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KADE R. MINCHEY, CIA, CFE
AUDITOR GENERAL

August 04, 2020
Report No: ILR 2020-F

Subject: A Limited Review of COVID-19 Test Turnaround Times

Timely testing reduces public health risk and has economic benefits. Whether test results are positive or negative, timely sharing of this information is paramount to the public and the individual. State COVID-19 data that we analyzed does not provide a complete picture of the time it takes to return a test result back to a patient. This limited our ability to provide a complete picture of COVID-19 test turnaround times in the state. Quick test turnaround times are essential in slowing the spread of the virus. A Utah Department of Health (DOH) representative on the state's COVID-19 Unified Command Team explained that delays in reporting test results for the virus can have serious implications, including:

- Further spread of the disease if the carrier does not take precautions to limit their exposure.
- Making contract tracing, investigating, and calling exposed persons exponentially more difficult, which we believe would further strain state resources.
- Potentially lead to economic losses from missed days of work.
- Produce a lost opportunity to retest (if a false-negative result) or get early medical care.

Due to the important nature of timely testing, we recommend the Governor's Office, in collaboration with DOH, formally establish a goal for COVID-19 lab processing time and complete turnaround time from test swab to patient notification. DOH should study the feasibility of publicly posting test result processing times by lab and geographic location on the coronavirus.utah.gov website.

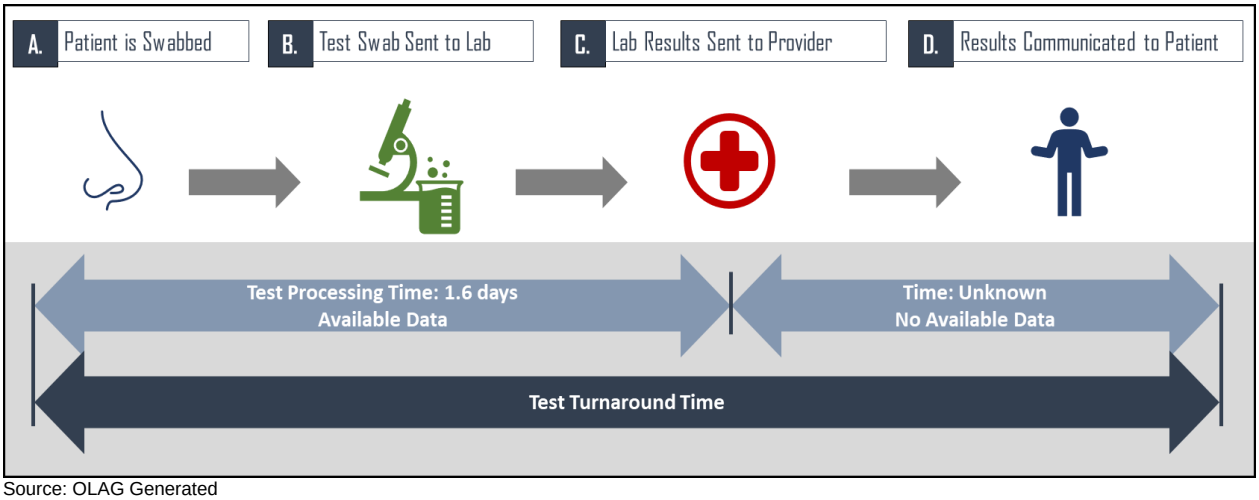
Turnaround Times Are a Function Of the Testing Process

We found that test turnaround time is not consistently described among health experts. Different individuals discussed turnaround times in two different ways:

- The time from when the patient is swabbed until the test result is communicated to the provider.
- The time from when the patient is swabbed until the test result is communicated to the patient through the provider.

We also found inconsistencies in messaging surrounding test turnaround times, with one state official saying it should be 24 hours, while a health expert said it was expected to be less than 72 hours. The process to test for COVID-19 among the various labs is described in Figure 1.

Figure 1 The Statewide Average Time for Test Results to Be Communicated Back to the Provider is 1.6 Days (see A – C). However, because the time it takes for providers to communicate results back to patients is not required to be reported (see C – D), it is unknown if further delays exist in this part of the process.



Source: OLAG Generated

The information available to us (shown in steps A – C in Figure 1) we refer to as "test processing time." According to the best available data provided to us by the DOH, the test processing time, or the average time between patient swabbing and when the sampled test results were communicated back to the provider, is 1.6 days,[1] or approximately 38 hours. In our opinion, the most critical measure, which is the full turnaround time from swab to patient notification, is currently unknown.

