Vaccine Tracking and Administration: Real-Time Data Drives Safety and Efficiency

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LEARNING OBJECTIVES

1. Discuss methods to rapidly implement technological solutions and overcome barriers in vaccine administration.
2. Illustrate the compilation of data to drive executive-level decisions for resource allocation.

BACKGROUND

COVID 19 Pandemic
- Novel severe acute respiratory syndrome coronavirus 2 (SARS-COV-2) infections spread across the US with the first case reported in early 2020. The virus has infected humans worldwide and resulted in over 500,000 deaths.[1]
- Vaccines from Pfizer, Moderna, and J&J were given emergency use authorizations in late 2020 and early 2021, respectively.[2]
- ASHP identified principles for COVID-19 vaccinations including "seek innovative solutions for adverse drug event monitoring and documentation to improve thoroughness, accuracy, and usefulness of data collection for improved vaccine safety."[3]

Vaccine Allocations
- Accuracy of data required for vaccine allocation requests from the state.

Current practices at Texas Children's Hospital
- Vaccines are distributed throughout the enterprise and stored in appropriate conditions until use. Storage includes automated dispensing cabinets and refrigerators/freezers within the pharmacy
- Nursing staff administers vaccines directly from vials
- Employee vaccinations recorded in Occupational Health Software (OHM) and patient vaccinations recorded in Electronic Medical Records (EMR)

METHODS

- TCH formed a tiger team with data architects, systems analyst and pharmacist to design a process map for COVID-19 vaccine procurement, distribution, preparations, dispensing, administrations and waste tracking in late 2020.
- Technology utilized includes application software, medication safety and labeling devices, Electronic Medical Record systems (EMR), Occupational Health Software (OHM), Enterprise Data Warehouse and data visualization software.
- Application developed within the application software development tool documents user inputs of vaccine delivery tracking/transfers, acquired number of vials, lot numbers, expirations, vaccines received by nurses for administration in real-time, and waste documentation. Medication safety and labeling devices are used to prepare batch doses of vaccines based on intentionally designed color-coded labels to differentiate vaccine manufacturers.
- Vaccine batches tracked with unique barcodes and documented in EMR or OHM. Data is extracted real-time from multiple databases to produce visualizations.
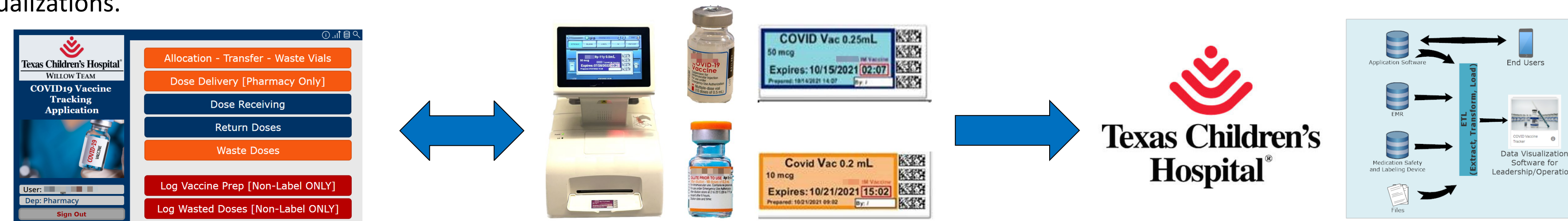
RESULTS

- Data extracted from application software, medication safety and labeling devices, EMR, and OHM to formulate multiple data visualizations. Visualizations include key performance indicators (KPIs) and additional valuable statistics to make informed decisions.

