Appendix A: Purpose, Scope, Objectives, and Methodology

Performance Audit Overview and Audit Objectives

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. Audit work was conducted from August 2020 to January 2021. OPT worked with ODH to obtain access to data and conduct interviews to establish current operating conditions. The audit report also contains the specific criteria used for comparisons and detailed methodology.

The performance audit process involved sharing preliminary information with the client, which included status meetings with the client. Input from the agency was considered and taken into account, as appropriate.

Although assessment of internal controls was not specifically an objective of this performance audit, internal controls were considered and evaluated when applicable to scope areas and objectives. We relied upon standards for internal controls obtained from Standards for Internal Control in the Federal Government (2014), the U.S. Government Accountability Office, report GAO-14-704G.

This audit report contains the following objectives:

Data Collection

Q	**What COVID-19 case data did the state collect and how does this compare to recommended practices?**
A	Data collected by ODH was consistent with existing public health standards including CDC COVID-19 case reporting requirements.
Q	**What COVID-19 treatment data did the state collect and how does this compare to national guidelines and recommended practices?**
A	Treatment data in regards to ventilator and hospital bed capacity appear to be collected in line with other states. Ohio and most other states do not publish additional specific treatment data on a regular basis.
Q	**How frequently did the state collect data for each variable?**

A Data is collected continually. Each day, data sent from laboratories are collected and analyzed.

Q **Were appropriate technology and processes in place to ensure timely receipt of the data by the state's Public Health Director?**

A Outdated technology systems contributed to problems in data collection, see **R6**. Additionally, the aging ODRS system and its underlying configuration caused problems in collecting the data. The volume of COVID-19 cases delayed the input of data into ODRS.

Internal Reporting

Q **Did the State identify entities performing testing and what guidance did the state provide in comparison to national standards and recommended practices?**

A The state continues to work to onboard facilities completing tests, allowing for the use of electronic laboratory reporting (ELR). This reduces data entry backlogs as faxes or other means of communication of laboratory results have been replaced with direct electronic reporting. ODH did not provide us with a calendar of the backlog in laboratory onboarding, information on why some laboratories took longer than others to onboard (although laboratories must undergo CLIA certification), or when the onboarding would be complete and therefore our audit was unable to determine when this would be completed. Ohio is one of three states that has not completed onboarding to its ELR.

ODH could not provide reasonable assurance regarding completeness of its data for inclusion in the Percent Positivity calculations. See **R1** and **R3**. Clarification regarding the calculation used for Percent Positivity was included in External Dashboard reporting. See **R3**. The internal control failures related to data collection and management are described in these recommendations.

Q **Was the data collected and reported adequate for monitoring purposes and was the data reported timely?**

A In two of the three months examined, laboratories reported to ODH within 2 days for 80 percent or more of cases collected during the given month. Most data was reported timely to ODH in line with recommended practices. The data points collected were in line with other states.

The dataset which was provided to our office included 37 data fields, we reviewed 35 of these columns for completeness of data. We found that six of the categories had no data missing, six of the categories had some data missing (between 0 and 20 percent), and 23 had significant data missing (more than 20 percent). Of those categories with significant data missing, the majority related to symptoms experienced by an infected individual.

Monitoring

Q **Did the state monitor how COVID-19 testing results were coded to determine whether the cases were coded and reported in accordance with established guidelines? Did the state adequately monitor or sample COVID-19 testing processes (test administration) and resulting data (result verification) to ensure accuracy?**

A Cases were coded and reported in accordance with established guidelines. Minimal examples of variation were identified. For more information, see observations in **Limitations of Data Review** section. Further, ODH had minimal insight into the state's test administration and laboratory result verification process due to the widespread involvement and significant role of healthcare providers during the pandemic.

Q **Did the state provide sufficient guidance to entities providing care to COVID-19 patients related to determining the cause of death, including when co-morbidity conditions existed?**

A ODH provided guidance to physicians on determining the cause of death, including when co-morbidity conditions exist and how these should be recorded, through the guidance devolved to the states from the CDC; however some states and the WHO differ in their handling of certain death certificate deaths. ODH did not issue separate guidance or clarifying guidance. See **R5**.