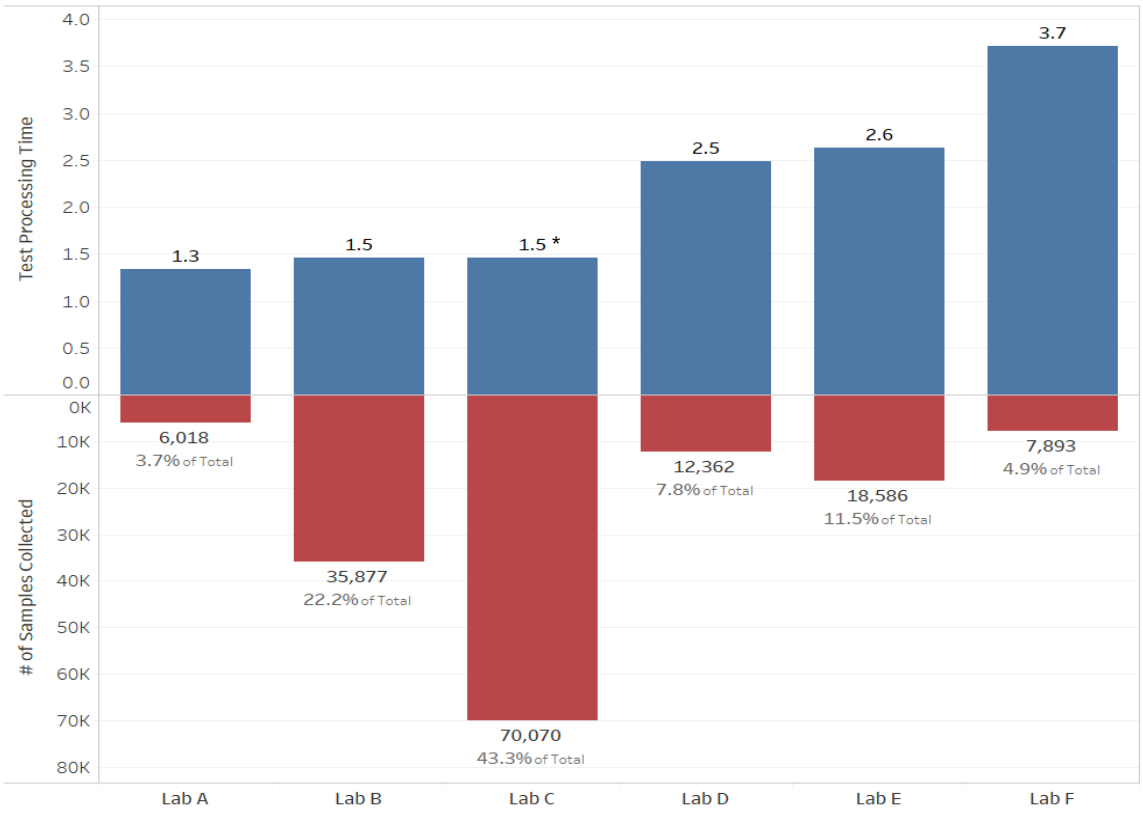
DOH receives lab reporting data that encompasses steps A through C shown in Figure 1; however, providers are not required to submit to DOH when the results were communicated to the patient (steps C through D). While we do not have access to this data, we were concerned to learn that one major provider discontinued calling patients with negative test results altogether when testing demand and volumes increased in June and July. As discussed earlier, this could lead to significant impacts to patient health and livelihood. As will be explained in the next section, test processing times can be delayed for various reasons and differ between labs.

[1] The test processing time of 1.6 days was calculated using data from 4/16/2020 to 7/16/2020. Despite any efficiencies gained since the beginning of the pandemic, this number has changed to about 1.8 days (42 hours) as test volumes continue to trend upward within a recent 21-day period of testing.

Test Processing Times and Volumes Vary Greatly Between Labs

Test processing times have varied widely from the beginning of the COVID-19 pandemic and vary greatly still today (between one and four days on average) depending on the processing lab. To account for any recent improvements to testing procedures, we narrowed our review to focus on test processing times over a recent 21-day period.[2] However, while we believe that any process changes may help speed turnaround times, we were told that there was a backlog due to some labs' sample preparation process, which could be magnified by larger sample volumes. These constraints appear to have challenged some labs' ability to further reduce test processing times, as shown in Figure 2.

