

# COVID-19 symptom duration correlates positively with cycle threshold (Ct)

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## Background

- Most widely available diagnostic tests for SARS-CoV-2 are currently RT-PCR based
- RT-PCR is sensitive but cannot distinguish between replicating and non-replicating virus
- RT-PCR cycle threshold (Ct) values are inversely correlated with viral load and have been shown to correlate with culturable virus *in vitro*<sup>1</sup>
- Understanding the duration of infectiousness in persons who test positive for COVID-19 is critical to evidence-based public health strategies on isolation and contact tracing
- Few data exist on the association between Ct values and duration of symptoms associated with COVID-19

## Methods

- All patients admitted to San Francisco General Hospital between April 1 and May 18, 2020 with confirmed COVID-19 infection based on RT-PCR testing (Abbott m2000 platform) were included in this analysis
- Patients were tested for COVID-19 infection based on clinical suspicion
- Date of symptom onset was abstracted from hospital records by two independent reviewers
- RT-PCR Ct values were manually extracted
- Median Ct and IQR were calculated for patients with <10 days of symptoms and  $\geq 10$  days of symptoms
- Between-group comparisons were performed using the Kruskal-Wallis test

Figure 1. Cycle threshold (Ct) by days of symptoms at time of testing

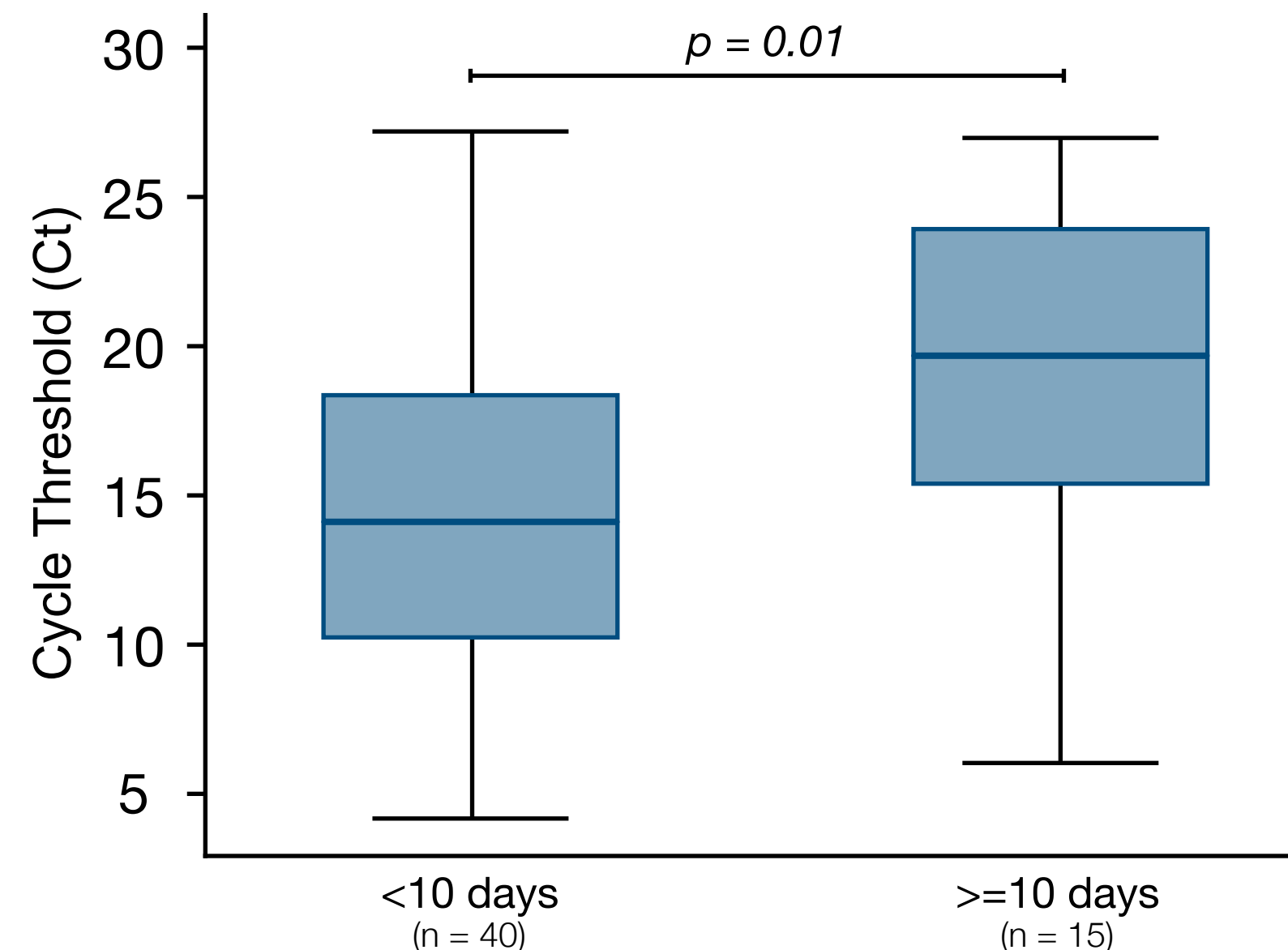
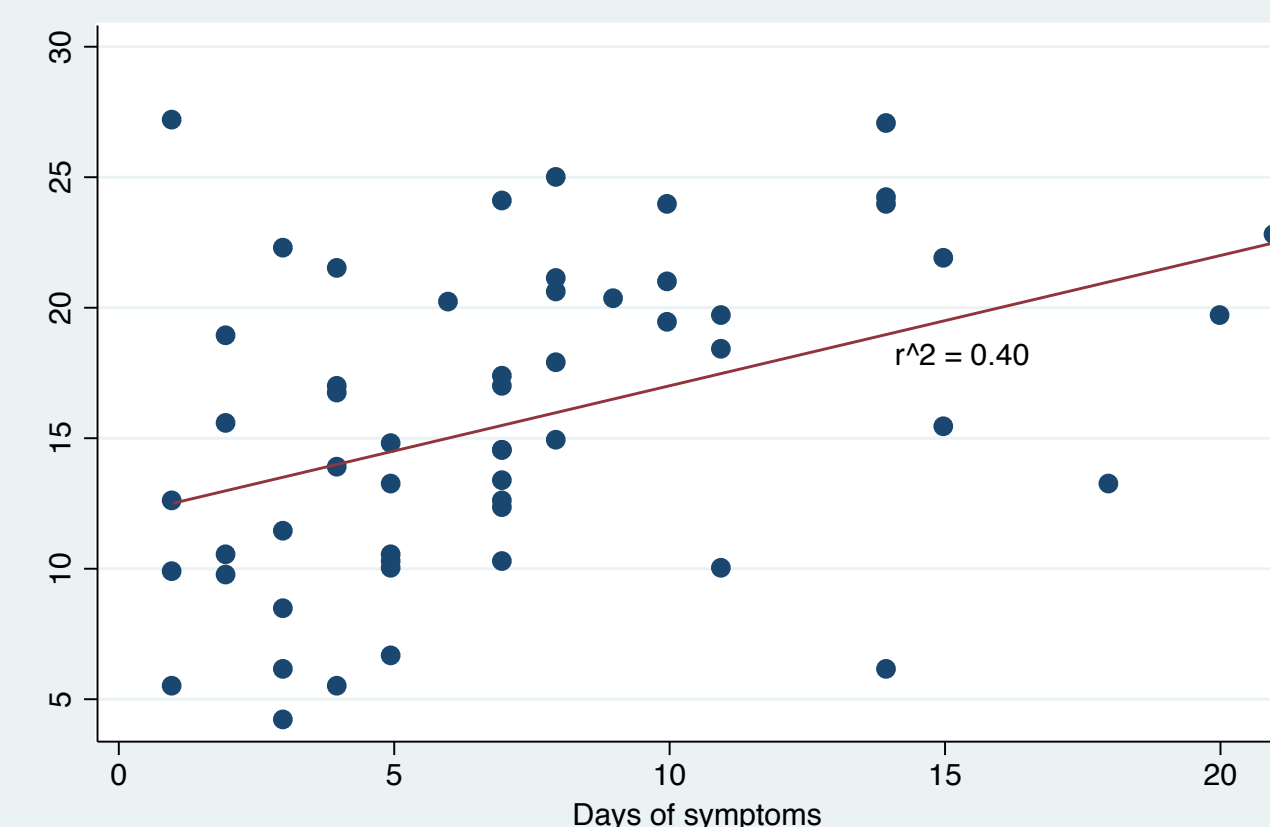