Figure 1
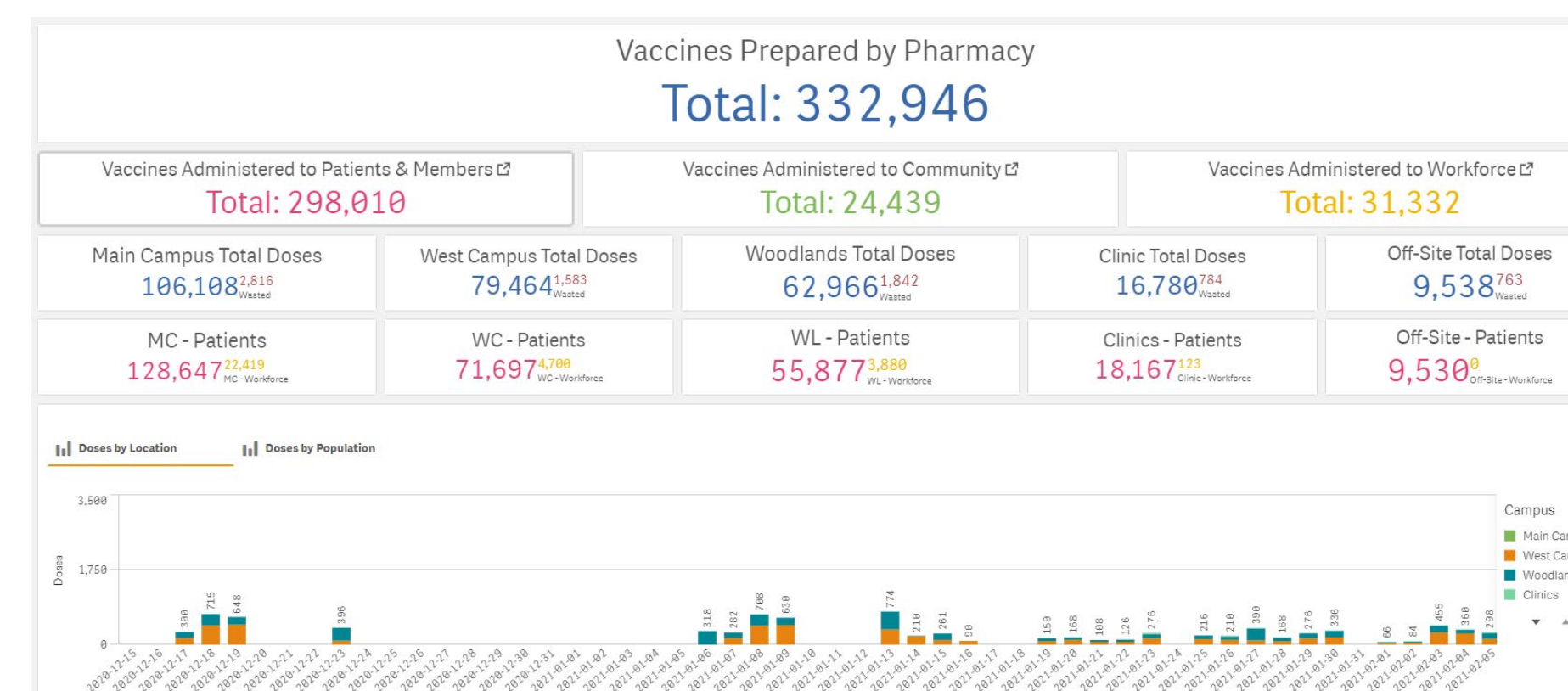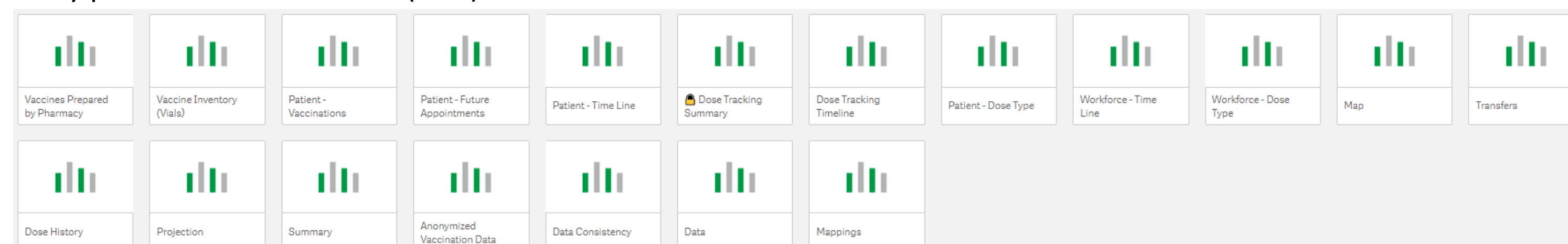Multiple data visualization sheets created from data extracts

