

COVID-19 Action Newsletter

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The Situation: Dallas County Epidemic Could Be Declining Statewide Mandatory Mask Order May be Working

In the world, as of July 24, 2020, 15,526,057 cases of COVID-19 have been confirmed, including 633,656 deaths. In the United States, there have been 4,038,864 cases, the most in the world followed in order by Brazil, India, Russia and South Africa. In terms of cases, China is now twenty-sixth with 86,045 cases. Deaths in the U.S. through July 24 have been estimated at 144,305.¹

From March 10 through July 23, there have been 44,087 confirmed cases of Covid-19 reported from Dallas County with 579 confirmed deaths, 30% of these from long-term care facilities.² Of hospitalized cases in Dallas County, more than two-thirds have been under 65 years of age. Diabetes mellitus has been seen in about one-third of all hospitalized patients. More men than women have died. Sixty percent of the cases have occurred in the Hispanic population. As of 7/21/20, 530 deaths have been analyzed by race with 27% occurring in Whites (actual White population 29%), Hispanics 44% (population 41%), Blacks 24% (population 24%), Asians 4% (population 7%). Specimens submitted for diagnosis of respiratory viruses show continuing positivity for SARS-CoV-2 with the latest result being 26.8%.²

References:

1. Covid-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU) (Updated 7/24/20)
2. Dallas County Health and Human Services. Acute Communicable Disease Epidemiology Division 7/24/20

Feature Article

Viral RNA and Antibody Determinations in Covid-19

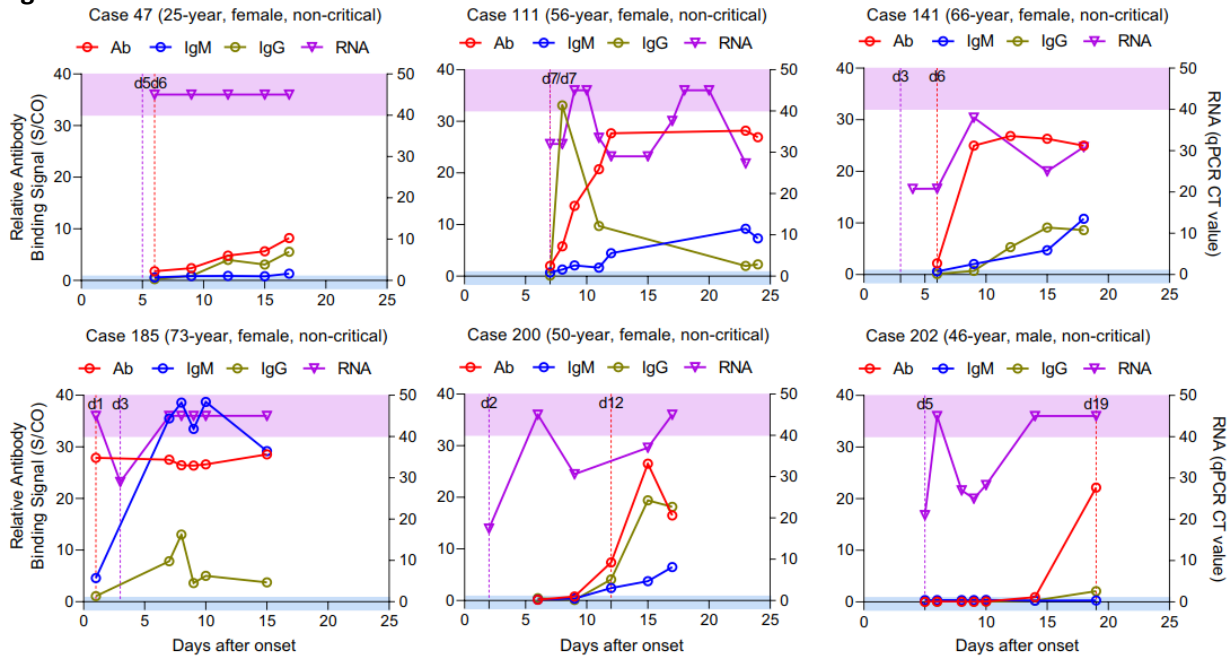
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Diagnostic tests for viral RNA and antibody (total antibody abbreviated as Ab, IgM and IgG) have been shown to improve diagnostic sensitivity in early Covid-19 disease and are documented in an article that is presently in press in *Clinical Infectious Diseases*.¹ The authors observed that many cases of Covid-19 that were linked epidemiologically and by typical chest x-ray features remained RNA negative in upper respiratory tract samples submitted for PCR. They noted that the performance of RT-PCR can be influenced by sample types, different stages of infection, operator skill and the quality of the PCR assay. They, therefore, set out to evaluate serological tests in Covid-19 for Ab, IgM and IgG and to compare and contrast these tests with upper respiratory samples processed by PCR for RNA.

