COVID-19 Evidence Accelerator Collaborative

Diagnostics Evidence Accelerator #46

Thursday, April 21, 2022, 12-1 PM ET

Call Summary

Introduction to Diagnostics Evidence Accelerator Meeting #46

This week's Diagnostics Evidence Accelerator meeting consisted of 2 presentation:

1. Public-Private Partnerships for the Generation of Real-World Evidence (Nilay Shah, PhD, Delta Air Lines)
2. Decentralized, Rapid Molecular Disease Screening (Randy True, FloodLAMP Biotechnologies, PBC)

Public-Private Partnerships for the Generation of Real-World Evidence (Dr. Nilay Shah, Delta Air Lines)

Delta Airlines has approximately 90,000 employees with approximately 175,000 beneficiaries. They have a global footprint but 95% of the footprint in the US. Figure 1 shows the timeline of testing and vaccination administered to the Delta Airlines employees and beneficiaries.

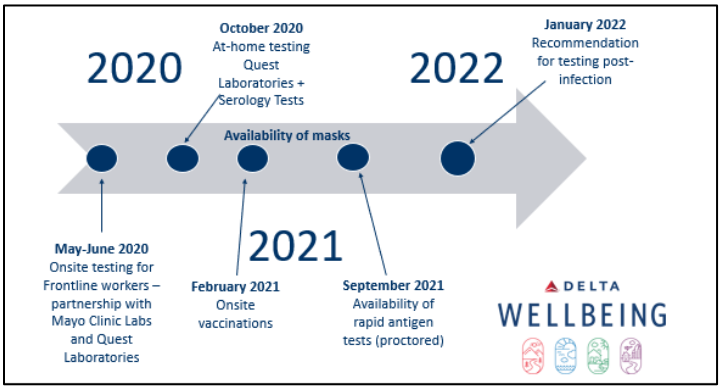

Figure 1: Delta Airlines COVID-19 timeline

Their COVID-19 mitigation strategies included distributing masks and administrating and distributing tests and vaccines. Delta Airlines has distributed 25 million+ masks (KN95, cloth, and surgical mask) to Delta employees and customers. They have distributed and administered 1 million+ tests (BinaxNOW rapid antigen test, Flowflex rapid antigen test, Quest laboratory PCR test, and onsite Rapid PCR test) and 300,000+ vaccine doses for employees, friends, and families. With the amount of masks, tests, and vaccines distributed, there was an opportunity to compare the effectiveness in a real-world setting. One diagnostic testing finding to note was that individuals that reported positive for a rapid antigen test, they would proceed to get a lab-based PCR test or an onsite rapid PCR test. The testing practice would provide confirmation of the individual being positive for COVID-19. Additional data can also be collected

through an individual testing positive on a rapid antigen test but negative on a PCR test and negative on both rapid antigen and PCR test. With the different data collected on the tests, there were opportunities to explore the performance of the test options.

Delta Airlines built a data infrastructure that captures information on symptoms, vaccinations, testing, demographics, infection, hospitalization, and death. The data captured is not connected to electronic health record or administrative claims. This presented a challenge in providing a visibility into the full picture that real world data (RWD) can provide. However, there were many opportunities for real world evidence (RWE). Some opportunities are understanding the performance of tests by test-type, performance of comparative antigen tests or rapid PCR tests, performance of tests/days after exposure, and repeat testing and positivity.

During the Omicron wave, Delta Airline's goal was to understand what proportion of people took a COVID test result within 5-15 days of a index positive test result. Additionally, they sought to understand of those who were positive, what was the positivity rate for each day 5 – 15 following the index test; did people test multiple times; were there demographic differences in daily positivity rate; and were there demographic differences between people who retested once and those who retested multiple times. The assumptions that were taken into considerations were the reporting of positive tests on or after December 15 focusing on the trends associated with the Omicron variant, excluding of inconclusive test results; the index date was date the case was created as the test date; and using date the test was collected as the test date for follow-up. Preliminary results were shared with the Accelerators during the presentation. Final results will be shared when they are available.

