

UC Davis Health | Covid-19 Unified Reporting Collaborative Vaccination Program

Summary: The Unified Reporting Collaborative (URC) was created at UC Davis Health to enable reporting collaboration across the health system and support operational needs of Covid-19 vaccination reporting. Specifically, the URC was first tasked by hospital leadership to create a dashboard to visualize the amount of vaccine supply on-hand and how that supply would be depleted by incorporating future vaccine deliveries (adding to) and scheduled vaccinations (reducing) two weeks out – internally referred to as the burndown chart (*figure 1*).

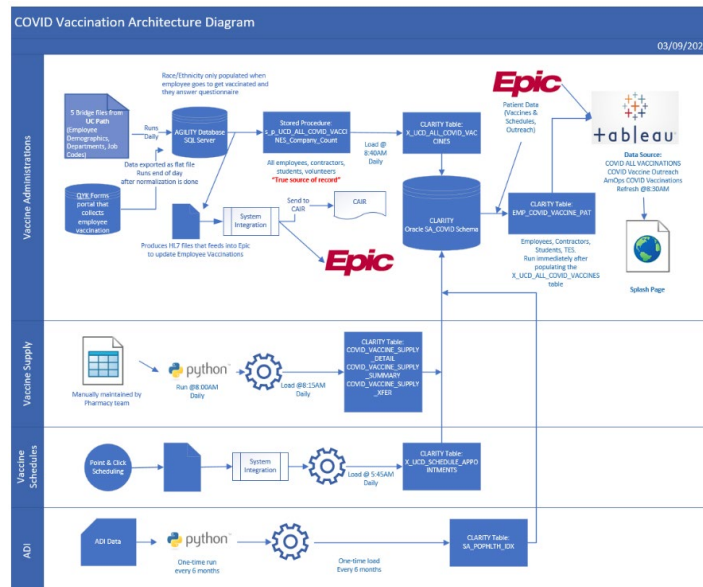
Figure 1 – Supply Burndown Chart



Project Details: UC Davis Health began [vaccinating frontline healthcare employees against COVID-19](#) on December 15, 2020 – receiving some of the first shipments from Pfizer. We expanded to vaccinating community members on January 12, 2021. As additional patients became eligible for vaccination it became more challenging to manage supply and scheduling. In addition, during this time vaccines were in short supply and allotments were given weekly by the State of California. The stakes were incredibly high as we needed to vaccinate as many community members as possible while ensuring we had the necessary supply of vaccines to do so. Cancelling vaccine appointments because of a lack-of-supply was not tenable.

Towards late January 2021 demand for highly accurate near real-time information was critical. Executive leadership had a rapid need for this information and our teams quickly formed to incorporate disparate data sources into a reliable and validated source of truth for vaccine reporting. For the first few weeks the URC was meeting at least every day with some additional tiger team meetings to hone in on specific issues – such as building a vaccine inventory reporting solution with pharmacy from scratch. The multidisciplinary team (Employee Health Services, Student Health & Counseling (Campus), Pharmacy, System Integration, Ambulatory Operations, Operational Analytics, and the Innovation Technology Data Center of Excellence) was able to build a process to incorporate the data sources through a combination of designing and building custom data structures and extracting relevant details to store in a central data warehouse (*figure 2*). Ultimately, the end solution required us to harmonize and automate the collection of vaccination data from seven sources through numerous time sensitive ETL processes utilizing SQL, Python, and Epic data linking.

Figure 2 – Covid Vaccination Data Flow Architecture



Separately from scheduling, supply, and administration we were able to incorporate social determinants of health information, e.g., Area Deprivation Index (ADI) and Healthy Places Index (HPI) into our data pipelines. This was used later to visualize in Tableau to better understand whom UCDH was vaccinating (figure 5).

By mid-February 2021 we had compiled the extremely complicated calculations to show current and future vaccine inventory (figure 1), current and future vaccine scheduling (figure 3), and historical vaccine administrations (figure 4) data. The vaccine information was visualized in Tableau and sent to UC Davis Health executives every morning (figures 1,3,4), allowing critical decision-making regarding our vaccination efforts that would otherwise not be possible.