The authors studied 173 patients from the Wuhan, China, epidemic who had detectable SARS-CoV-2 RNA in at least one respiratory sample and consistent clinical and x-ray findings. They considered critically ill patients to have oxygen saturation values < 93% or who required mechanical ventilation either invasively or non-invasively. PCR tests were performed and expressed in terms of cycle number. A value > 40 was considered negative and was denoted in their Figure 1 as a purple zone. Antibody studies, performed by ELISA, measured

Ab, IgM and IgG. Antibody measurements were expressed in terms of serum immunofluorescence/negative cutoff values. In Figure 1, the antibody seronegative zone was denoted in blue. In interpreting the figure, a vertical purple broken line was used to indicate the time in the patient's course when viral RNA first became detectable and a broken red line, the first antibody seroconversion by total antibody Ab. Note: The authors used seroconversion in this figure to indicate the appearance of any antibody measured in this assay since they could detect no antibody in their studies in patients whose sera were secured before the epidemic. Total antibody is composed of IgM and IgG antibody plus other components with antibody function.

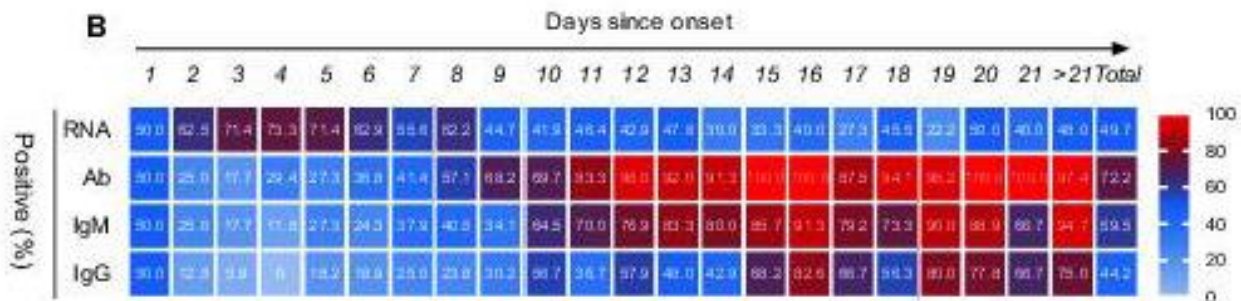
Figure 1.



In Figure 1, multiple specimen results from patients are seen. In the early phase of illness ≤ 7 days after onset, PCR had the highest sensitivity (66.7%); whereas, antibody assays showed only 38.3% positivity. In samples from patients 8-14 days after onset, antibody positivity results were all higher (Ab, 89.6%; IgM, 73.3%; IgG, 54.1%) than those of the RNA test (54.0%). In their patient #47, Panel 1, PCR values were negative after onset and in their patients 111, 185, 200 and 202, PCR values were intermittently positive.

Critically ill patients tended to have higher antibody titers than non-critical patients. This was also observed in the SARS epidemic in 2003. They speculate that this might have resulted from prior endemic coronavirus exposure as in an anamnestic response or from antibody-dependent enhancement of viral replication as found in reinfection with multiple serotypes of dengue virus.

The authors include an additional figure (1B, in their manuscript) showing a heat map that delineates the sensitivities of the different tests (RNA, Ab, IgM and IgG) for Covid-19 infection by time after onset of



symptoms. While PCR for viral RNA remains the best test within the first week after onset of symptoms, antibody tests sometimes were positive when PCR was negative even in the first week. After the first week,

however, the antibody test was better. They conclude that by combining RNA and antibody measurements, they were able to raise the sensitivity for detecting the infection. Acute antibody response in SARS-CoV-2 is very similar to other acute viral infections in this respect.

The authors concluded that their findings provide strong evidence for the routine application of both a PCR test for viral RNA and serological antibody assays in the diagnosis and clinical management of Covid-19 patients. Total antibody Ab was superior to both IgM and IgG.

Editorial Note: If the Covid-19 problem continues, it is likely that sera drawn late after onset will have persistent anti-Covid-19 IgG antibody levels, and that will complicate future serological analysis much like West Nile virus IgG persistence complicates present investigation of patients with CNS infections in Dallas.

Reference:

1. Zhao J, Yuan Q, Wang H et al. Antibody responses to SARS-CoV-2 in patients of novel coronavirus disease 2019. *Clin Infect Dis* 2020 Mar 28, 2020. Doi: 10.1093/cid/ciaa344.
2. Cheng MP, Papenburg J, Desjardins M et al. *Ann Intern Med* 2020;172:726-734. Doi:10.7326/M20-1301.

