Understanding COVID-19 Vaccine Data to Improve Equity

State of Minnesota — Minnesota IT Services

CATEGORY:
Data Management, Analytics & Visualization

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INITIATION DATE:
January 2021

END DATE:
Ongoing

MINNESOTA IT SERVICES

Executive Summary

On January 12, 2021, Minnesota launched the COVID-19 vaccine dashboard to detail the progress of COVID-19 vaccine allocation, distribution, and administration across Minnesota. The dashboard, produced by Minnesota IT Services (MNIT) and the Minnesota Department of Health (MDH), provides a visual and user-friendly way to view key vaccination data for our state.

The dashboard, and the data behind it, was collected from three sources:

1. The Minnesota Immunization Information Connection (MIIC), a confidential immunization information system.
2. American Community Survey (ACS).
3. Centers for Disease Control and Prevention's (CDC) Vaccine Tracking System (VTrckS).

The dashboard tied pieces of vaccine information together to give Minnesotans a complete picture of the state's COVID-19 vaccine response. Visual data helped people understand who was getting the vaccine, which vaccine was received by various populations, and how providers were meeting their initial vaccination goals.

This was one of the first public data dashboards for the State of Minnesota that met an immediate public need during a crisis. The dynamic data dashboard on the state's COVID-19 response site allowed Minnesotans to access the information in a way that could be updated as the pandemic evolved.

In 2021, the dashboard had 3,093,457 visitors. The data informed additional, targeted strategies to ensure the equitable distribution of vaccine to Minnesotans of all races and ethnicities, including communities disproportionately impacted by COVID-19 because of systemic inequities. Gaps identified by this data led to additional programming for communities disproportionally affected by COVID-19, such as the expansion of community-based vaccination sites, mobile vaccination units, and the Small Chain Independent Pharmacies (SCIP) pilot program.

Idea

What problem or opportunity does the project address?

From the beginning of the pandemic, Minnesota saw an increased interest from healthcare organizations, city, county, and regional public health organizations, the media, and the public in the latest data about COVID-19 and its impact. To meet this demand, MDH provided an unprecedented amount of data on a daily basis. As vaccines started to be rolled out, and given the limited initial supply, MDH knew there would be a lot of interest about how many vaccine doses were allocated to the state and where they were being distributed.

To immediately meet this need in an efficient and accessible format, the agency provided this information on their website using static tables and maps, but that meant the information was spread

out across multiple web pages and did not have a quick snapshot of the current vaccine landscape. MNIT and MDH sought to address this by working on a dashboard solution to feed the same data into a more interactive and visual format with all of the relevant data displayed in one spot on multiple tabs. This provided a one-stop-shop for partners, media, and the public to see how vaccines were distributed and administered.

The detailed data also promoted transparency with how the process was working to distribute vaccines quickly and equitably across the state.

Why does it matter?

Throughout the COVID-19 pandemic, MDH and the State of Minnesota sought avenues to clearly communicate ongoing efforts for COVID-19 mitigation. As vaccines became available, the public had questions about how the limited supply would be distributed, who was receiving vaccines, and whether the state was meeting its goals. Reporters wanted access to the data to validate vaccine distribution, Minnesotans called public hotlines with questions, and conflicting information swirled around social media channels that was difficult to address. MDH developed a data management process to showcase vaccine distribution data on different web pages on the MDH website, but the separate web pages made it more difficult to see the full picture in one place. The pages also used static tables and maps to meet accessibility standards and were updated weekly.

As vaccine distribution information changed on an almost daily basis in January 2021, the State of Minnesota knew it needed a public place to provide all the information, daily, in an-easy-to-read format, that could be updated efficiently. MDH worked with MNIT to take the static data files and create a public data dashboard using Microsoft Power BI. The dashboard provided visual data about of vaccine distribution and administration in the state so Minnesotans could easily see who was getting the vaccine, which vaccine various populations received, and how providers were meeting their initial vaccination goals. The dashboard was developed with flexibility in mind. Vaccine supply was limited in January 2021 and there was an intense focus on ensuring that shots were in the arms of Minnesotans quickly and efficiently with a focus on vaccinating priority groups identified at the federal level. The COVID-19 vaccination data is used to monitor state- and county-level immunization coverage and progress towards national, state, and local coverage goals. The data also helps to identify at-risk populations that have been disproportionately affected by COVID-19 and encourage public health actions and policies aimed at increasing immunization.

The goal of the dashboard was to combine information from different data sources to visually show progress in vaccinating all communities. The state developed new partnerships within the healthcare sector to provide more robust metrics on equity and social vulnerability for the dashboard. The dashboard provided a transparent and definitive place for Minnesotans to receive information, promoting trust in government.

What makes it different?

