS has served as the foundation of all COVID-19 data, and yet was antiquated and unstable when COVID-19 cases first emerged in Texas. At the same time, NEDSS was tasked with receiving and processing unprecedented volumes of data on a daily basis. Texas experienced several barriers to standardized, regular, and consistent reporting of electronic health data.

- Dated infrastructure - NEDSS was unable to handle massive volumes of data and the user interfaces were inadequate for external users.
 - ▶ Slow ingestion of data from reporters resulted in delayed receipt of laboratory reports
 - ▶ Slow data extraction, with data extracts taking up to 72 hours, resulted in delayed visibility of COVID-19 trends
 - ▶ Insufficient server capabilities and capacity to accommodate data volume led to NEDSS instability and frequent system downtimes

- Inconsistent use among LHDs – Due in part to NEDSS antiquated state, not all LHDs used NEDSS to report cases monitor cases. Some LHDs used work arounds including:
 - ▶ Use of customized infectious disease surveillance systems that did not seamlessly interface with NEDSS and caused backlogs and duplicative reporting requirements for providers
 - ▶ Submission of paper or fax copies to DSHS for DSHS entry into NEDSS, which diverted DSHS from other COVID-19 responsibilities and delayed timeliness of case reporting
 - ▶ Submission of incompatible electronic data sets requiring DSHS staff to adjust file formats or enter the data into NEDSS manually

These barriers initially resulted in gaps in COVID-19 surveillance and reduced visibility and timeliness of data for both local health jurisdictions and DSHS. Additionally, DSHS staff experienced unsustainable increases in workforce hours with managing the existing NEDSS system, working to upgrade NEDSS, and conducting manual work-arounds to ensure daily case reporting to the public.

Best Practices for Electronic Laboratory Reporting

The 86th Legislature appropriated funds to DSHS to stabilize the NEDSS system. At the beginning of the pandemic, this funding allowed for critical purchases of upgraded hardware and software to perform much needed updates. Federal grant funding for the COVID-19 response further allowed DSHS to upgrade the NEDSS system to the most up-to-date version.

With the system upgrades, NEDSS has improved its ability to ingest and process timely electronic laboratory reports. Prior to the pandemic, NEDSS processed an average of 2,000 electronic lab reports per day. Now, with latest upgrades, NEDSS can process approximately 400,000 electronic lab reports daily.

The system's processing time to update the reporting database has reduced by 50 percent. NEDSS is currently in the most modern CDC approved version and Texas has been recognized by CDC for its advancements to the NEDSS system, with Texas now serving as a beta testing site for the CDC.

DSHS has also been able to implement non-technological best practices to improve the quality, quantity, and timeliness of electronic lab reporting. These best practices were made possible by significant federal COVID-19 grant funding.

- Augmented staff – DSHS has hired federally funded staff and temporary positions and contracted with vendors for data collection, provider support, and analytics.
- Outreach to providers - DSHS created a team to reach out to facilities identified that were not submitting their COVID-19 results to the state electronically or that had patterns of missing data or errors.
 - ▶ Onboarding these facilities to submit electronically helped significantly reduce the manual entry by the local and regional health departments
- Onboarding procedures – The number of NEDSS users increased from 500 to more than 8,000. DSHS has harnessed federal grant funds to streamline and simplify onboarding procedures for providers.
 - ▶ DSHS offers providers free reporting software and comprehensive support through an expert onboarding vendor in COVID-19 laboratory reporting
 - ▶ DSHS offers customized assistance to provide needed individual support to facilities experiencing consistent challenges in their onboarding efforts
- Enhanced training and communication – Federal funding allowed DSHS to greatly enhance the technical assistance to NEDSS users.
 - ▶ DSHS created comprehensive training resource tools and on-demand video training for users.
 - ▶ DSHS developed training manuals tailored to submission method.
- Help desk capacity – DSHS has increased NEDSS user support and help desk capacity fourfold to accommodate the increase in NEDSS.
- Data quality assurance – DSHS works routinely with data submitters to monitor data quality and validity.
 - ▶ DSHS now conducts routine data quality and completeness reports and follows up with labs appropriately to resolve discrepancies
- DSHS has been promoting the adoption and implementation of national messaging standards to reduce the likelihood of errors when provider systems transfer data into NEDSS.

