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Automating Data and Analytics to Improve Public Health in LA County

Back in 2018, an article in Health Management Magazine discussed the need to elevate the role of clinical laboratories in healthcare delivery, patient health, and the management of public health priorities. The article points out that, at the time, contemporary research indicated a subordinate role for laboratories, with pathology services generally treated as a low value commodity.

The argument of the authors was that with the ever-increasing reliance on data to improve service delivery, patient outcomes, and population health management, laboratories should play a transformational role in the progress of value-based healthcare. The article put forward a vision of "Lab 2.0", where laboratory medicine plays an integral role in value-based healthcare by "combining longitudinal patient results with population data and the latest medical understanding to connect the clinical dots."

Connecting the Dots with Data

Fast forward to 2021 where the global SARS-CoV-2 (COVID-19) pandemic put "Lab 2.0" into breakneck motion by placing a greater dependency on laboratories to provide data to help manage population health. Public health organizations — from the largest state to the smallest communities — found themselves relying on a network of laboratories to process and provide results from COVID-19 testing.

The largest county in the United States, Los Angeles County is home to more than 10 million people and host to millions of visitors each year. When the true scope of the pandemic came to light, the Los Angeles County Department of Public Health (LAC DPH) knew the importance of laboratory testing as a mechanism to track the progress of the SARS-CoV-2 virus and took action to make the collection of results more efficient.

1.6 Million Cells of Data … and Counting

As of October 5, 2021, over 31.5 million positive and negative SARS-CoV-2 test results have been reported to LAC DPH via the electronic lab reporting (ELR) system. In addition, more than 900,000 test results have been reported in flat files from laboratories not yet reporting via ELR. At the height of the pandemic, an average of 5,400 and up to 35,000 flat file test results per day were being reported to LAC DPH.

In theory, a specific reporting structure should help address data quality issues, but in practice, with laboratories processing hundreds or thousands of results every day and the tedium of manual data management of flat file lab results, even with the best intentions, data quality issues are going to occur.

Consider this — with an average of 5,400 daily file test results reported to LAC DPH, even a 5% daily error rate would result in 270 "out of compliance" reported results every day. Assuming it would take 10 minutes for each "out of compliance" result to be followed up on and rectified, the LAC DPH would have had to expend 45 work hours — greater than 5 FTEs per day.

With flat file data coming in from more than 50 different laboratories, the LAC DPH understood that standardization of the information provided by these individual laboratories would be critical. The team provided each laboratory with specific data reporting requirements for flat files, including how 32 fields of data should be laid out and how the information in each cell should be formatted.

Improving the Course of Public Health with Analytics Automation

With a set format for each laboratory established, an Alteryx workflow was built to examine the structure of each report and determine if the columns were in the right order. More than that, the workflow could examine each individual cell to make sure the required information was present and in the right format. For laboratory reports that were verified, the results were included in additional analyses to track the spread of the virus.

In this same process, reports that were out of compliance — either because of formatting issues and/or missing/incomplete data — were pulled and inconsistencies/errors identified.

Now, instead of the LAC DPH having to contact the specific laboratory with the reporting problems, an analytic workflow automated the notification process with an auto-generated email that was sent to the laboratory with detailed information. This automated notification sped up the process by which the laboratory could rectify the reporting issue and resubmit the information.

In addition to the time and resources saved, the LAC DPH sped up time to insight, which allowed the DPH to monitor percent positivity, pinpoint areas of concern, and better inform policy decisions.