Figure 2 Over a Recent 21-Day Period, Lab Processing Times for COVID-19 Ranged from 1.3 to 3.7 Days. Lab sample processing capacity also varies, with two labs processing nearly two-thirds of all samples. Timeframes in this figure account only for the data available to us, which is from test swab to provider notification. The timeframe from provider to patient notification could be much longer.

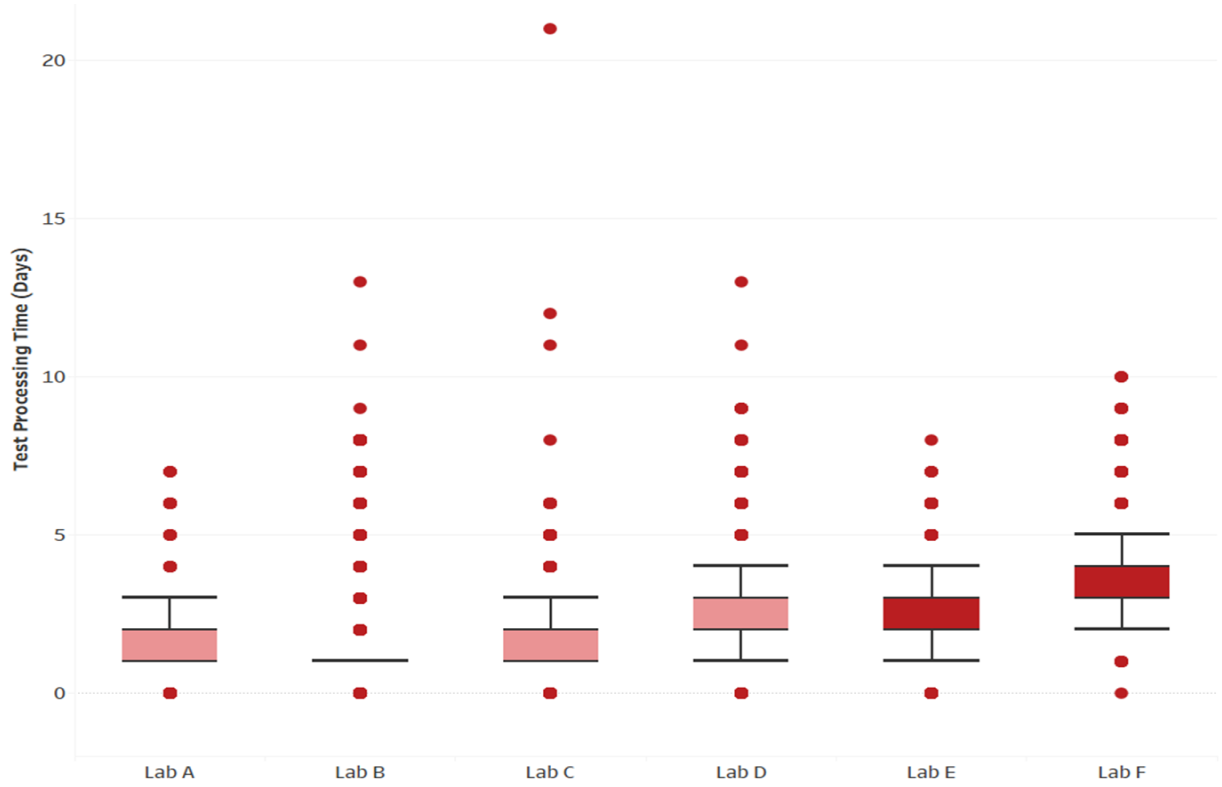


Source: OLAG Generated with Utah Department of Health Data.
*Note that one major lab's data feed to DOH does not provide comparable or accurate test processing time data. We were told that this is being addressed and could be fixed as early as August. However, this data was independently obtained and is included in the figure.

[2] We reviewed data available to us from 6/26/2020 to 7/16/2020 inclusive.

While test delays vary from 1.3 days to 3.7 days on average,[3] some labs have had rather lengthy processing times. Figure 3 shows the variability of time to process tests by lab over a recent three-week period for which we have data, from June 26 to July 16.

Figure 3 The Range of Sample Processing Times Within Each Lab Also Varies. Over a recent three-week period, sample processing times for one lab ranged from less than 24 hours up to 21 days. Prior to our three-week review, we found 16 samples that were delayed greater than 21 days, thus showing that labs are becoming more efficient in their testing procedures.



