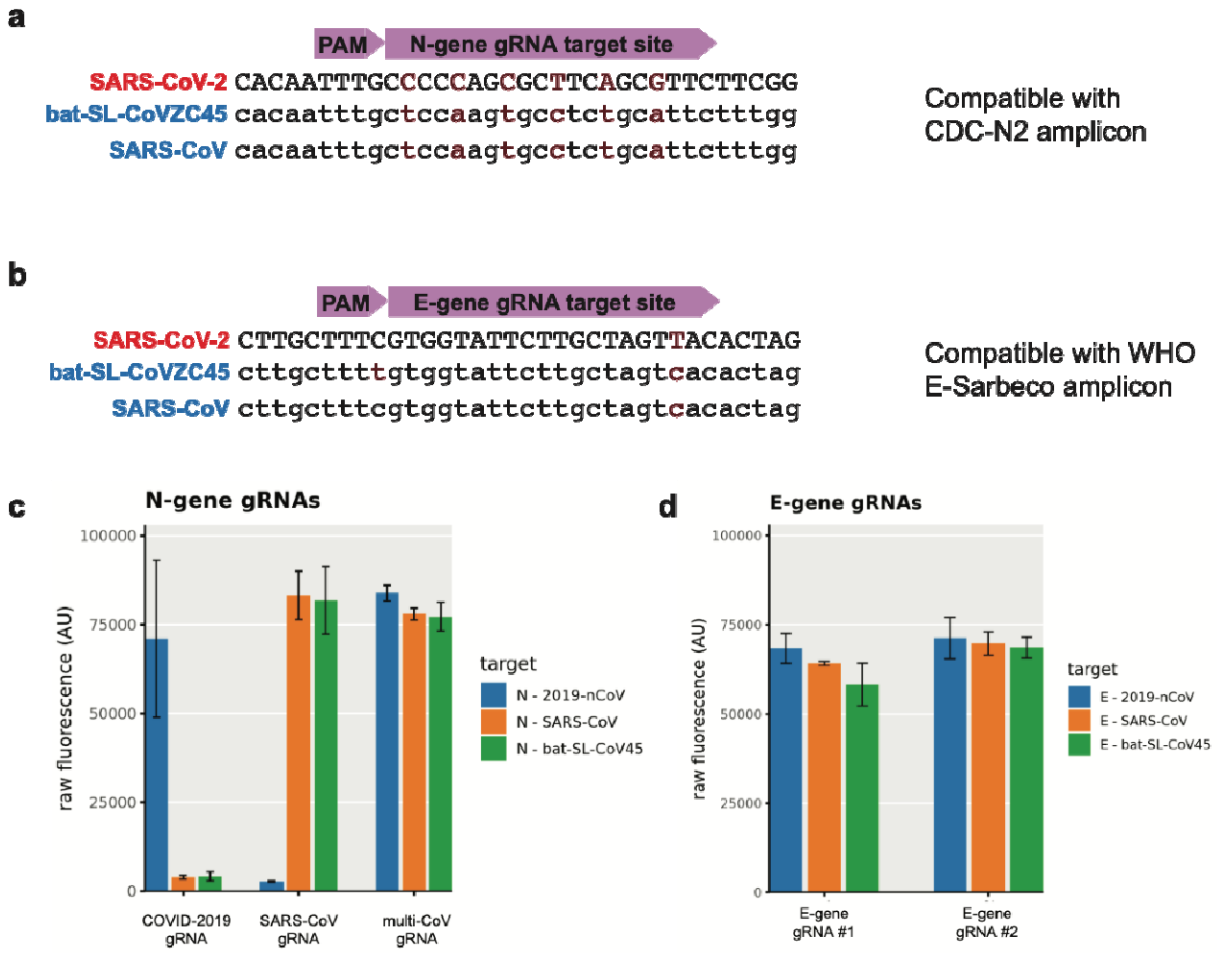
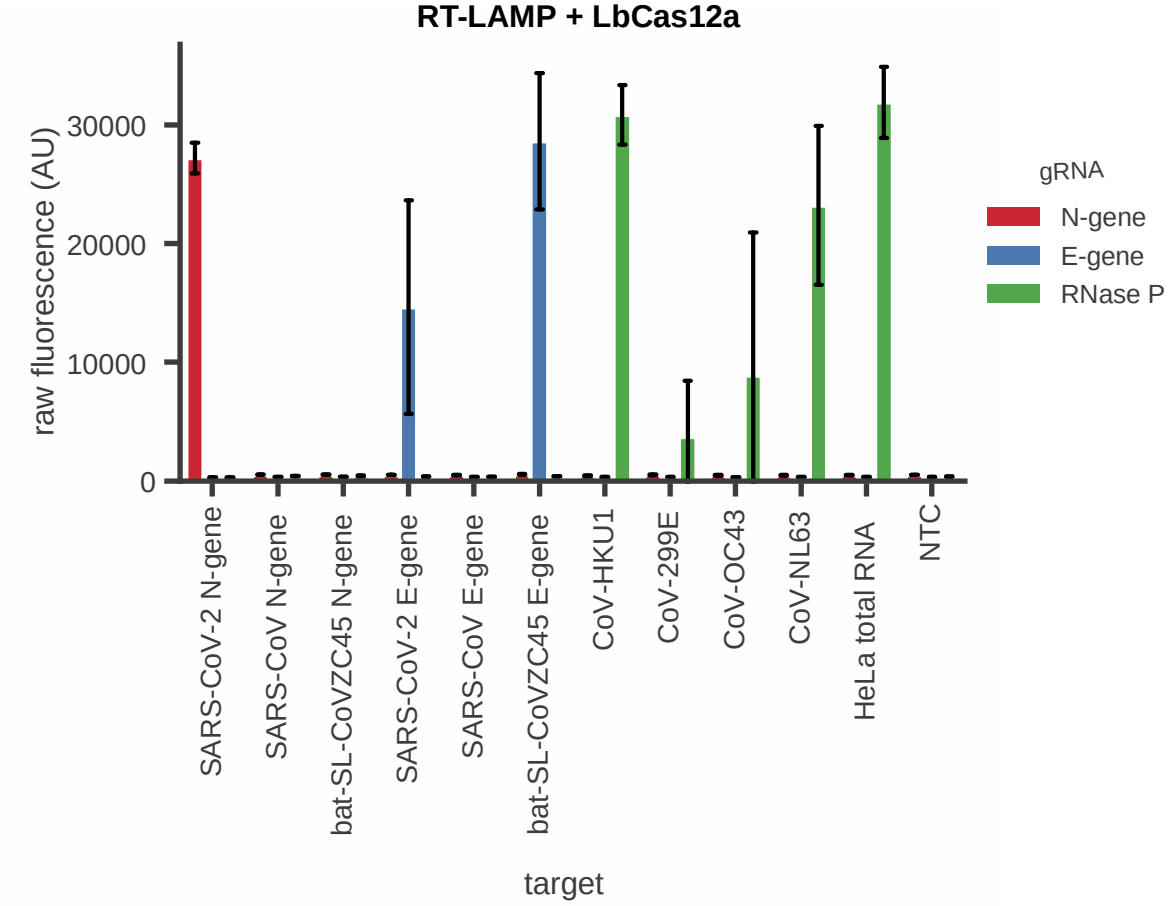
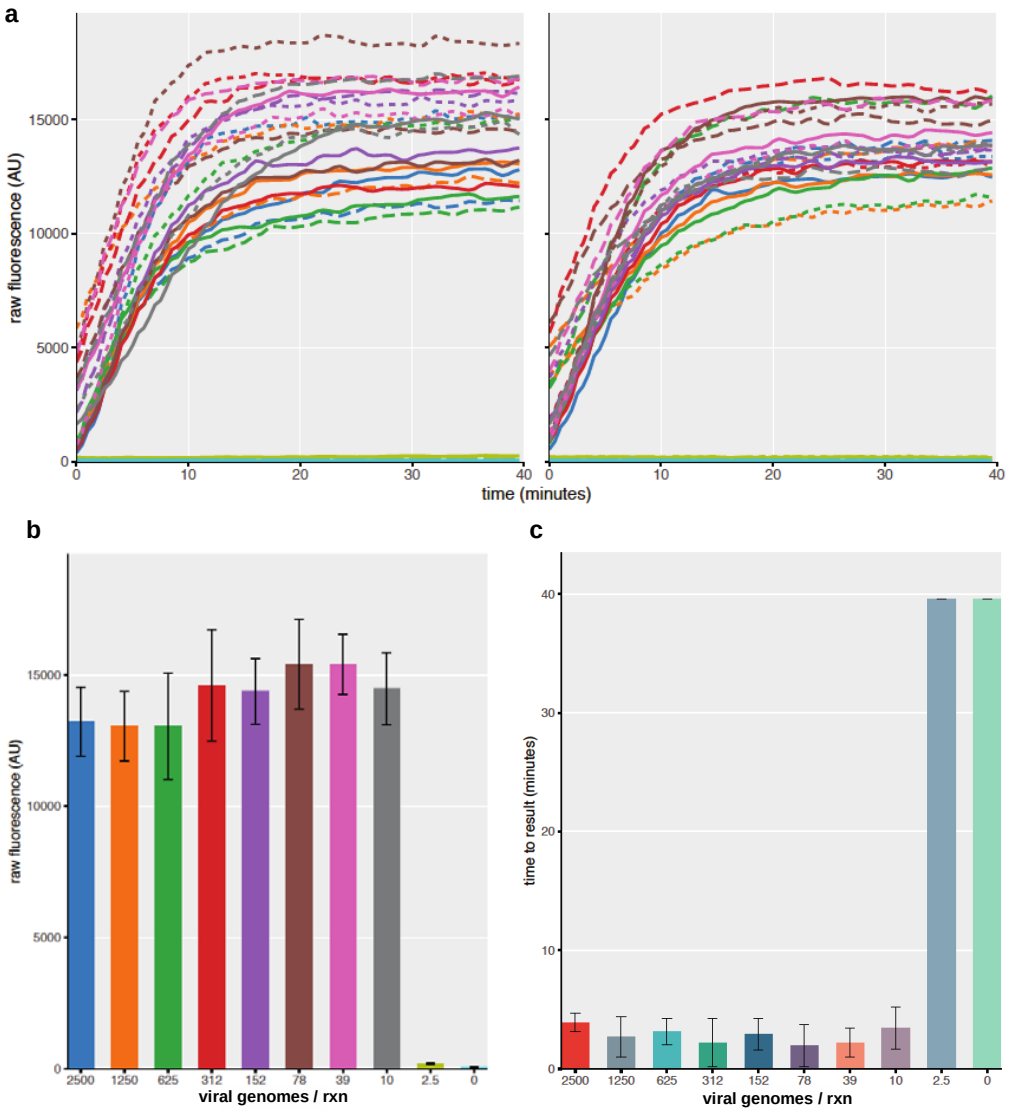
SUPPLEMENTARY FIGURES



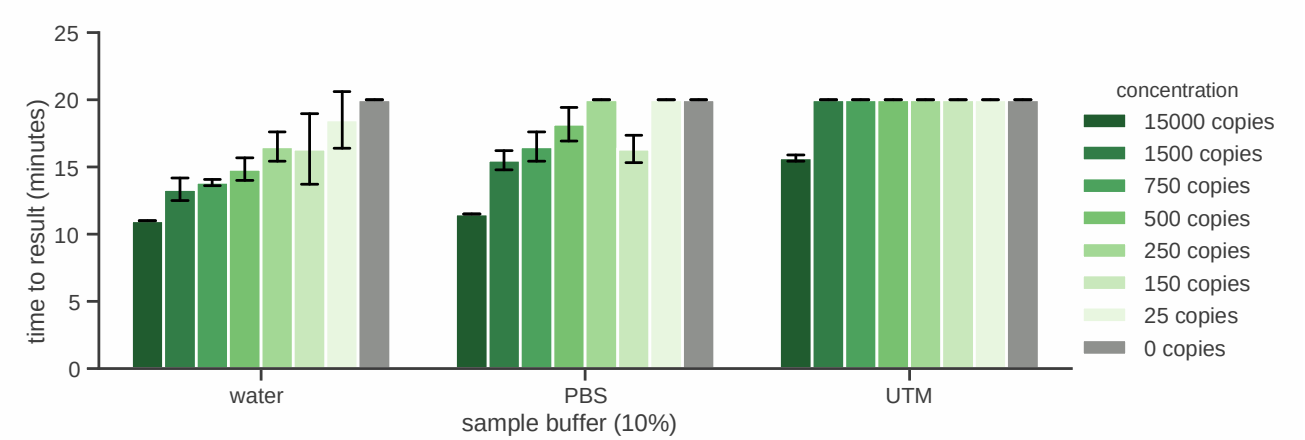
Supplementary Figure 1. Comparison of sequences between SARS-CoV-2, SARS-CoV, and bat-SL-CoVZC45 at the sites targeted by the gRNAs used in this study. **(a)** The N-gene gRNA is compatible with the CDC-N2 amplicon, and **(b)** the E-gene gRNA is compatible with the WHO E-Sarbeco amplicon. **(c-d)** DETECTR fluorescence values using **(c)** N gene gRNAs and **(d)** E gene gRNAs.