- Reporting entities were able to initiate electronic data transmission from their systems to DSHS systems because of the investments made during the pandemic.

4. Hospital Capacity Data

Another significant public health data source during the pandemic has been related to hospital capacity. As required by federal Centers for Medicare and Medicaid Services (CMS) rules⁴ and Texas Governor Abbott's Executive Order [GA-38](#), DSHS has collected and publicly reported hospital capacity since April 2020.

DSHS used federal COVID-19 funding to adapt EMResource, a web-based resource management and communication tool, to collect hospital data. Hospitals report their data to eight of the DSHS regional advisory council contractors, known as Hospital Preparedness Program (HPP) partners. HPP partners facilitate data flow to DSHS through the EMResource system and this process allows DSHS to meet federal requirements for reporting to the U.S. Health and Human Services (HHS) portal.

Hospital capacity data has evolved over the pandemic based on federal requirements. Required reporters currently include hospitals, psychiatric and rehabilitation facilities, and freestanding emergency rooms, with hospitals and freestanding emergency rooms reporting daily. Since August 2020, facilities are responsible to report over 60 aggregated data points including:

- Hospital bed availability by type
- Hospital bed occupancy by type
- COVID-19 suspect and lab-confirmed inpatient patients
- COVID-19 suspect and lab-confirmed admissions in the past 24 hours
- COVID-19 patients on a ventilator
- Availability and use of durable medical equipment like ventilators and anesthesia machines
- Emergency department visits, including due to suspected or lab-confirmed COVID-19
- Intensive care unit (ICU) bed availability and use
- COVID-19 therapeutics use and availability

⁴ Interim Final Rule (IFC), CMS-3401-IFC; Requirements and Enforcement Process for Reporting of COVID-19 Data Elements for Hospitals and Critical Access Hospitals.

- Fatalities due to COVID-19 in the past 24 hours

Hospital capacity data provides point-in-time situational awareness of regional and statewide capacity to handle COVID-19 patient volumes. It also offers a public health perspective on the impact of COVID-19 over time.

Barriers to Hospital Capacity Data

While hospital capacity data has been a key indicator of the pandemic's impact in Texas, data collection has placed a significant strain on the same facilities that struggled to respond to surges of COVID-19 patients within their communities. Several challenges have been evident related to hospital reporting.

- Manual processes – Many facilities manually update data daily to provide a snapshot of their capacity situation. This can be time intensive and take away from patient care. Facility processes differ widely, depending on their technological capabilities and internal procedures.
- Changing requirements – The federal government has periodically changed what data points are mandatory. This led to disruptions to data collection as facilities worked to adjust to changed expectations.
- Volume of data points – Based on federal expectations, facilities were required to report numerous data points, some of which may not have significantly informed emergency response activities but required facilities to manage a constant flow of data collection and reporting in addition to patient care duties.
- Data uses – Hospital capacity data was intended to provide situational awareness of the hospital system's ability to maintain care for both COVID-19 and non-COVID-19 patients throughout Texas. The data has been most useful for trend analysis. However, throughout the course of the pandemic, there was a desire for the system to go beyond original purposes, such as:
 - ▶ Tracking individual patient outcomes, vaccine, or therapeutic status
 - ▶ Providing real-time patient tracking to facilitate patient transfer for hospitals that ran out of capacity

Best Practices for Hospital Capacity Data

The federal requirements for hospital reporting remain in place and there is no indication that reporting will significantly roll back. While U.S. HHS has allowed some relief in frequency of reporting for psychiatric and rehabilitation hospitals,

most Texas hospitals continue to report over 60 metrics daily. It is unclear whether the federal government intends for these requirements to fully end at any point.