Q **Did the state have adequate processes in place to contact and monitor COVID-19 positive individuals?**

A Variation in contact tracing occurred due to COVID-19 demand outpacing health department contact tracing capacity. See **R7**.

External Reporting

Q **How did the state disseminate information to the public? How does this compare to recommended practices?**

A ODH disseminated information to the public but this was sometimes inconsistent from the data disseminated by some local health departments. See **R4**.

Q **How was the data organized and presented to provide data that was useful, comparable, and informative for the public and for policy makers? Was it timely, accurate, meaningful, and consistent? Who ensured the accuracy?**

A Data was organized without clear and consistent terminology. See **R3**. Further, ODH has released its data daily for nearly a year, often causing confusion due to insignificant spikes or changes numbers related to the review process which occurs post release. See **R2**.

Q **How did the state decide which data to share? Why isn't data updated with recovered numbers?**

A ODH was unable to explain how particular data elements were selected, although certain elements were at the request of the Governor's office. Additionally ODH provides presumed recovered numbers based on an estimated duration of the virus of 21 days per person. Specific recoveries are not available, as that data is not being collected through case investigation and therefore we were unable to complete this objective. See R3.

On-Site Data Review

ODH provided us a data set related to COVID-19 cases extracted from ODRS. The dataset did not include all fields collected by ODH and was anonymized so we were unable to correlate records to a secondary source. We used the data set provided for a series of limited reviews on selected topics. The anonymized dataset that ODH provided to us and that we reviewed had nearly 850,000 rows of data, which ODH stated included relevant case data necessary to ensure the accuracy of reported cases published on the Dashboard. This information matched the confirmed and probable case data presented on the COVID-19 Dashboard which is also predominantly extracted from the ODRS system.

We conducted analyses using both Excel and RStudio[58] to determine potential data errors relating to duplication or miscoding of test data in the provided data set. These analyses were designed to identify instances where an individual had two unique cases associated with them, suggesting a double counting of cases. They were also designed to identify instances where a probable case was counted as a confirmed case, and vice versa. This was attributed to miscategorization of certain tests and test results which could be reflected as in either an under or over reporting of this data in the confirmed versus probable case count on the public dashboard.

The review of the anonymized data allowed our analysts to draw some limited conclusions regarding COVID-19 case data. ODH provides daily updates on the number of confirmed and probable COVID-19 cases in Ohio though the Dashboard. We analyzed the provided data to ensure that the number of cases listed on the Dashboard accurately reflected the data from ODRS. While we confirmed the information provided to us accurately reflected the information on the Dashboard, we could not verify that the dataset provided to us represents the totality of all test data contained in ODRS or contained all positive tests administered in Ohio.

Using Excel and RStudio we identified approximately 1,300 potential cases that were duplications. We provided 11 examples to ODH for review and found that of those examples, 10

[58] RStudio is an open source data analysis tool.

were in fact duplicates, although the Department had already identified and corrected the information within ODRS. The last potential duplicate required additional review from the LHD in order to determine if action was required. Based on our limited analysis, the internal controls relating to data cleaning appear to be effective in identifying and correcting duplications within the dataset.

We conducted a similar analysis in order to determine instances where a positive PCR test was categorized as "probable" or where a positive antigen test was categorized as "confirmed" we found 784 instances where cases were potentially labeled incorrectly. These cases represented 0.12 percent of cases at the time of analysis and were referred to ODH for review.

One anomaly was identified within publicly available data that were observed during the course of our audit: Hospitalization dates that occurred prior to the onset of COVID-19 symptoms. During interviews with BID staff, this was attributed to case investigation processes and lack of clarity on how to complete the hospitalization field within ODRS. We were unable to analyze this fully during our on-site review due to the anonymized data set.