

# Colorado: Whole Genome Sequencing Mandate and Electronic Ordering

## Innovations in Informatics: Laboratory Success Stories

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During the height of the SARS-CoV-2 pandemic, Colorado required the public health laboratory to perform whole genome sequencing (WGS) on every positive molecular test in the state. The Colorado State Public Health Laboratory made use of an existing data feed from healthcare facilities to public health based on the initial laboratory test to initiate a WGS test order with all required patient information, reducing the need for duplicative data entry and allowing the lab to forecast WGS testing load.

### The situation

In the midst of the COVID-19 pandemic, Colorado's governor issued a mandate requiring that the public health laboratory perform WGS on every positive molecular test in the state. While an important advancement in surveillance for COVID-19, this mandate placed an incredible burden on medical providers submitting orders and on the lab staff receiving them. Providers had to fill out and manually submit a paper requisition form for WGS testing and the lab staff had to manually enter the data from the form into their laboratory information management system (LIMS). It was a case of double data entry for everyone involved during a time when the volume of data was already nearly insurmountable.

Additionally, these order forms often left out critical pieces of information or included typos or other standard human error. If the data submitted via the electronic laboratory report (ELR) and the requisition form didn't align, patient matching was impossible and results were essentially lost.

The status quo at the lab was not sustainable. The time being spent on double data entry and the lack of data quality had to be resolved.

### The solution

The laboratory utilized an existing ELR data feed from a provider's electronic health record (EHR) to trigger an electronic test order. Within two to three months, Colorado created a Rhapsody interface to intercept the ELR and reflexively send the WGS test request to the lab, with all of the necessary data passed along as well.

### Impact

- >13,000 staff hours saved
- Improved data quality
- Ability to forecast testing volume

More than 116,000 WGS tests came through the interface. If a paper order form previously required seven minutes of data entry per order (three to four minutes on both the provider side and the lab side), that equates to a savings of 812,000 minutes, or 13,533 hours of data entry.

When COVID-19 was at its peak and staff were working around the clock to manage testing, **saving 13,533 staff hours was worth its weight in gold.**

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## Reflections

### Collaboration

This project was a collaborative effort between the laboratory team, the ELR team and the Rhapsody team. The laboratory also had to listen to their customers and gain their buy-in. The data entry demands and lack of data quality were so overwhelming that the return on investment for all parties was worth the time and investment. The laboratory and their submitters ultimately agreed that they needed a comprehensive overhaul to improve the standard process.

### Challenges

The biggest challenge with building this interface was to operationalize it and get customers to use it properly. Colorado used a team of testers to communicate, train and coordinate all of the laboratory's customers. Clearly communicating the benefits of the project was essential to successful adoption of the solution.

### Suggestions for others

This project required effort up front. It is important to go into an implementation project like this with realistic expectations about the work it will take. For Colorado, the time saved, the quality improvements and the compliance improvements were worth the effort. Laboratories must weigh the effort against the benefits and make sure it's a win for everyone putting in the effort.

## Up next

Colorado is working now to expand the interface to other reportable conditions. This initiative gave the laboratory a potential model for other types of testing. The infrastructure and pipeline is now in place and can be expanded without having to be rebuilt or reinvented; the heavy lift has already been done. This extensible solution provides Colorado with the flexibility to respond to new scenarios where hospitals require follow up testing based on diagnostic results.

Electronic test orders streamline workflows for the provider, state epidemiology and the laboratory, reduces data entry and improves data quality.

**It's truly a three-way-win.**

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