At the same time, [Senate Bill 984, 87th Legislature, Regular Session](#), requires DSHS to keep in place a hospital reporting system of de-identified health care data, including demographic data, necessary for Texas and its regions to effectively plan for and respond to public health disasters and communicable or infectious disease emergencies. DSHS is reviewing, as part of its COVID-19 after-action review (AAR) process, which data elements have been most helpful during the response to inform how hospital reporting should continue once federally mandated reporting concludes.⁵ Until COVID-19-related hospital reporting requirements are repealed, DSHS is unable to fully implement the intent of SB 984 with a permanent and sustainable process.

While current federal COVID-19 requirements limit DSHS' ability to make significant progress on improving hospital capacity data reporting, some best practices and considerations have emerged.

- HPP facilitation role – Hospital partners uniformly conclude the success of harnessing the HPPs to facilitate data collection. This approach has allowed single regional touch points for both hospital and DSHS. Further, the HPPs provide a quality check function for the state.
- Focused data points – The current hospital reporting system makes clear that any required reporting should seek to limit the amount of data points to minimize potential impact to patient care and operations. Hospital reporting should focus on the minimum needed level of usable data.
- Data dictionary – A key best practice has been DSHS implementation of a data dictionary throughout the hospital reporting effort. Comprehensively communicated data definitions have better ensured that facilities use the same terms as each other, and collect data using consistent approaches.
- Patient transfer – During the COVID-19 response, DSHS implemented the Pulsara system to assist participating facilities with matching available beds and

⁵ Following a disaster response incident, DSHS conducts an AAR with partners to evaluate the response specific to DSHS emergency planning and response responsibilities. The DSHS AAR identifies strengths and challenges and advises on strategies to preserve those strengths and mitigate and improve on identified challenges.

patient transfer across the system. While at certain points in the pandemic, beds were simply not open to allow patient transfers, Pulsara did offer an option to streamline the transfer process.

- ▶ Pulsara does not provide real time information on bed availability, but rather allows participating facilities to see patient transfer requests instantly for consideration
- ▶ Pulsara also can track transferring patients through the health care continuum, from the sending facility and physician, through EMS transport, and to the receiving facility and physician
- ▶ Pulsara presently costs \$2.4 million annually and has been funded by federal COVID-19 funds
- ▶ There is no ongoing funding source
- ▶ DSHS is discussing options and needs for the system or one like it when there is no statewide disaster

5. Immunization Administration Data

Immunization and antiviral administration data reporting into the Texas Immunization Registry, also called ImmTrac, is required during a public health emergency or disaster under [Texas Health and Safety Code, Section 161.00705](#). Further, [Texas Health and Safety Code, Section 161,0074 \(d\)](#), requires DSHS to report on certain demographic, accessibility, and disparity information in the two years following a public health disaster as it relates to immunizations for the communicable disease pertaining to the declaration. Additionally, during the COVID-19 emergency response, federal expectations were that states provide complete vaccine administration data in order to continue to receive federally purchased COVID-19 vaccine.

Throughout the effort to make COVID-19 vaccine available and accessible to all Texans, ImmTrac has been a key system to monitor the effectiveness of vaccine outreach and allocations strategies. ImmTrac is a service that consolidates and stores vaccine records from a variety of sources, including health care providers, pharmacies, and public health clinics. ImmTrac consolidates each consenting person's immunization into one electronic record. With more than 164 million records, ImmTrac is a major public health data asset for the state.

Barriers to Immunization Administration Data

Typically, a person's immunization record can only be entered into ImmTrac if consent is provided. However, during the COVID-19 pandemic, it has been a requirement that providers enter all COVID-19 vaccinations into ImmTrac per Texas statute and federal expectations. This requirement, combined with the number of COVID-19 vaccines being administered, led to an unprecedented strain on the ImmTrac system, which was last updated in 2017.