The COVID-19 vaccine dashboard took complex data sets from a variety of sources and displayed them in a user-friendly format to answer the public's questions about vaccine distribution. The dashboard, and the data behind it, was collected from:

- The Minnesota Immunization Information Connection (MIIC), a confidential immunization information system.
- American Community Survey (ACS)
- Centers for Disease Control and Prevention's (CDC) Vaccine Tracking System (VTrckS)

The dashboard is a final product for the complex data collection and distribution efforts to communicate about COVID-19 vaccine information. The dynamic data dashboard on the state's COVID-19 response site allowed Minnesotans to access the information in a way that could be updated more easily as the pandemic evolved.

What makes it universal?

Historically, this data existed in silos and was rarely presented in one place, or in a consumable form for the public. The dashboard addresses both data management and digital government priorities. Typically, outside organizations such as nonprofits groups or the media take data (either shared by the state or received as part of a data request) and visually display the data to tell whatever story they are looking for. When the state harnesses the power of data visualization, it can help make the data understandable for the public, without needing to rely on another organization to tell a story. To get there, MNIT and MDH created new data quality processes and created a public digital service that had not previously existed.

We compiled the data for this dashboard electronically, and made it accessible and more importantly, customizable by the public and decision makers. That model has supercharged business intelligence and how data is presented to the public. There are now many more dashboards. For example, this COVID-19 Vaccine web page on MDH's website uses dashboards to describe breakthrough data.

Implementation

What was the roadmap?

MNIT and MDH teams developed the prototype for the build. This project used a waterfall-type method. Subject matter experts, developers, and management worked and transitioned items on the fly.

To populate the dashboard:

1. MDH extracted data from MIIC, the state's immunization system.
2. The MNIT and MDH teams curated the data, which was stored separately in multiple documents.

3. MNIT and MDH created a quality control process to ensure that the data was accurate and that MDH agreed with the results that MNIT was publishing.

One of the main benefits for MNIT MDH teams was that the COVID-19 pandemic response super-charged their evolution to a more responsive customer-focused creation environment.

Who was involved?

The dashboard was meant give a holistic, accurate, and readily available view of the pandemic no matter the stakeholder. To develop the dashboard, the below groups were involved:

- Public interest groups: Drove what they wanted to see on the dashboard.
- General public: The dashboard was used by the public to give them a central location to see official statistics about the COVID-19 pandemic. Many were clamoring for this information in a central, official, and unified location.
- MDH: Was the lead agency for the COVID-19 pandemic. MDH worked with public health partners and health care entities to disseminate vaccine data to the public.
- MNIT: Teams across MNIT, from MNIT Finance and MNIT staff supporting MDH, helped to develop the dashboard.
- Media: Following the launch of the dashboard, media members created scripts that ran for the data. They used the raw data and the visual dashboards for daily reporting.

How did you do it?

1) The first accomplishment was the COVID-19 vaccine dashboard public launch on January 12, 2021. At launch, only 7,000 Minnesotans had completed their vaccination series, and the state had a three-day goal from when vaccine providers received a vaccination dose, to when it went into the arm of a Minnesotan. The dashboard needed to show those Minnesotans that were not yet eligible or could not receive a vaccine due to limited supply, how the state was progressing on that goal, and where doses were currently being allocated. This launch improved efficiency for MDH to communicate with the public and media, which included giving access to reporters to write their own scripts to validate and share the data. Reporters from the Star Tribune, Minnesota Public Radio (MPR), and other outlets used the dashboard data to report on vaccine distribution across the state.
2) Another key success was adding vaccination data by race and ethnicity on March 5, 2021. This was made possible through the groundbreaking partnership between the State of Minnesota and the Minnesota Electronic Health Record (EHR) Consortium. This unique and innovative collaboration between public health and health systems was the first statewide effort of its kind in the United States. The data informed additional, targeted strategies to ensure the equitable distribution of vaccine to Minnesotans of all races and ethnicities, including communities disproportionately impacted by COVID-19 because of systemic inequities. Gaps identified by this data led to additional programming for communities disproportionally affected by COVID-19, such as the expansion of community-based vaccination sites, mobile vaccination units, and the Small Chain Independent Pharmacies (SCIP) pilot program.

3) To improve the efficiency of the team managing the data behind the dashboard, MDH developed a process using Microsoft Teams to collaborate behind the scenes.

