Producing Real-Time, City Scale COVID-19 Data to Support Epidemic Response in the City of Stamford, CT: Lessons from an Academic-Health Department Partnership

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Cities Need Fine Grained COVID-19 Data

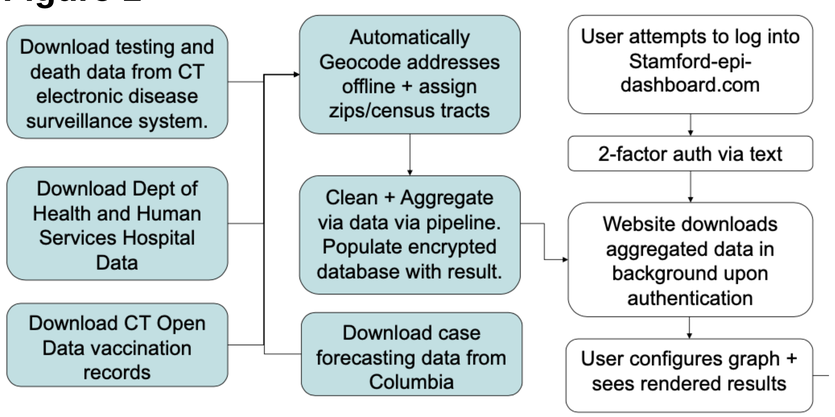
State government created COVID-19 dashboards often did not meet the needs of municipal health departments. Thus, the City of Stamford CT, Department of Health (SDH) partnered with the Mailman School of Public Health (MSPH) to generate real-time, fine grained data and analysis of COVID-19 infections, hospitalizations, deaths, hospital capacity and later, vaccination rates, by sociodemographic strata and by neighborhood for the City of Stamford.

Building a Data Pipeline and Dashboard

COVID-19 testing, hospitalization and death data are downloaded daily from the CT Electronic Disease Surveillance System (CTEDSS) for reportable diseases. The CTEDSS was designed to inventory cases of reportable disease, facilitate contact tracing and to record interactions between the cases and the healthcare system. But it was not designed to calculate key epidemiological statistics required for tracking the course of the epidemic in the population.

Using Python, an automated data pipeline was created to clean, process, geocode and anonymize the raw CTEDSS data into a usable configuration. Data were also integrated from CT Open Data (vaccination statistics), the Department of Health and Human Services (ICU/hospital capacity data), and from the MSPH COVID-19 Projections team (Figure 1). A highly flexible online dashboard (figure 2) was created, allowing 150 possible graph and map visualizations of the data.