Delta Airlines analyzed many testing strategy considerations for international travel pilot program. Through the analysis, they found that the testing strategy for 72 hours preflight molecular test, rapid antigen test at the airport, confirm positive antigen test with molecular test was the best strategy. Figure 2 shows that process used for testing for the pilot program.

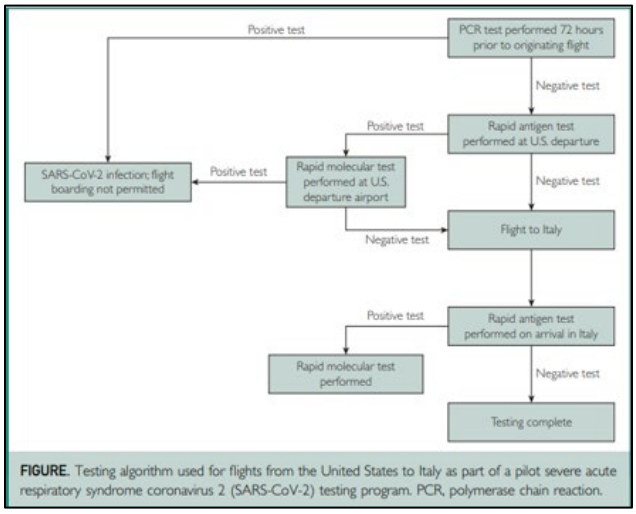

Figure 2: Testing process for pilot program.

Figure 3 shows the number of individuals that were completing travel and infections identified.

TABLE 2. Infections Identified Through Testing Performed at US or Italian Airports, Presented With Number of Passengers and Frequency of Infections Per 1000 Passengers

Month	Number of passengers completing travel	Infections identified	Infections identified per 1000 passengers
December	359	0	0
January	893	1	1.1
February	937	2	2.1
March	960	0	0
April	2788	2	0.7
May	3912	0	0

Figure 3:Number of individuals traveling and the number of infections identified through the pilot program.

There are opportunities to create a potential public-private partnership with employer to generate RWE. There is an increasingly many diverse streams of data as administrative claims and EHR data alone may not be adequate. Additionally, there are possibilities for conducting natural experiments, creating values through partnerships, and including the role of consortia.

Questions and Answers:

- Did you contract with CVS for testing?
    - Yes, Delta Airlines did contract with CVS for testing and vaccinations, however, CVS was not receiving all of the data that they were collecting on their employees and beneficiaries.
- How complete is the race and ethnicity data?
    - It is complete because the data is captured as part of the hiring process.
- Would you see an opportunity for cluster randomized trials in the organizations?
    - Delta Airlines is doing this in the context of digital health space. The process might be closer to a natural experiment instead of a cluster randomized trial in the healthcare space. They do want to leverage cluster randomized trial in the airport space.
- Are you able to combine the claims data with the data you are collecting?
    - Yes. Delta Airlines is able to capture data from CVS and use the deidentified data for analysis
- How do you see antigen tests moving forward?
    - The use of antigen tests will continue to grow. There are individuals that use PCR tests for confirmatory measures, however, with the ease of use for antigen tests, more individuals will continue to use antigen tests moving forward. This is the reason why it is increasingly important to assess the performance of tests.

<u>Decentralized, Rapid Molecular Disease Screening (Randy True, FloodLAMP Biotechnologies, PBC)</u>

FloodLAMP Biotechnologies is a public benefit company where they focus on developing decentralized rapid molecular disease screening for low cost. With there being so much unknown, there is still need for more work to be able to prepare for additional COVID-19 variants.