Figure 3 – Scheduled Vaccinations (Today and Future)

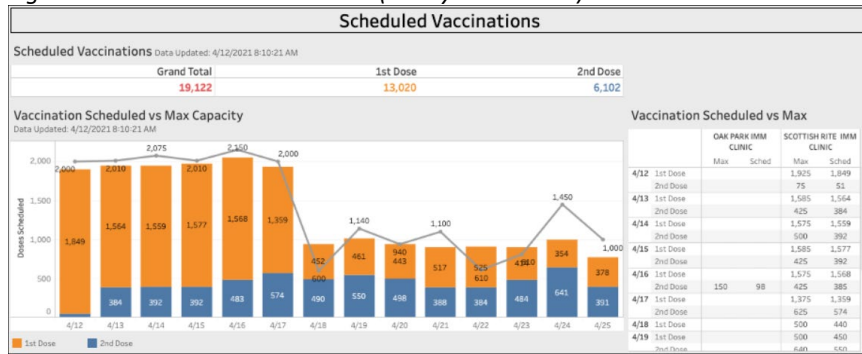
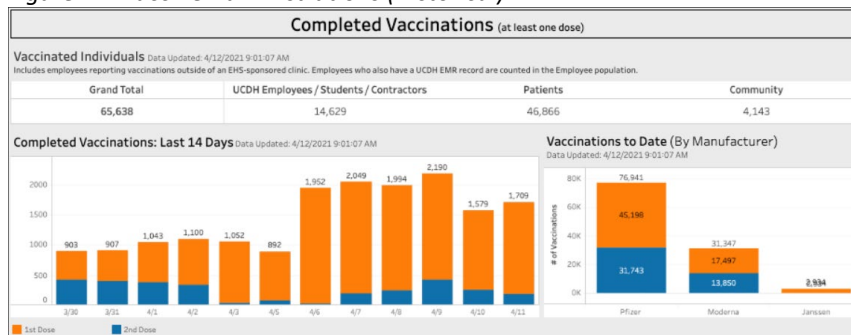


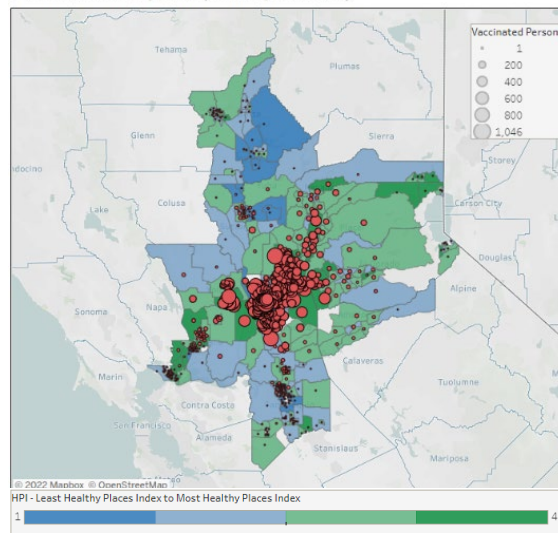
Figure 4 – Vaccine Administrations (Historical)



Impact: This information was harnessed by our executive leadership and allowed UC Davis Health to maximize the number of community members we could vaccinate by ensuring our pharmacy team knew how many vaccines were needed to meet our scheduling capacity and conversely how many vaccination appointments could be scheduled by our Ambulatory Operations team (for our mass vaccination sites).

Figure 5 – Vaccinations by HPI

Vaccinations by HPI (County & Tract)



Because in part of the efforts of the Unified Reporting Collaborative – UC Davis Health was able to provide 160,000 1st and 2nd dose vaccines to 85,000+ individuals in the early stages of the pandemic (through May 2021). Also, we were able to clearly articulate our vaccine supply needs weekly to the State of California for allocation purposes, no vaccines expired on the shelf, and no vaccination appointments were cancelled due to a lack of vaccine supply.

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