Source: OLAG Generated with Utah Department of Health Data. Note, lab names correspond to those listed in Figure 2.

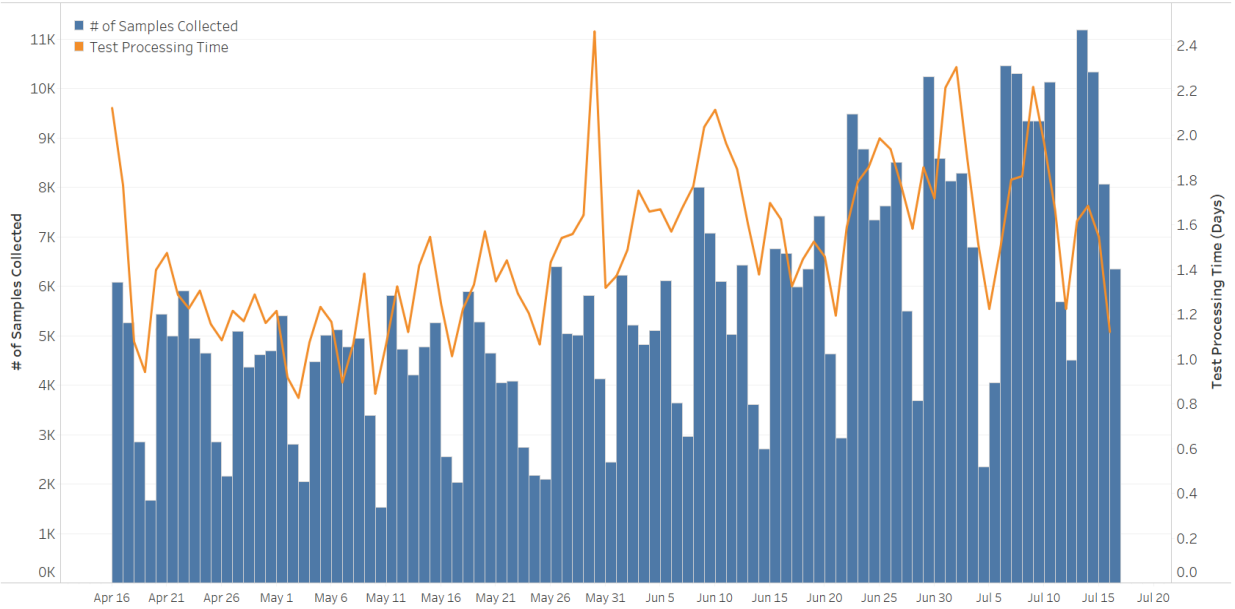
It is important to note that these delays in test processing times account for only the time from when the patient is swabbed to when the lab sends the results to the provider. Delays could potentially be longer depending on provider backlogs in their efforts to communicate results to patients. However, because focusing on improving efficiencies from swab to provider is a key aspect in reducing the time it takes to get the patient the results, the remainder of this report will focus on this portion of the testing process, what is causing these delays, and ways they can be addressed.

[3] Testing averages may include different test types (such as pre-procedure screening tests that have a quicker turnaround time) which may lower the average. For example, last week one provider conducted a large amount of pre-procedure screening tests (2,500) with 1.3 percent testing positive.

Lab Test Delays Found At Several Points in the Process

We did not review lab testing processes in detail. However, one factor that could impact labs' ability to process samples in a timely fashion is the number of daily samples submitted to the lab. Increased volume may amplify poorly designed test processing procedures and create further delays. Figure 4 shows the total volume of samples submitted to all major labs since the early part of the COVID-19 pandemic.

Figure 4 The Number of Samples Submitted to Labs for Processing (Blue) Has Increased Dramatically, Especially Over the Last Few Months. With a slight offset in timing, processing time (orange) appears to follow closely the volume of tests submitted to labs for processing.



Source: OLAG Generated with Utah Department of Health Data

In addition to increases in test volume, which may account for some state-wide testing delays, stakeholders we spoke with cited other sources of bottlenecks in the testing process, which include:

- **Strained Testing Resources:** A healthcare expert reported that supply chains for COVID-19 test resources (such as rapid tests and protective equipment) have never been great, a condition echoed across all health systems.
- **Limited Other Resources:** Limited staffing, sample receiving, and post processing capacity are constraints in the test processing timeline, especially with the recent surge in tests sent to labs for processing.

