

CalCORVID: An Open-Source Dashboard for Exploring and Sharing Spatiotemporal Clusters



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CATEGORY: Forecasting, Modeling, & Outbreak Analytics



The California Clustering for Operational Real-time Visualization of Infectious Diseases (CalCORVID) dashboard transforms complex disease cluster detection results into an interactive, easy-to-use tool for public health practitioners. Developed by the California Department of Public Health (CDPH), the open-source dashboard streamlines visualization and dissemination of SaTScan cluster results, helping health departments detect outbreaks earlier and respond more effectively.

The “What”

During the COVID-19 pandemic, the California Department of Public Health (CDPH) received an unprecedented volume of testing data. While contact tracing was initially used to identify outbreaks, the scale of transmission quickly made this approach infeasible. This challenge highlighted the need for a statistical approach that could be systematically applied to surveillance data for early detection of emerging clusters of disease. One such approach involves the spatiotemporal scan statistic as implemented through the Spatial and Temporal Scan (SaTScan) software, which several health departments have successfully used to detect clusters and inform outbreak investigations. Although CDPH had explored SaTScan prior to the pandemic for other pathogens, its use was limited by technological constraints and a manual workflow across multiple systems.

With emergency funding during the pandemic, CDPH strengthened its technical infrastructure, making the implementation of SaTScan far more streamlined. These improvements included the ability to pull data from a data warehouse, develop automated data pipelines, schedule scripts, and build an internal COVID-19 dashboard to display SaTScan cluster results that updated dynamically as new data became available. While SaTScan provides some built-in visualizations and export options, the internal COVID-19 dashboard enhances visualization and streamlines dissemination of cluster results without requiring additional data manipulation by end users. It also offers additional features such as an interactive map, a table of detected clusters, contextual information like the Social Vulnerability Index, and the ability to view results through time. The interactive dashboard can be easily shared internally or externally, eliminating the need to maintain email listservs or perform additional data processing for distribution.



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SUBMITTED FEBRUARY 2026

The “So What”

The CDPH COVID-19 SaTScan dashboard was made available to state and local health jurisdiction epidemiologists to complement existing disease surveillance activities and improve situational awareness statewide. CDPH received several requests to share the dashboard code with other jurisdictions using SaTScan that wanted to adapt the dashboard for their own internal models, prompting the CDPH Modeling Team to create an open-source version to make it broadly accessible. The Modeling Team gathered feedback from epidemiologists across California to understand jurisdictional needs and identify the most useful features. Building on the existing CDPH COVID-19 SaTScan dashboard, the Modeling Team created the open-source California Clustering for Operational Real-time Visualization of Infectious Diseases (CalCORVID) dashboard framework, which is now available on [GitHub](#) with an accompanying [manuscript](#) that provides additional context on the technical underpinnings of the dashboard.

The CalCORVID dashboard is available on GitHub



CalCORVID lowers barriers to visualizing and disseminating SaTScan cluster results. Designed for ease of use, it works “out-of-the-box” and only requires a SaTScan cluster results file, which eliminates the need for advanced coding skills or spatial analysis expertise. By consolidating features such as line lists and historical results into a single interface, the dashboard facilitates preliminary outbreak investigations. Users can also customize the code for specific audiences (e.g., internal teams) and leverage open-source flexibility to promote reproducibility.

At least one California local health jurisdiction (Los Angeles County) has successfully adapted CalCORVID for its own use, and CalCORVID has also been extended to other pathogens at CDPH. Although adoption is difficult to track, CDPH hopes this open-source resource will encourage more health departments to leverage SaTScan for timely cluster detection and to simplify the visualization and dissemination of results.

The “Now What”

The CDPH Modeling Team plans to expand CalCORVID by incorporating advanced features, including support for other spatiotemporal clustering methods, non-circular cluster detection, and a quantitative approach for tracking clusters over time.

The goal is to continue lowering barriers to using SaTScan and other cluster detection tools, making them more accessible and actionable for public health practitioners. By enhancing functionality and usability, more jurisdictions may be able to integrate automated cluster detection methods into their surveillance activities, strengthening early outbreak identification and response.

Key contributors to this project include Lauren White and Seema Jain at the California Department of Public Health and San Francisco Department of Public Health, respectively. We would also like to acknowledge foundational work done by the SaTScan maintainers and colleagues at the New York City Department of Health and Mental Hygiene.

Funding source: The *CSTE Stories from the Field* project was supported by The Centers for Disease Control and Prevention (CDC) of the U.S. Department of Health and Human Services (HHS) as a part or component of a financial assistance award totaling \$300,000 with 100 percent funded by CDC/HHS. The contents are those of the author(s) and do not necessarily represent the official views of, nor an endorsement, by CDC/HHS, or the U.S. Government.