The ideal profile of screening tests are tests that are scalable when needed. Therefore, the test needs to be decentralized, rapid, molecular, and low cost. The team is currently focusing on molecular tests due to their accuracy compared to antigen tests and adaptability to new targets. They are able to deploy

their testing program in schools, neighborhoods, and emergency departments. Additionally, they are able to quickly deploy their programs to areas where there is a surge in cases. For their program, they use at-home accessioned collection with a mobile app. They offer family/household pooling (up to 4 people) in order to extend the coverage and stop disease spread in interacting organizations. They are using a rapid molecular LAMP test. LAMP or Loop-Mediated Isothermal Amplification is an alternative molecular amplification technology. LAMP generates 10x more DNA product in a third of the time compared to PCR. It can be formulated for easy visual readout. If Accelerators are interested in learning more about LAMP technology, they can visit New England BioLabs.

A clinical evaluation was performed by the Stanford CLIA Lab, analyzing three FloodLAMP tests:1) a visually read colorimetric LAMP test, 2) a fluorimetric LAMP test read on a qPCR instrument in <30min, and 3) a PCR test using the SalivaDirectTM version of the CDC's SARS-CoV-2 primers (EasyPCRTM) All 3 tests are extraction-free using an inexpensive lysis and inactivation buffer. The LAMP tests have primers for 3 different SARS-CoV-2 genes which allows them to be robust in capturing the different variants. They saw a 98% sensitivity for the EasyPCRTM Test and 90% sensitivity for the QuickColorTM LAMP Test. Figure 4 shows the FloodLAMP Biotechnologies platform. One component to note is the mobile app, which is a key to the program, by providing preasseccioned pooled samples to the lab, and enabling sample collection data capture.

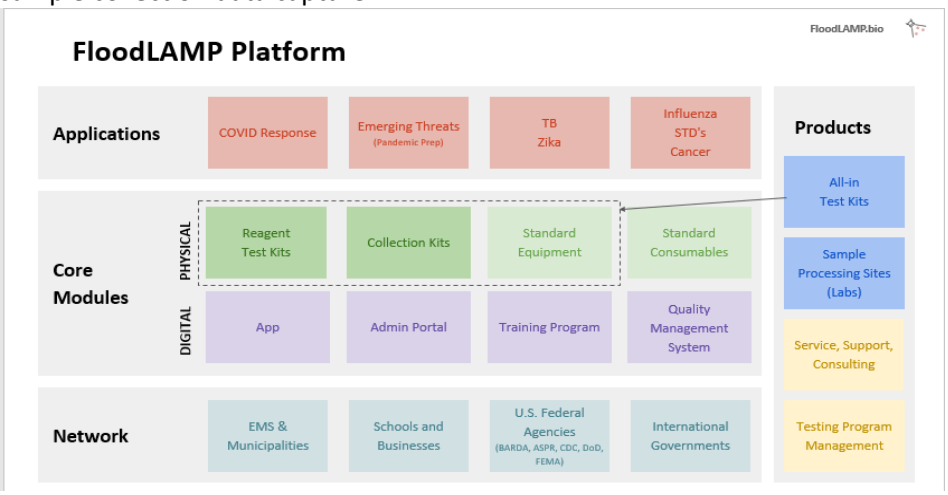

Figure 4: FloodLAMP Platform

Prior to the Omicron surge, they had deployed surveillance testing in Davie, FL, Coral Spring, FL, Bend, OR, and Bay Area CA. They have screened approximately 30,000 individuals. They are in the process of getting follow-up diagnostic data from organizations that have run FloodLAMP tests. In Coral Springs, FL they saw 22 FloodLamp positive results in one day. When they tested the samples on a BinaxNOW for confirmation, they only saw one test as positive. However, all 22 became positive over the next few days. This shows that as expected, the FloodLAMP rapid molecular test is able to identify unknown asympotomatic infections earlier, sometimes by days, compared to antigen test strips. They have submitted 2 full open-source protocol EUAs and a pre-EUA on pooled collection to the FDA, and seek to resubmit in collaboration with partners and federal agency support.

Next Steps

- Continue making data connections through the Evidence Accelerator and through www.EvidenceAccelerator.org.

Next Meeting: Thursday, May 19, 2022 12-1 pm ET