Figure 2
Data visualization including KPIs from Vaccines Prepared by Pharmacy sheet
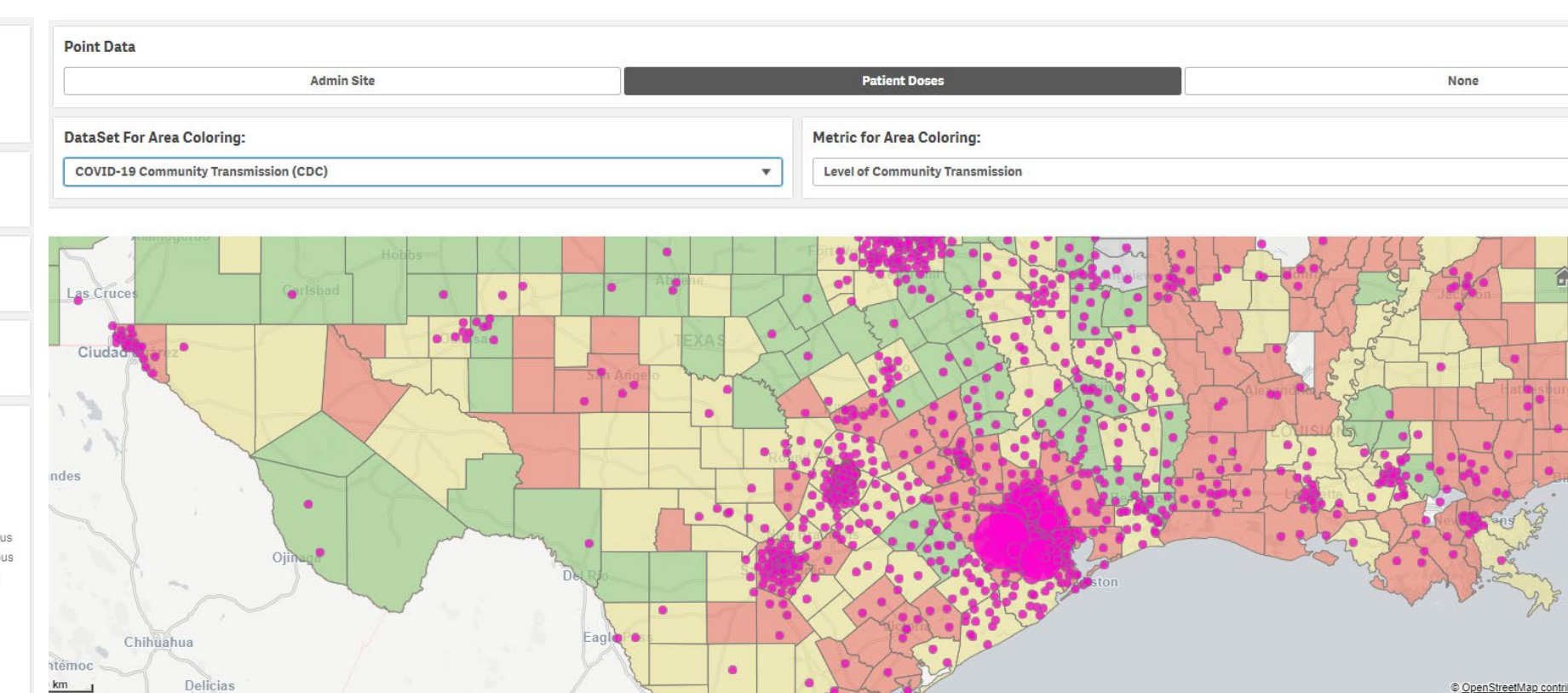
Figure 3
Data visualization of doses administered to population represented on map

DISCUSSION

- Rapid organization and implementation of customized existing applications allows for enhanced data capturing capabilities.
- Customizations in data visualization software available on the cloud platform incorporates data from multiple sources. Data can easily be filtered to end user needs.
- Statistics can be accessed by key executives to make real time decisions to determine vaccine outreach, employee needs and appointment availability based on vaccine allocations.
- Flexibility of application software allows for immediate changes for new areas of vaccine administration
- Medication safety and labeling device customized color-coded labels easily identify doses in syringes and manufacturer.