- Data volume – As of August 2022, over 46.8 million COVID-19 doses have been administered in Texas.
 - ▶ Each of these doses has been entered into ImmTrac, constituting 10 times the volume that ImmTrac was able to handle prior to the pandemic
 - ▶ Volume issues regularly led to system outages and downtime at the beginning of vaccine rollout, at a time when the federal government was closely monitoring daily administration data to inform future allocations

- Time-consuming data entry – Providers were required to report doses administered within 24 hours of administration, but the ImmTrac user interface was outdated and cumbersome and delayed provider reporting
- Quality of data – The cumbersome data entry process led to error-prone data so that Texans were unable to retrieve their personal information and demographic data was initially not reliably complete

Best Practices for Immunization Administration Data

DSHS used federal COVID-19 grant funds to make improvements to ImmTrac. DSHS also used federal funds to bring on board over 60 temporary employees and contractors to support the vaccine effort, including vaccine data analysis, ImmTrac support, and the Vaccine Allocation and Ordering System (VAOS). These enhanced resources allowed DSHS to stabilize and update ImmTrac and provide vaccine administrators with much needed technical assistance and streamlined processes.

- System capacity and speed – ImmTrac upgrades significantly increased the system’s capacity to ingest higher volumes of vaccine records without system failure, with as many as 270,000 new records processed in one 24-hour period.
- Streamlined provider interface – A self-service rapid entry interface option was introduced for providers to complete required fields more easily, a particularly useful tool for providers conducting mass vaccination or drive thru clinics.
- Maintenance and upkeep – Before the pandemic, ImmTrac was last updated in 2017. Ongoing upkeep of the system and planning for future iterations of ImmTrac will be important as the system ages and to maintain modern capabilities.
- Demographic data – DSHS was able to reinforce the need for providers to enter demographic data like age and race/ethnicity, leading to robust statistics about vaccine coverage among different groups.
- Data analytics – DSHS was able to use federal COVID-19 funds to implement a strong data analytics component to vaccine administration data.
 - ▶ The public facing website provides county and regional metrics
 - ▶ DSHS provided LHDs with granular data to allow them to better pinpoint clinic locations

- ▶ DSHS was able to perform complex analysis to report on the effectiveness of vaccination in preventing COVID-19 fatalities and severe illness

6. Data Analytics and Sharing

[House Bill 3704, 86th Texas Legislature, Regular Session, 2019](#), states that DSHS may enter into an agreement with a LHD that provides essential public health services to provide the entity access to identified public health data relating to the entity's jurisdiction and any public health data relating to a jurisdiction contiguous to the entity; and deidentified public health data maintained by the department relating to any other jurisdictions.

Throughout the pandemic, DSHS and LHDs have experienced the need for more seamless data analysis and sharing. Particularly in the early days of the pandemic, DSHS and its partners were hampered by cumbersome and antiquated systems for sharing and analyzing infectious disease data. LHDs in particular were negatively impacted by this situation. They had the responsibility to collect and submit data to DSHS, and also needed DSHS data analytics to feed data and trend information back to them. Using federal COVID-19 temporary grant funding, DSHS was able to put systems and short-term staffing in place to build and integrate best practices.

Barriers to Data Analytics and Sharing

The complexity and volume of data during the COVID-19 pandemic strained Texas systems that were outdated, designed for low volume, manual, or simply did not exist. At the same time, the processing power and enhanced analytics required to manage such data sets necessitated a large public health and technical work force that did not exist at a sufficient level before the pandemic.

- Disparate legacy systems – Data resided in numerous locations and databases but had to be brought together each day to deliver COVID-19 metrics to the public and decision makers.
 - ▶ Data took 9 to 12 hours each day to collate and distribute
 - ▶ The manual processes were inefficient and prone to human error and delays
 - ▶ These limitations initially reduced DSHS' ability to answer fundamental questions about the impact of COVID-19 on Texas, requiring hours of manual analysis due to lack of automation
- Inefficient sharing with local jurisdictions - Data sharing limitations put up roadblocks for DSHS and LHDs.

