

REDCap and R support the “Lab Bus”, a mobile community COVID-19 testing facility



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CATEGORY: **Epidemiology and Laboratory Capacity (ELC)**

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To provide services to neighborhoods with limited access to testing sites, Broome County (NY) Health Department converted a transit bus to a laboratory to bring services to these communities. Using technology, they were able to set up web-based scheduling and track a patient sample from collection to result while routinely transmitting data to the state database.

The “What”

Throughout the pandemic, Broome County (NY) Health Department had three conventional, fixed-location testing facilities, two operated by hospital systems and one operated by the state health department. They were concentrated in the more densely-populated central part of the county, within about two miles of each other. All three were “drive-through” services, requiring the patients to arrive in (and remain in) a private vehicle.

The concern was for neighborhoods with less access to these fixed testing sites, whether due to distance, rarity of private vehicle ownership, or other factors. The solution was



to convert a transit bus to a laboratory, and move it, and the supporting resources, to 17 different locations around the county at 1-2 week intervals. The Health Department did this from about October to April in two consecutive years, 2020-2021 and 2021-2022. They conducted about 15,000 tests during each of those periods, for a total of over 25,000 tests.

In planning the operation, the big questions pertained to (1) scheduling appointments, (2) managing throughput, (3) data integrity: accurately and unfailingly attributing a test result to the patient from which the specimen came, and (4) feeding the results into the state health department laboratory result database, in a timely and accurate manner, as required. And doing all this efficiently, repeatedly, every day, from any location. The combination of REDCap and R enabled them to do exactly that.



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The Lab Bus traveled to 17 different locations around the county at 1-2 week intervals from about October to April in two consecutive years, 2020-2021 and 2021-2022. They conducted about 15,000 tests during each of those periods, for a total of over 25,000 tests.

The Health Department created a REDCap project that offered web-based self-scheduling to the general public, supplemented by "211" operators who could schedule those without internet access. All scheduled patients received an appointment confirmation with instructions and a unique record identifier. Check-in staff at the site used barcode scanners to locate records accurately. Thereafter, barcoded stickers for patient and specimen kept those data "together" in the REDCap database. Each REDCap record included an auto-generated, boilerplate patient-specific order from the county health department medical director. Results with accompanying instructions were provided to patients when tests were complete.

They wrote an R script that a designated staff member executed at the end of every day; this could be done from anywhere with an internet connection. The script interfaced with the REDCap project via its application programming interface (API), downloading all new results and wrangling them into the format required by the state lab result database, with the end result being a file that was easily uploaded to the state database. The entire process took less than four minutes at the end of every day, irrespective of the number of patients tested.

The native Record Status Dashboard feature of REDCap enabled the medical director to monitor the operation from anywhere, including, at any moment in time, the number of patients checked in and waiting to be sampled, the number of samples on test, the number of results completed, and the proportion of positive and negative tests. REDCap natively provides a robust audit trail, documenting everything that was done with the data, when, and by whom.

The "So What"

The Health Department was able to reach neighborhoods and communities that were under-served by the fixed-location COVID-19 testing resources then available. Their data management system, based on REDCap working in concert with R, enabled them to do so efficiently and accurately. In a typical six-hour operational day, they would test about 200-300 patients.

The "Now What"

They have since used REDCap and R for several other activities, some pandemic-related and some not. They expect this platform will become increasingly important to both emergency response and to their day-to-day operations.