Future Steps:
- Expand application software utility for other TCH processes and medication tracking
- Expand use of medication safety and labeling devices in pharmacy workflows
- Create one application for tracking and visualization

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The authors have no relevant financial relationships to disclose

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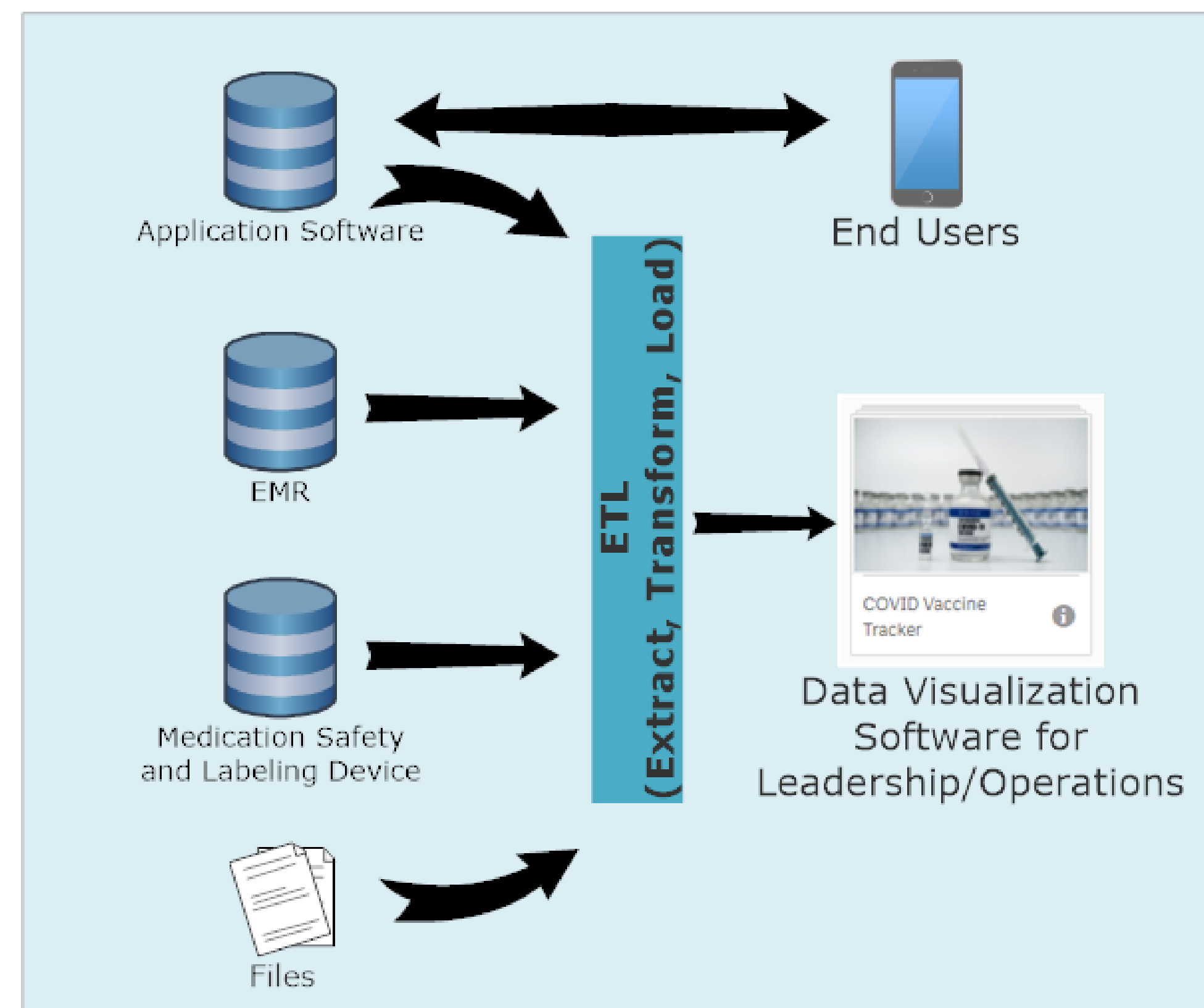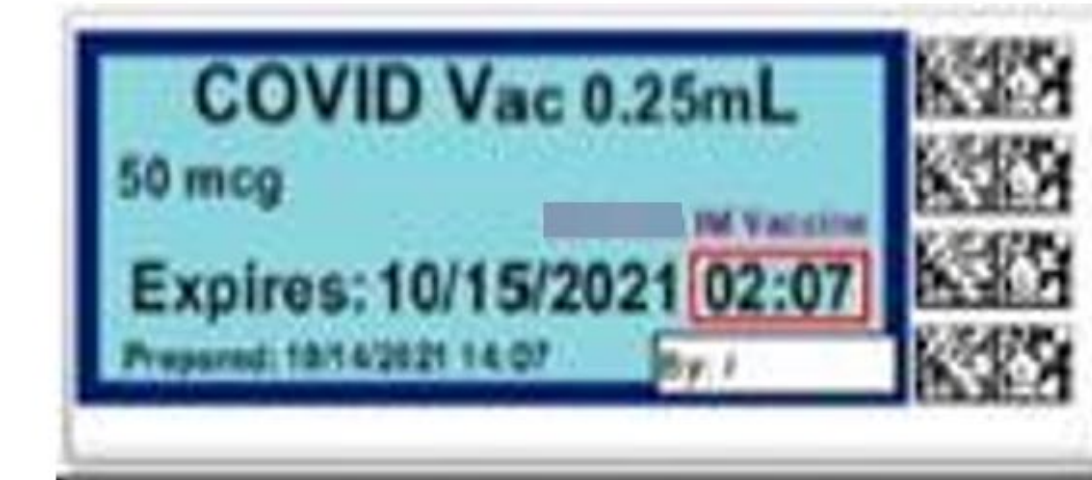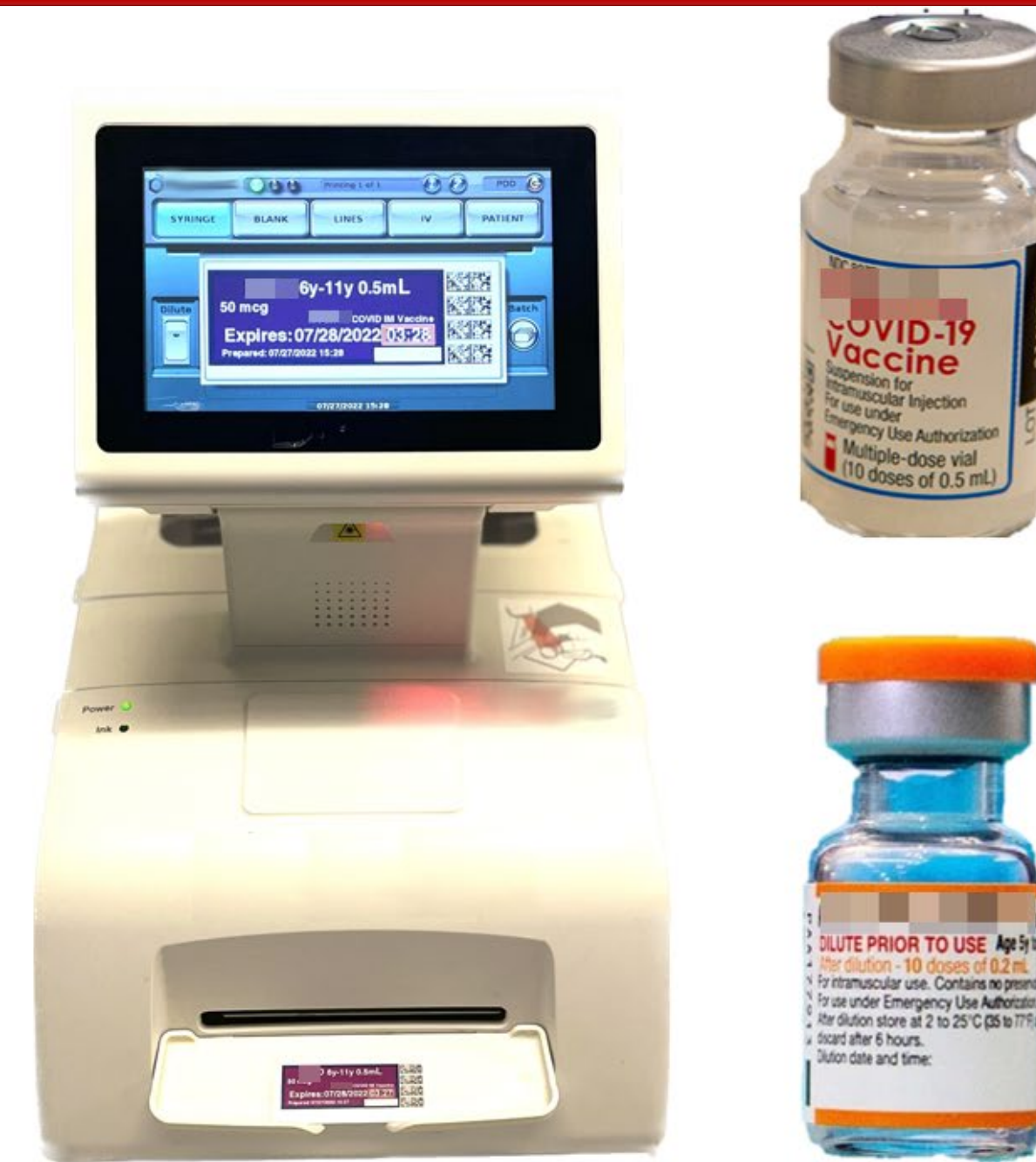**Shawn Mathew, PharmD, MBA, BCPS,** Clinical Pharmacy Informaticist
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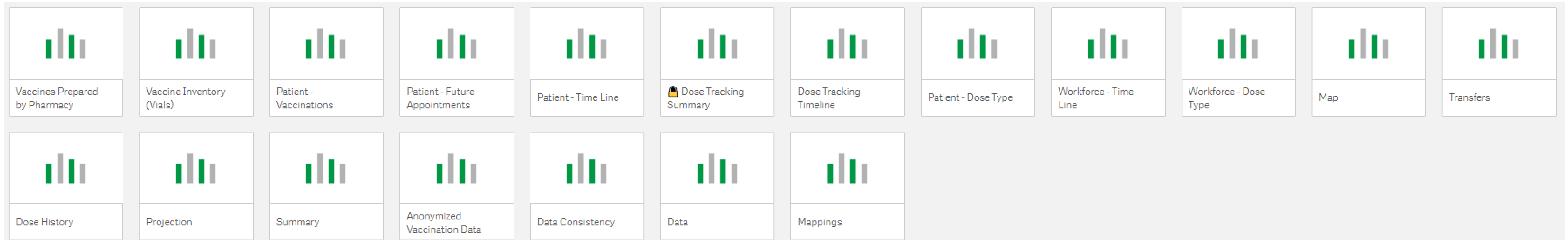