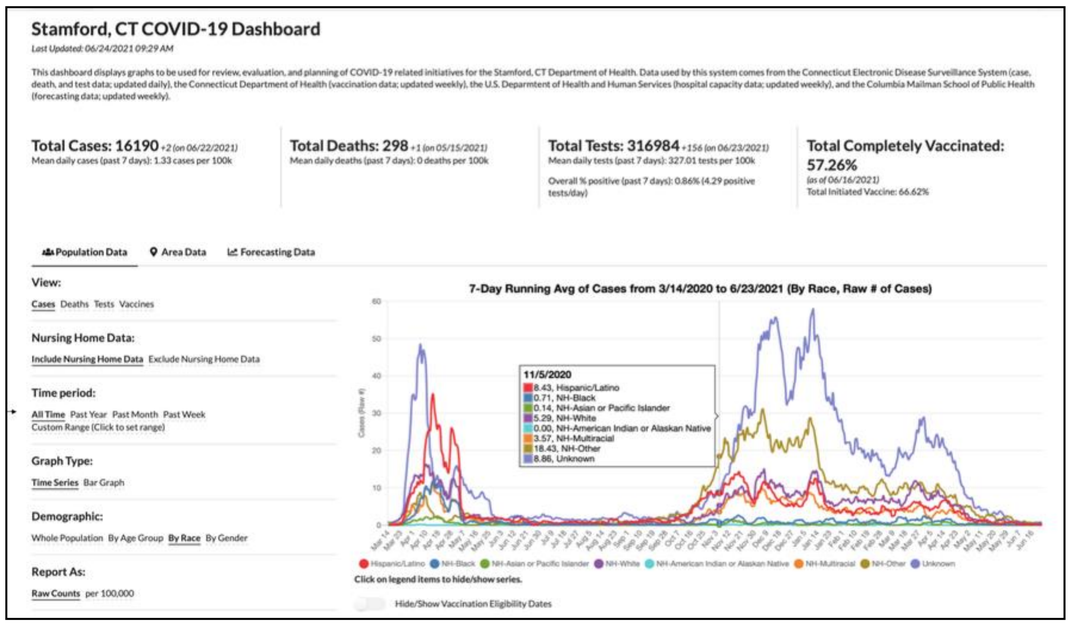
Figure 1

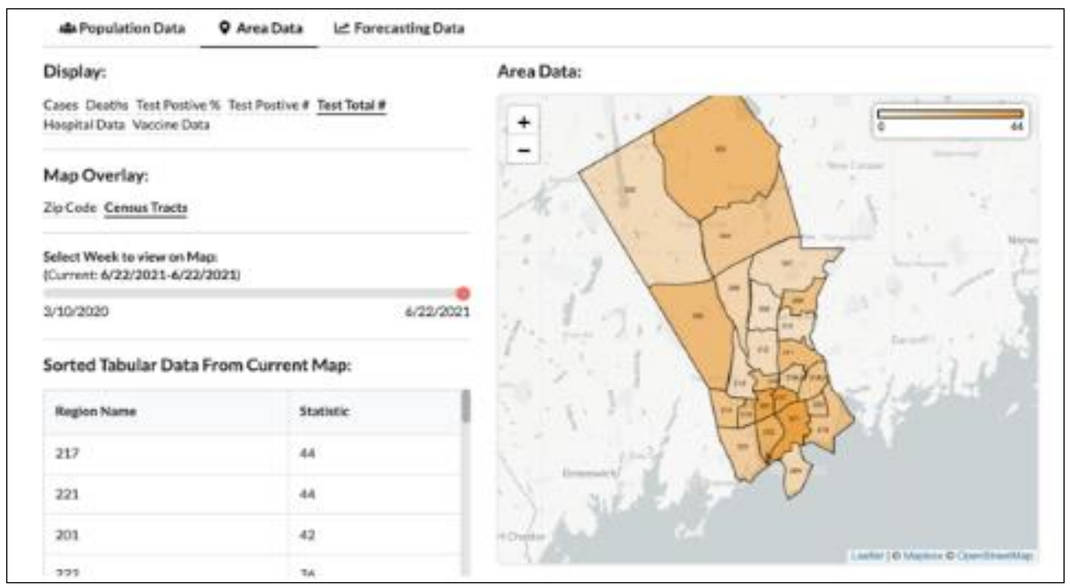


Outcomes

As of October 6 2021, the dashboard has been viewed 2,379 times since Jan 2021 by SDH members (n=11) with an average of 1.59 hours/week spent viewing and interacting with the dashboard. Additionally, approximately 2-3 graphs were exported from the system per week for distribution to city officials. A key value of the dashboard was that showed disparities in infection by age and race that leadership were not aware of from CT state reports. Additionally, the dashboard's mapping tools provided critical information on real-time disease spread and enabled the city to carry out targeted testing and vaccination campaigns.

Figure 2





Lessons Learned

The collaboration was facilitated by Commissioner of Health's pre-existing appointment as an Adjunct Professor at MSPH. The Commissioner had an existing University ID account, logon access to the computer systems, a professional and social network within the School and administrative standing, allowing for a rapid integration between the SDH and MSPH teams. This suggests that formal relationships between schools of public health and local departments of health, such as faculty positions for key Department of Health personnel, should be considered as part of disaster and emergency preparedness planning.

The presence of Masters and Doctoral students at MSPH with prior computer programming, data science and IT training proved critical to the success of this project and to several other COVID-19 response projects conducted by the MSPH. Students with advanced computer programming skills and epidemiologic training will continue to be needed during public health crises. This experience suggests that deeper ties should be fostered within universities between schools of public health and undergraduate and graduate computer science and/or data science departments.

Local data and publicly accessible interfaces to make these data not just useful, but also used, are still in need to best respond to pandemics and other large-scale public health crises.