- **Transportation:** We found that tests performed in some counties outside of the Wasatch Front often have longer processing times, presumably because of the time it takes to get samples to a lab.
- **Delays in Entering Test Data into the State's System**: Inputting test data into the state's database and assessing for duplications or other errors takes a great deal of time, potentially resulting in delays.

While we found delays that are, or potentially could be, found in the test processing period, we believe some key actions could help expedite the testing process. The next section will provide recommendations moving forward.

Addressing Process Delays Would Help Processing Times Among Labs

Labs, and those employees working in them, are certainly on the front lines of the pandemic. We found that some labs have refined their testing processes to handle greater capacity. One lab has modified technology to provide notification of test results through an app or through their website. In addition to this technology, they have reportedly hired additional staff, and are constantly reviewing their processes. We were told the state lab run by DOH has recently been able to reduce a backlog of 3,000 samples through new processes and leadership. We did not conduct any in-depth lab reviews to determine what best practices they are deploying or what efficiencies they could still achieve. However, some labs' processing times are not improving, potentially from an inability to adequately manage large volumes of daily tests. For example, one of the labs illustrated in Figure 2 increased their overall test processing delay time from 2.3 days (from April 16 to June 25) to 3.7 days over the following 21-day period.

We recommend five methods to improve efficiencies in the test processing timeframe:

- First: The Governor's Office should collaborate with DOH to clearly articulate a statewide goal for both test processing times (swab to provider notification) and test turnaround times (swab to patient notification).

- Second: DOH should convene a commission of health care providers to determine if test turnaround time (swab to patient notification) can be determined. If so, these times should also be publicly available at coronavirus.utah.gov.

- Third: DOH should study the feasibility of publishing the average test processing time by lab and geographic location to the coronavirus.utah.gov website. We believe transparency in test processing times empower patients with information to make the most informed decisions about their health and economic situation.

- Fourth: DOH should work with labs to help them achieve further efficiencies. DOH could work with providers to understand what efficiencies have been gained during the pandemic and help labs to further refine their processes. This sharing of best practices could help all labs perform at a higher level.

- Fifth: DOH should review the feasibility of transporting backlogged samples to labs with greater capacity, which could reduce delays. We understand this may not be feasible, as we could not document a method that already exists in the state for shifting test samples from backlogged labs to labs with higher processing capacity. Nevertheless, we believe a study of this option is warranted.

Timely testing reduces health risks and has economic benefits to both the individual and the public. We believe the implementation of these recommendations will help expedite delays in the test turnaround time and overall test process and provide value as we continue to navigate the COVID-19 pandemic.

Recommendations

1. We recommend the Governor's Office, in collaboration with the Department of Health, formally establish a goal for both COVID-19 test processing times and complete turnaround times.

2. We recommend the Department of Health officially convene a commission to determine the feasibility of collecting and publishing complete turnaround times, time from swab to patient notification of COVID-19 test results.

3. We recommend the Department of Health study the feasibility of publicly posting test processing times by lab and geographic location on the coronavirus.utah.gov website.

4. We recommend the Department of Health work with labs and providers to share best practices that could result in greater efficiencies to reduce test turnaround times.

5. We recommend the Department of Health review the feasibility of creating a system to shift test samples from backlogged labs to labs with greater capacity.

For questions contact the supervisor of this audit Jesse Martinson at 801-652-3566 or at jmartinson@le.utah.gov.

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Agency Response

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State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

GOVERNOR'S OFFICE OF MANAGEMENT AND BUDGET

KRISTEN COX
Executive Director

August 4, 2020

Kade Minchey, Auditor General
Office of the Legislative Auditor General
Utah State Capitol Complex
West Office Building, Suite W315
Salt Lake City, UT 84114

Mr. Minchey,

Speed is key in the fight to manage the spread of COVID-19.

The time from when a sample is collected, test results are provided, contact tracing performed, and appropriate quarantine put into place currently takes 6.5 days on average. Ideally, the process end to end would take 72 hours to reduce secondary spread. While this may not be possible in all cases, the state is setting targets in areas that impact high-risk and superspreader environments. Because testing cycle times are often the longest part of this process, the Governor's Office of Management and Budget (GOMB) welcomes the findings and recommendations in this report.

GOMB specifically welcomes and encourages public reporting of operational measures, especially testing cycle times along with ensuring common definitions of processing time.