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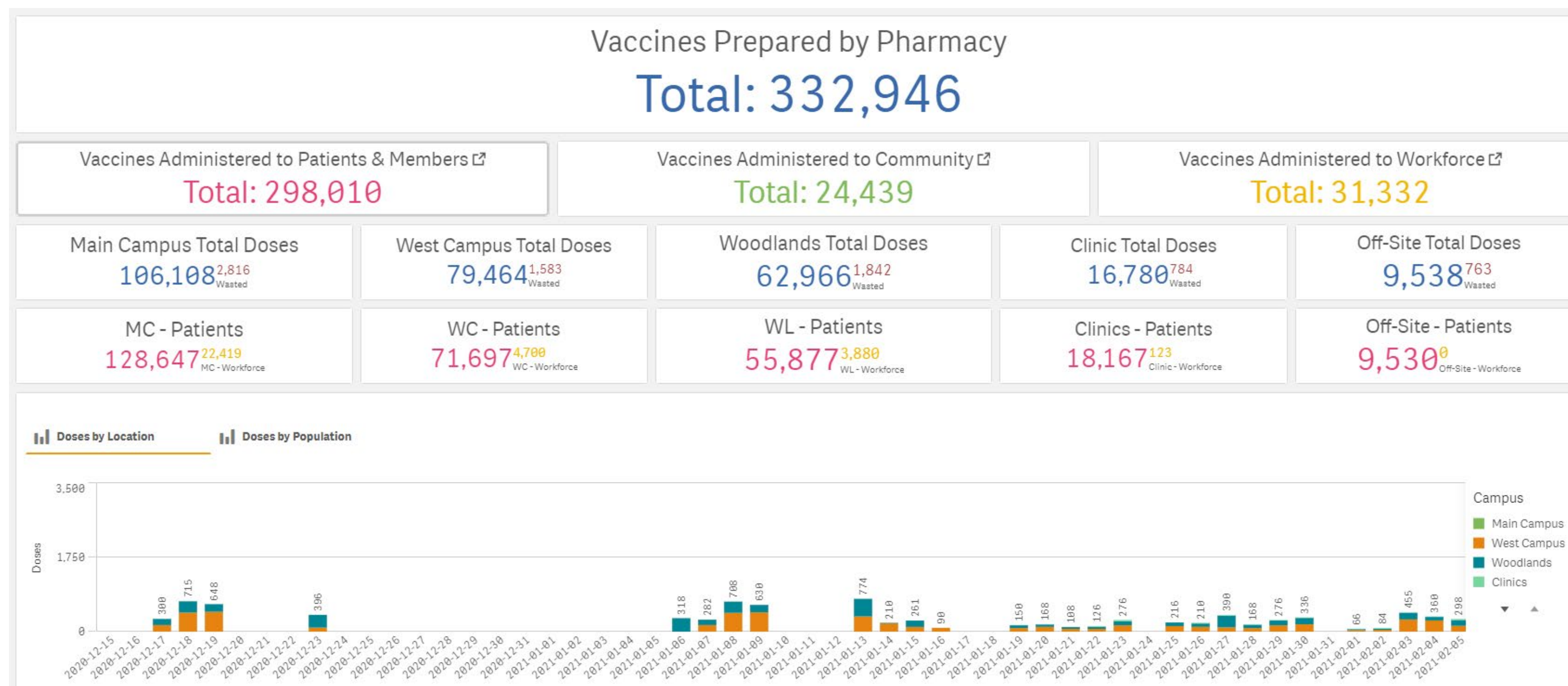Multiple data visualization sheets created from data extracts