- ▶ Data sharing limitations reduced DSHS' ability to provide local jurisdictions access to data specific about their communities
- ▶ DSHS systems were not sufficient to provide data interfaces for LHDs to directly access data they are authorized to receive

Best Practices to Data Analytics and Sharing

DSHS has undertaken specific efforts to better serve LHD data needs. Building on pre-pandemic work, DSHS has used federal COVID-19 funds to develop the State Health Analytics and Reporting Platform (SHARP). SHARP integrates, stores, and enables analysis of public health data. SHARP can automate complex processing jobs and increase overall efficiency and reliability of reports. SHARP incorporates data visualization tools that provide powerful insight. SHARP also enables and enhances the data governance of public health data assets to ensure data is used and shared appropriately and securely. Best practices enabled by SHARP include:

- Quicker processing time – SHARP brings together data sets from multiple systems to allow robust and timely complex public health data analysis.
 - ▶ SHARP decreased the time for analysts to check data each day from 3 hours a day to just one hour
 - ▶ SHARP automated report generation for daily situation reports, saving nearly 2 hours each day
- Better data quality – Additional data quality checks and ongoing data quality monitoring.
 - ▶ SHARP has reduced the possibility of human mistakes causing data errors or miscalculations
 - ▶ SHARP allows higher data quality all while cleaning the data more quickly and efficiently
- Access to data visualizations – SHARP offers user ability to view maps and graphs to gain summary information about individual regions and the state.
 - ▶ SHARP provides a self-service data reporting and analysis feature for LHDs, allowing them to curate raw data for their jurisdiction into meaningful analyses
 - ▶ DSHS programs and other users will be able to increasingly benefit from these features over time as SHARP implementation continues, with level of access based on authority provided by statute

- Access to line-level data – SHARP offers user ability to access data and run analyses within the SHARP system.
 - ▶ SHARP provides over 70 health entities access to their jurisdiction’s COVID-19 data on a real-time basis
 - ▶ SHARP increases security of data sets with protected health information by allowing authorized jurisdictions to access and analyze their area’s data without transferring or downloading raw data files to local systems

The SHARP system won a State IT Award for data sharing and management from the Texas Association of State Systems for Computing and Communications as well as the GovTech Best of Texas Award for Best Innovative Use of Data Analytics. Initial SHARP implementation has focused on COVID-19 data sets. As the SHARP implementation project continues, local jurisdictions will be able to further access data they are entitled to under Texas statute.

7. Vaccine and Therapeutics Tracking

During the COVID-19 emergency response, DSHS was tasked with allocating, distributing, and tracking COVID-19 vaccine and therapeutics. This effort ensured Texans' access to these preventive and treatment resources through efficient logistics tracking and asset monitoring; it also ensured the state's compliance with federal requirements to continue receiving the federally controlled resources.

Since June 2020, DSHS distributed tens of millions of doses of COVID-19 vaccine. DSHS has also allocated and shipped therapeutics courses to hundreds of providers and LHDs. As of August 2022, DSHS is still maintaining this effort on behalf of the state for COVID-19 vaccine and treatments.

Barriers to Vaccine and Therapeutics Tracking

- Antiquated system – DSHS previously had in place a legacy inventory vaccine management system called the Electronic Vaccine Inventory (EVI) system. No system was in place with the capability to track therapeutics.
 - ▶ This system had limited capacity and could not manage high volumes
 - ▶ The system could not integrate with other systems like the state's Immunization Registry, ImmTrac
 - ▶ The system was inflexible and could not be adjusted quickly for changes to product type, dosing, or shipment specifications
- Manual data extraction and analysis – The first allocations of COVID-19 therapeutics occurred in June 2020.
 - ▶ The analysis and calculations to allocate 5,700 critical treatment doses to about 300 health care facilities were conducted entirely by hand in Excel
 - ▶ DSHS allocated various treatment options according to this method until August 2021, when the Vaccine Allocation and Ordering System (VAOS) opened for therapeutics ordering and analysis
 - ▶ The use of VAOS has extensively reduced the manual aspects of the allocation and ordering process
- Provider base – Historically, DSHS has been responsible for oversight of vaccine orders specific to its Adult Safety Net and Texas Vaccines for Children programs.