Table 1. Median Ct and IQR by days of symptoms at time of testing

	Median Ct	IQR
<10 days	14.2	10.2, 18.3
$\geq 10$ days	19.7	15.3, 23.9

Figure 2. Cycle threshold by days of symptoms at time of testing



## Results

- Among 55 initial patients with positive SARS-CoV-2 RT-PCR tests:
  - 40 reported < 10 days of symptoms (including 2 patients who were presymptomatic)
  - 15 reported  $\geq 10$  days of symptoms

## Conclusions

- Among symptomatic, hospitalized patients SARS-CoV-2, RT-PCR cycle threshold values were higher (indicating lower viral load) in patients with longer symptom duration
- The range of Ct values was wide among all symptomatic patients and multiple individuals with duration of symptoms >10 days were observed to have low Ct values
- **A combination of symptom duration and RT-PCR cycle threshold value might be informative in more precisely determining patients' infectivity. This could inform infection control and isolation practices both in hospital and community settings**
- Future directions: additional analyses are being done on a larger sample of patients, and with other RT-PCR platforms

1. Singanayagam A, Patel M, Charlett A, et al. Duration of infectiousness and correlation with RT-PCR cycle threshold values in cases of COVID-19, England, January to May 2020. *Euro Surveill.* 2020;25(32):2001483. doi:10.2807/1560-7917.ES.2020.25.32.2001483