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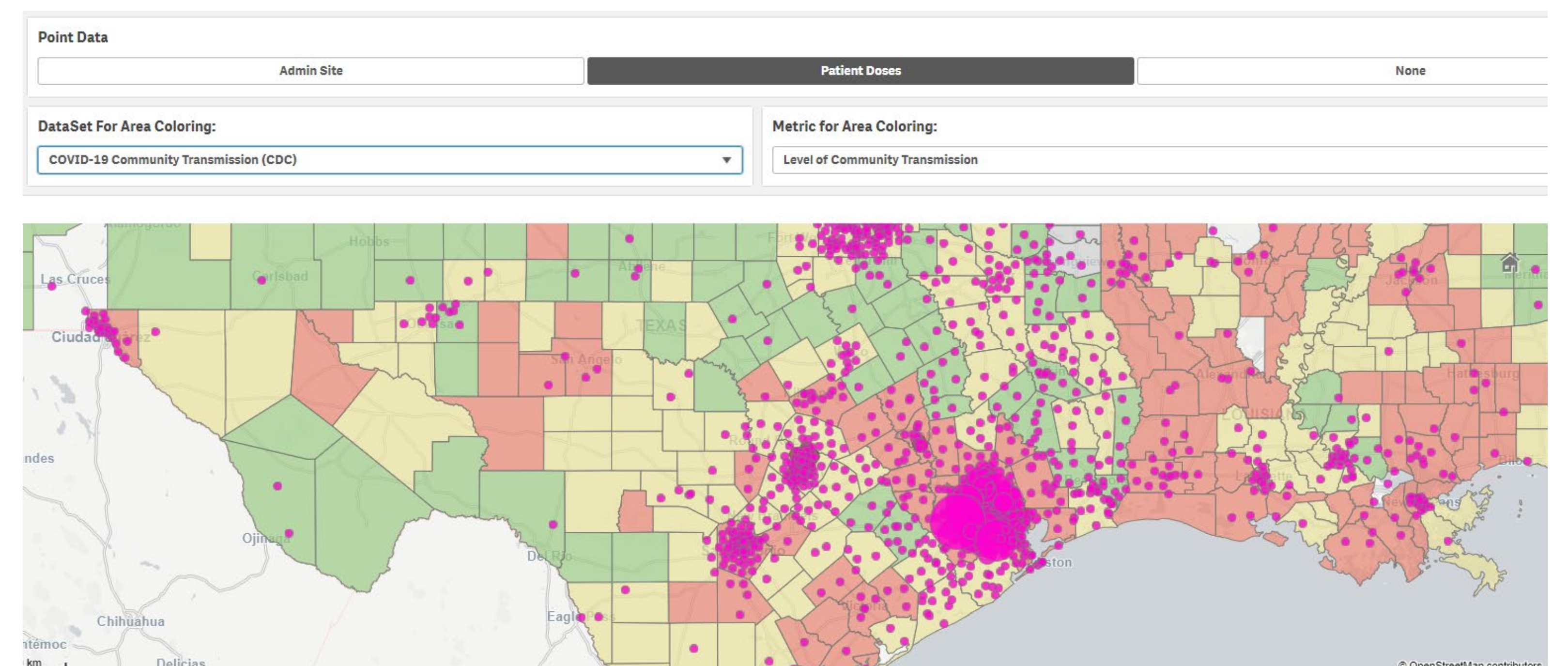Data visualization including KPIs from Vaccines Prepared by Pharmacy sheet

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