The state is focused on improving cycle times and capacity of its public labs and is seeing results. Because the state does not have direct oversight over other labs, it welcomes sharing best practices across all of the labs to improve processing while also sharing information on new and promising testing modalities.

Utah Leads Together 4.0 includes examples of the operational measures GOMB developed with the Utah Department of Health and local health departments. This audit report will help to strengthen the focus and need to improve operations, especially testing cycle times. GOMB welcomes ongoing evaluation and input on how to improve processes as entities work hard to protect lives and livelihoods.

Sincerely,

Kristen Cox
Executive Director
Governor's Office of Management and Budget

State of Utah

GARY R HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Utah Department of Health
Executive Director's Office

Rich Saunders
Interim Executive Director

Nate Checketts
Deputy Director

Dr. Marc Babitz
Deputy Director

August 3, 2020

Kade Minchey, Auditor General
Office of the Legislative Auditor General
Utah State Capitol Complex
West Office Building, Suite W315
Salt Lake City, Utah 84114

Dear Mr. Minchey:

Thank you for the opportunity to respond to the Informal Letter Report "A Limited Review of COVID-19 Test Turnaround Times" (ILR 2020-F). We concur with the recommendations in this report and will implement the actions in our attached response.

The Department is committed to the efficient and effective use of taxpayer funds and values the insight this report provides on areas that can be improved.

Sincerely,

Rich Saunders
Interim Executive Director
Utah Department of Health

Response to Recommendations

Recommendation 1
We recommend the Governor's Office, in collaboration with the Department of Health, formally establish a goal for both COVID-19 test processing times and complete turnaround times.

We concur with this recommendation. We are currently working with the Governor's Office and the Legislature on a goal for test processing times for the Utah Public Health Laboratory (UPHL) and will finalize that work. Depending on the outcomes of the discussions on complete turnaround times discussed in our response to Recommendation 2, we will set a complete turnaround time goal for UPHL.

We have discussed test processing time goals with most of the other labs in the state and have invited them to align with the UPHL's goals. We will work with the Legislature and Governor's Office for their support in implementing these turnaround time goals more broadly across the state.

Contact: Rich Saunders, Interim Executive Director, Utah Department of Health, 801-538-6111
Implementation Date: August 31, 2020

Recommendation 2
We recommend the Department of Health officially convene a commission to determine the feasibility of collecting and publishing complete turnaround times, time from swab to patient notification of COVID-19 test results.

We concur with this recommendation. We will convene the Testing Coordination Council to discuss the feasibility of collecting information on the time between results being reported to the provider and patient notification. If it is feasible to collect that information in a systematic way, we will include that information in our reporting.

Contact: Nate Checketts, Deputy Director, Utah Department of Health, 801-538-6689
Implementation Date: August 31, 2020

Recommendation 3
We recommend the Department of Health study the feasibility of publicly posting test result processing times by lab and geographic location on the coronavirus.utah.gov website.

We concur with this recommendation. We presently collect and post this information to an internal dashboard used by the Governor's Office and the Utah Department of Health to manage the COVID-19 response. We will work with the Legislature to determine what elements of this reporting would be most helpful to be publicly posted.

Contact: Tom Hudachko, Director of Communications, Utah Department of Health, 801-538-6111

Implementation Date: August 24, 2020

Recommendation 4
We recommend the Department of Health work with labs and providers to share best practices that could result in greater efficiencies to reduce test turnaround times.

We concur with this recommendation. We have been meeting regularly with the lab directors from the groups providing COVID-19 testing since March 2020. We often discuss efficiencies in these calls and will have it as a specific topic in future calls. We will also discuss at the Testing Coordination Council, which includes a provider representative, to identify potential improvements in the current process.

Contact: Nate Checketts, Deputy Director, Utah Department of Health, 801-538-6689
Implementation Date: August 24, 2020

Recommendation 5
We recommend the Utah Department of Health review the feasibility of creating a system to shift test samples from backlogged labs to labs with greater capacity.

We concur with this recommendation. We have put in place several lab contracts that will allow us to send state-collected samples to different locations. We are also exploring a partnership with a university to see if some testing can be done at one of their labs. We will use these options to best match sample collections with available lab capacity.

Other labs in the state have partnered in the past to help address backlogs. We will raise the issue in our lab directors' call and discuss the feasibility of creating a more formal system to shift test samples.

Contact: Andreas Rohrwasser, Operations Director, Utah Public Health Laboratory, Utah Department of Health, 801-965-2550
Implementation Date: August 31, 2020