Epi Corner

Covid-19 Cases in Dallas Co. Decline for Fourth Straight Day

Following the stepwise reopening of businesses in Texas through May of this year and widespread celebrations over the Memorial Day holiday, Dallas County along with the rest of Texas saw a steady rise in Covid-19 cases, followed soon by increasing hospitalizations, ICU admissions and eventually deaths (Fig. 1). Rather suddenly in early July, the daily case count skyrocketed to over 1,000 cases per day. On July 3, the Texas governor issued an executive order mandating masking when distancing is not possible (arrow in Fig. 1). The daily count of reported cases, however, remained over 1,000 for over 2 more weeks. Finally 3 days ago, we saw our first break, with reported cases suddenly plummeting to the 700s, the next day to the 400s, and yesterday to the low 600s. While health department epidemiologists are checking the stream of test reporting to rule out artifactual drops, this could be a sign that the statewide masking mandate is working in Dallas County at least.

Further insights appear in the health department’s plot of daily confirmed cases by *date of test*

collection (Fig. 2) rather than by date of report (Fig. 1). Fig. 2 shows an almost immediate downward deflection of the epidemic curve after the masking order, allowing for the regular weekend lulls in testing. Barring some artifactual explanation, the timing of this remarkable turnaround strongly suggests a dramatic effect of the masking order, as was seen earlier in the first 15 states that issued statewide masking mandates (see C.A.N. Vol.1, No. 10, June 19, 2020, issue).

Epidemiologists, however, are advising caution in interpreting the dramatic reversal. Often such abrupt changes in epidemic curves

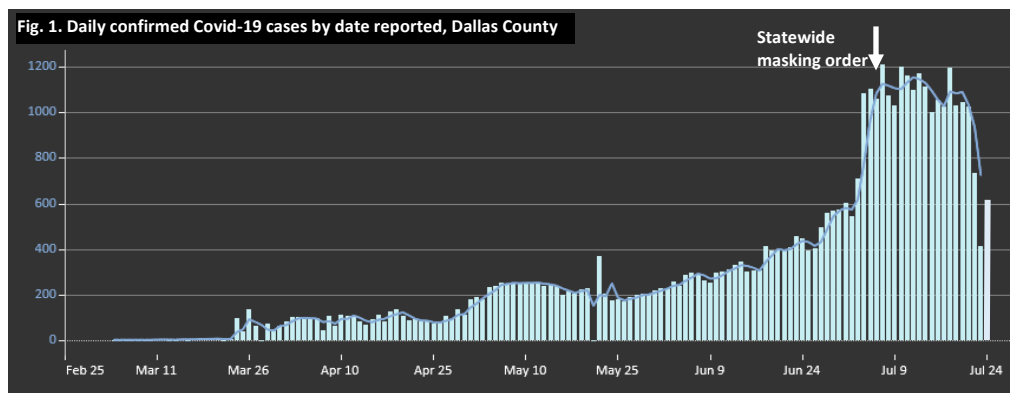
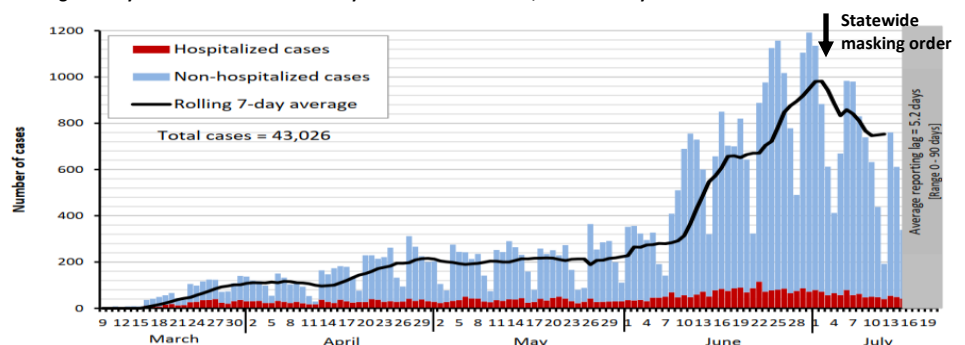


Fig. 2. Daily confirmed Covid-19 cases by date of test collection, Dallas County



turn out to reflect testing or reporting artifacts; we are yet to see convincing drops in hospital or ICU admissions, and deaths are still high. On the other hand, it may be too early for those indicators to start responding due to the usual intervals between onset of infection, testing, reporting, hospitalization, ICU transfer and death. For the moment, however, we can enjoy the positive prospect that the early summer resurgence may finally be responding to widespread adoption of masking by Dallas County residents.

From the Editors

The aim of this weekly newsletter is to serve as a source of information for the UT Southwestern community which can lead to better understanding and control of a new disease (COVID-19) caused by the pandemic spread of an emerging viral pathogen (SARS-CoV-2). We welcome questions, comments, and suggestions for topics and authors.