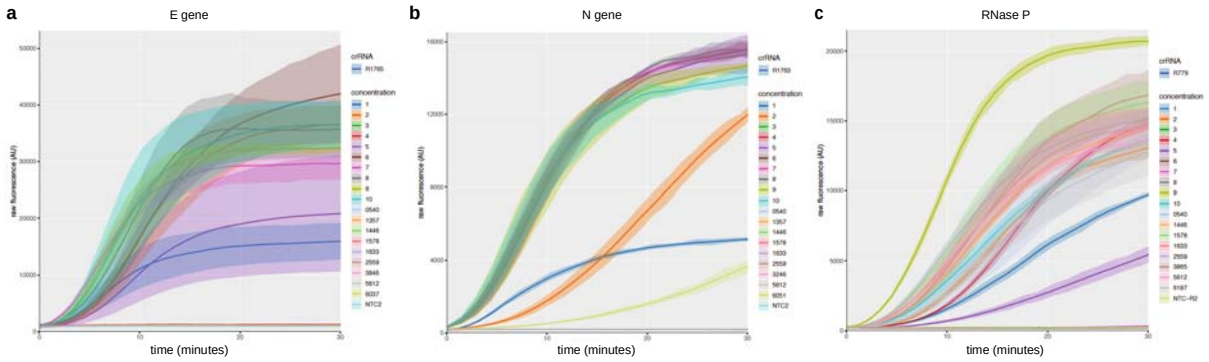
Supplementary Figure 2. Cross-reactivity of DETECTR to common human coronaviruses. SARS-CoV-2 DETECTR assay (RT-LAMP + Cas12a) was evaluated on IVT RNA products from SARS-CoV-2, SARS-CoV, bast-SL-CoVZC45, and clinical samples from common human coronaviruses. As expected, the N-gene is only detected in SARS-CoV-2, whereas the E-gene is detected only in SARS-CoV-2 and bat-SL-CoVZC45. SARS-CoV E-gene was not detected as the RT-LAMP primer set is not capable of amplifying the SARS-CoV E-gene, even though the E-gene gRNA is capable of detecting the SARS-CoV E-gene target site. RNase P is detected in common human coronaviruses because these samples are RNA extracted from clinical samples. Result shown at 15 min of LbCas12a detection assay signal on fluorescent plate reader.



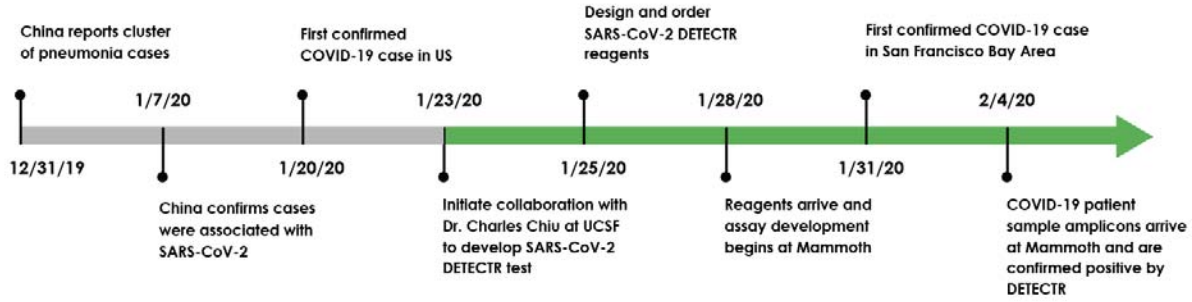
Supplementary Figure 3. DETECTR analysis of SARS-CoV-2 identifies down to 10 viral genomes in approximately 30 min. Duplicate LAMP reactions were amplified for twenty min followed by LbCas12a DETECTR analysis. **(a)** Raw fluorescence curves generated by LbCas12a detection of SARS-CoV-2 N-gene (n=6) show saturation in less than 20 min. **(b)** Further analysis reveals the limit of detection of the SARS-CoV-2 N-gene to be 10 viral genomes per reaction (n=6). **(c)** Evaluation of the time to result of these reactions highlights detection of 10 viral genomes of SARS-CoV-2 in under 5 min (n=6).



Supplementary Figure 4. Impact of sample buffers on performance of RT-LAMP pre-amplification. Time-to-result for RT-LAMP amplification (lower value indicates faster amplification) with 10% universal transport medium (UTM), 10% PBS, or 10% water final volume for the SARS-CoV-2 N-gene on a standard curve of the 2019-nCoV positive control plasmid (IDT) in 10% reaction volume. Results indicate that 10% PBS inhibits the assay less than 10% UTM.



Supplementary Figure 5. DETECTR kinetic curves on COVID-19 infected patient samples. Ten nasopharyngeal/oropharyngeal swab samples from 5 patients (COVID19-1 to COVID19-5) were tested for SARS-CoV-2 using two different genes, N2 and E as well as a sample input control, RNase P. **(a)** Using the standard amplification and detection conditions, 9 of the 10 patient samples resulted in robust fluorescence curves indicating presence of the SARS-CoV-2 E-gene (20-minute amplification, signal within 10 min). **(b)** The SARS-CoV-2 N-gene required extended amplification time to produce strong fluorescence curves (30-minute amplification, signal within 10 min) for 8 of the 10 patient samples. **(c)** As a sample input control, RNase P was positive for 17 of the 22 total samples tested (20-minute amplification, signal within 10 min).



Supplementary Figure 6. Timeline showing major events in the progression of COVID-19 detection and assay development.