- ▶ Prior to the pandemic, providers for these programs comprised only about 3,000 health care providers statewide
- ▶ Over the course of vaccine and therapeutics ordering, DSHS systems interacted with over 20,000 provider users

Best Practices for Vaccine and Therapeutics Tracking

In just three months, DSHS and its contractors developed the Vaccine Allocation and Ordering System (VAOS) in preparation for federal approval of COVID-19 vaccines. VAOS would also be used for therapeutics ordering and allocations periodically as federal processes shifted throughout the pandemic. DSHS implemented many best practices for VAOS based on lessons learned in laboratory reporting related to training, technical assistance, and provider tools. Training and provider tools – DSHS used the lessons of NEDSS to ensure sufficient availability of technical assistance for providers.

- ▶ Using temporary federal funding, DSHS brought on board 64 employees and contractors to support both VAOS and ImmTrac and provide hands on assistance to providers
- ▶ DSHS facilitated training for over 12,300 vaccine providers through over 100 webinars at an average of 400+ providers in attendance each week
- ▶ Providers had access to over 20 job aids, simple instructions designed to help providers avoid mistakes in using the system
- Flexibility – VAOS offers a flexible and scalable platform that can adapt to changing demands.
 - ▶ VAOS has updated periodically during the COVID-19 response to quickly adapt to new available vaccines or therapeutics, with roll out occurring in as little as 12 hours following federal announcements
 - ▶ VAOS has been adapted for therapeutics and vaccine in response to the 2022 monkeypox outbreak
 - ▶ VAOS has been updated to accommodate pre-bookings for annual flu vaccine

8. Conclusion

[Senate Bill 969, Section 4\(c\), 87th Legislature, 2021](#), directs DSHS to identify and implement best practices as it relates to improvement of standardized public health data collection and reporting and report its findings to the legislature no later than September 1, 2022.

Throughout the COVID-19 pandemic response and since the passage of SB 969, DSHS has collaborated with laboratories, health care facilities, LHDs, and other reporting entities to implement best practices to improve and standardize the collection and reporting of critical data. These improvements have occurred largely in the following areas:

- Electronic laboratory data
- Hospital capacity data
- Immunization administration data
- Data analytics and sharing
- Vaccine and therapeutics tracking

Over the course of the COVID-19 response, DSHS has harnessed federal COVID-19 funding to implement best practices in data collection and analysis. These funds have allowed DSHS to make significant investments in the technology and workforce infrastructure necessary to maintain high quality, standardized data. To continue the capabilities and best practices achieved during the COVID-19 response, ongoing support for maintenance of these systems would be necessary. As the COVID-19 emergency response tapers down and federal grant funding expires, the ongoing maintenance of these everyday data systems will be a key consideration for decision makers.

DSHS continues to make advances in improving the public health data that public health and emergency response partner, policy makers, and the general public depend on to make informed decisions about Texas' health. As DSHS continues to evaluate the COVID-19 response, through analysis like its after-action review process, DSHS will work to further implement best practices in data maintenance, sharing, and analysis.

List of Acronyms

Acronym	Full Name
ASN	Adult Safety Net Program
CARES	Coronavirus Aid, Relief, and Economic Security Act
CDC	Centers for Disease Control and Prevention
DSHS	Department of State Health Services
ELR	Electronic Laboratory Report
EVI	Electronic Vaccine Inventory system
HHS	U.S. Health and Human Services
LHD	Local Health Department
NEDSS	National Electronic Disease Surveillance System
SHARP	State Health Analytics and Reporting Platform
TVFC	Texas Vaccines for Children Program
VAOS	Vaccine Allocation and Ordering System