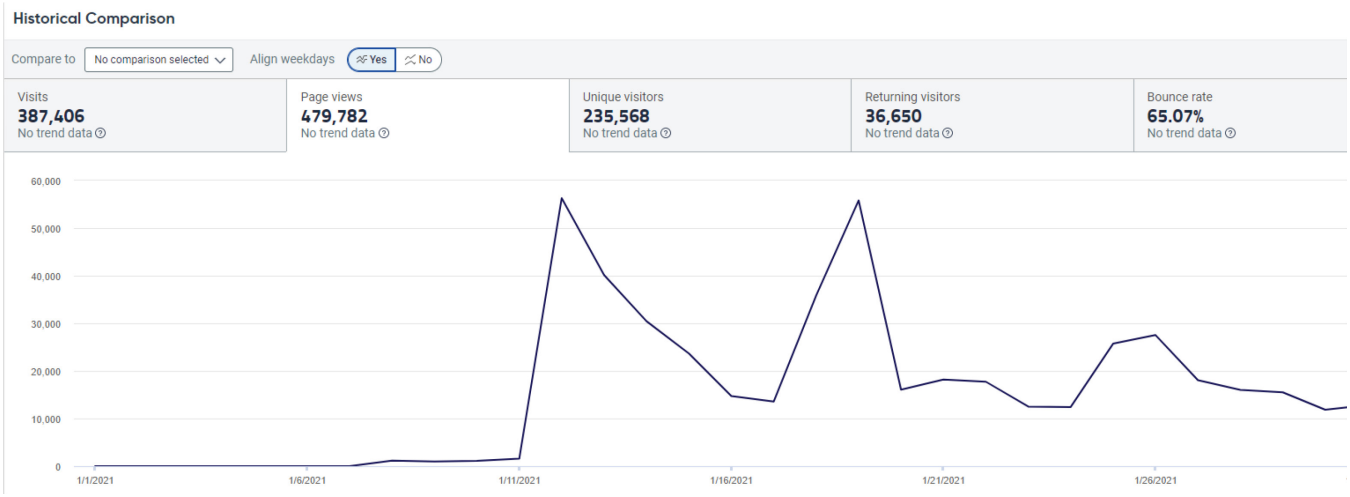
Impact

What did the project make better?

For state government, the COVID-19 vaccine dashboard created a unique partnership between MDH, MNIT, health care organizations, local public health entities, and more, to combine complex information to simply answer the public's questions. This was one of the first public data dashboards for the State of Minnesota that met an immediate public need during a crisis and helped promote transparency. This dashboard changed how data is shared with Minnesotans, built with their needs in mind, to provide data responses and be an accessible source of truth for the average person.

Minnesota was among the early adopter states for sharing this data in this way. MNIT and MDH worked with the vendor to provide load support during launch. The data visualization tool had not been used on a page that had the level of traffic that Minnesota's COVID-19 website was experiencing at launch. The COVID-19 vaccine dashboard launched on January 12, 2021. The dashboard saw a peak that day, and another peak on January 19, 2021, when the State of Minnesota announced that Minnesotan's 65+ could schedule vaccine appointments through a state system.

Figure 1 – January 2021 page views of vaccine dashboard.



The level of public interest in this information was new. The dashboard was designed by MNIT to stand up to the high traffic and optimize performance during those peak periods. It was important that Minnesotans could toggle between different data visualization tabs, such as "Who's getting vaccinated" and "distribution" – all of which were pulled from different data sources – without lags in load time to answer their specific questions about vaccination administration and distribution. The tool also allowed MNIT and MDH to add additional data for the public to view as the pandemic evolved.

How do you know?

From launch to Aug. 3, 2021, the vaccine dashboard had over 2.9 million page views and over 215,000 downloads of the static CSV files on the web page. Reporters from the Star Tribune, Minnesota Public Radio, and other outlets used the dashboard data to report on vaccine distribution across the state.

The data informed additional, targeted strategies to ensure the equitable distribution of vaccine to Minnesotans of all races and ethnicities, including communities disproportionately impacted by COVID-19 because of systemic inequities. Gaps identified by this data led to additional programming for communities disproportionally affected by COVID-19, such as the expansion of community-based vaccination sites, mobile vaccination units, and the Small Chain Independent Pharmacies (SCIP) pilot program.

What now?

Presenting data in a polished and professional manner is now central to data driven decision-making. The capability has grown from making consumable public information about COVID-19 vaccine distribution to using data to improve workforce planning, drive decisions about financial investments, cloud adoption, IT project go/no-go status, and much more.

Minnesota saw first-hand that when information is presented in a transparent and accessible manner to the public, it can drive equitable decisions. This applies beyond COVID-19. For example, Minnesota launched its first-ever children's fiscal map in December 2021, which was a collaborative effort between Minnesota's Children's Cabinet and Minnesota Management and Budget's Budget Division. The map provides fiscal information on state programs that serve Minnesota's children and youth ages 18 and under to inform fiscal decision-making and maximize expenditures on children. The fiscal map includes 415 programs across 15 state agencies.

The map determined that $31.94 billion of the state budget for the 2020-2021 biennium is directed towards children, which is 35.6% of the total budget. Also, before 2022-2023 legislative session, Governor budget recommendations were informed by using the map to identify where current dollars are spent and where there may be gaps.

The Minnesota's Children's Fiscal Map includes a public Tableau display that allows for information sharing and analysis by external stakeholders to understand and support investments in children, youth, and their families, and downloadable data that can be analyzed to better understand state expenditures. The map also helps decision makers understand who should be in the room for conversations about expenditures and programs by categorizing expenditures by agencies, service models, and outcome goals.