Rapid Cycle Improvements in the Hot Zone

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BACKGROUND

March 24, 2020, the University of North Texas Health Science Center (UNTHSC) opened Fort Worth's first drive-through coronavirus testing site in partnership with the City of Fort Worth. At that time Tarrant County reported a total of 127 cases and one death (2). The test site was able to serve both as a service for the community and an opportunity for health professional student volunteers to learn the basics of rapid cycle improvement. Most UNTHSC classes and clinical rotations had been transitioned to an online format, allowing students to be available during the day to volunteer at the testing site. Nasopharyngeal swabs were administered through vehicle windows in what was referred to as "the hot zone." It was there that the risk was highest for pathogen transmission. Directly adjacent was the warm zone, which is considered uncontaminated in relation to the hot zone but also contaminated in relation to anyone outside the warm or hot zones.

AIMS STATEMENT

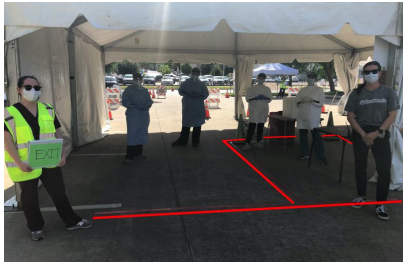
To ensure safe, efficient, and affective SARS CoV-2 testing for patients, staff, and volunteers. The most current safety standards were evaluated subjectively and objectively.

ROLES

Each hot zone requires four volunteers or staff: The **swabber** is the only team member actually in the hot zone and wears full PPE. They receive the test kit, verify name and date of birth, and administer the swab. The **warm volunteer** is the only team member in the warm zone, which is adjacent to the hot zone. The warm volunteer hands gives test kit from runner to swabber, receives the used swab and places the completed test in cooler, and assists the swabber in sanitizing in between patients. The **safety officer** is a crucial part of the hot zone. The safety officer ensures safety of all team members by enforcing proper donning and doffing, sterility standards, traffic safety, and heat safety. The **runner** brings a labeled swab and test kit from command to the hot zone.

RAPID CYCLE IMPROVEMENT

Planning & Doing:	Studying & Acting	Did it meet our aims?
Installed a semi-permanent tent around the hot and warm zones	➤ Shade for swabbers and warm zone volunteer ➤ Increased containment of potential aerosols and droplets ➤ Obvious boundaries for hot zone made accidental entry more difficult 3 heat related incidents intercepted 1 accidental hot zone entry 3101 nasopharyngeal tests administered 305 positive test results 400+ volunteers in 12 week period 0 cases of COVID among volunteers and staff	✔ Decreased risk of pathogen exposure and heat exhaustion
Standardized and created videos for warm volunteer and safety officer training	➤ Safety officers and warm volunteers were more prepared for and more confident in roles ➤ Subjective improvements in task based performance and knowledge of sanitizing and sterility concepts ➤ Increased swabber confidence and trust in warm and safety officer ➤ Good catches or near misses discussed in daily debrief 4 good catches per week 8 incidents total	✔ Improved teamwork, increased application of safety standards, and decreased risk of contamination
Added a second lane and hot zone in parallel to first	➤ Administered 40 tests per hour during peak ➤ Required new volunteer position to direct traffic and cars exiting tent Record number of tests administered during 2 hour shift: 62 for single lane 112 for two lanes	✔ Provided more tests for first responders and general public
Staggered lane opening times by 30-60 minutes	➤ Swabbers and warm volunteers spent less time in PPE ➤ Staggering provided extra time to ensure need for second lane (and subsequently, twice the exposure and twice the PPE) 165 minutes average in PPE for two lanes simultaneous opening 120 minutes average in PPE for staggered opening	✔ Decreased risk of heat exhaustion ✔ Conserved PPE (a secondary goal)



(Left to right) A traffic monitor, two swabbers, two warm volunteers, and one safety officer in the tent. Red lines dividing hot, warm, and cool zones enhanced.

A warm volunteer (right) hands the swabber (left) a clean glove. Note the red line on the ground dividing the hot and warm zones.

LESSONS LEARNED

Keep a stool or step ladder in hot zone for tall vehicles.

Double check to make sure vehicles are in park before administering swab.

Have procedures planned for vehicles that are too tall for the hot zone or cannot roll down windows.

Safety officers are absolutely crucial during doffing personal protective equipment (PPE) at the end of the shift.

Standardizing procedures (sanitizing between patients, checking name and date of birth, etc) keeps all team members on the same page as team members differ from shift to shift.

Donning and doffing PPE must be supervised and standardized procedures. Safety is paramount. Plenty of time should be allowed for both donning and doffing to ensure absolute adherence to safety standards.

Morning briefs can be used to encourage a culture of safety and to reinforce the concepts of rapid cycle improvement and "good catches."

FUTURE DIRECTIONS AND RECOMMENDATIONS

➤ Hot zones and testing sites can be designed so that if a vaccine becomes available, the site can transition from nasopharyngeal swabs to vaccine administration. Safety measures and social distancing will likely still be necessary, therefore a drive-thru setup is a natural choice.
➤ The use of an FM radio transmitter can provide audio instructions in patients' cars in English and in Spanish.
➤ Stoplights are universal signals to stop or move forward.
➤ Setting up the sites at a parking garage could work well as they are designed for traffic flow and can provide shade to volunteers.

SOURCES

1.Holshue M. L., DeBolt C., Lindquist S., Lofy K. H., Wiesman J., Bruce H. *et al*. 2020 First case of 2019 novel coronavirus in the United States. *N. Engl. J. Med.*382, 929–936. 10.1056/NEJMoa2001191
2. COVID-19 (Coronavirus). (2020). Retrieved July 30, 2020, from Tarrantcounty.com website: http://www.tarrantcounty.com/en/public-health/disease-control---prevention/coronaviruas.html