

with Covid-19,<sup>5</sup> even in patients with SARS-CoV-2 infection who are not critically ill. Our results indicate that SARS-CoV-2 has an organotropism beyond the respiratory tract, including the kidneys, liver, heart, and brain, and we speculate that organotropism influences the course of Covid-19 disease and, possibly, aggravates preexisting conditions.

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## Transmission of SARS-CoV-2 in Domestic Cats

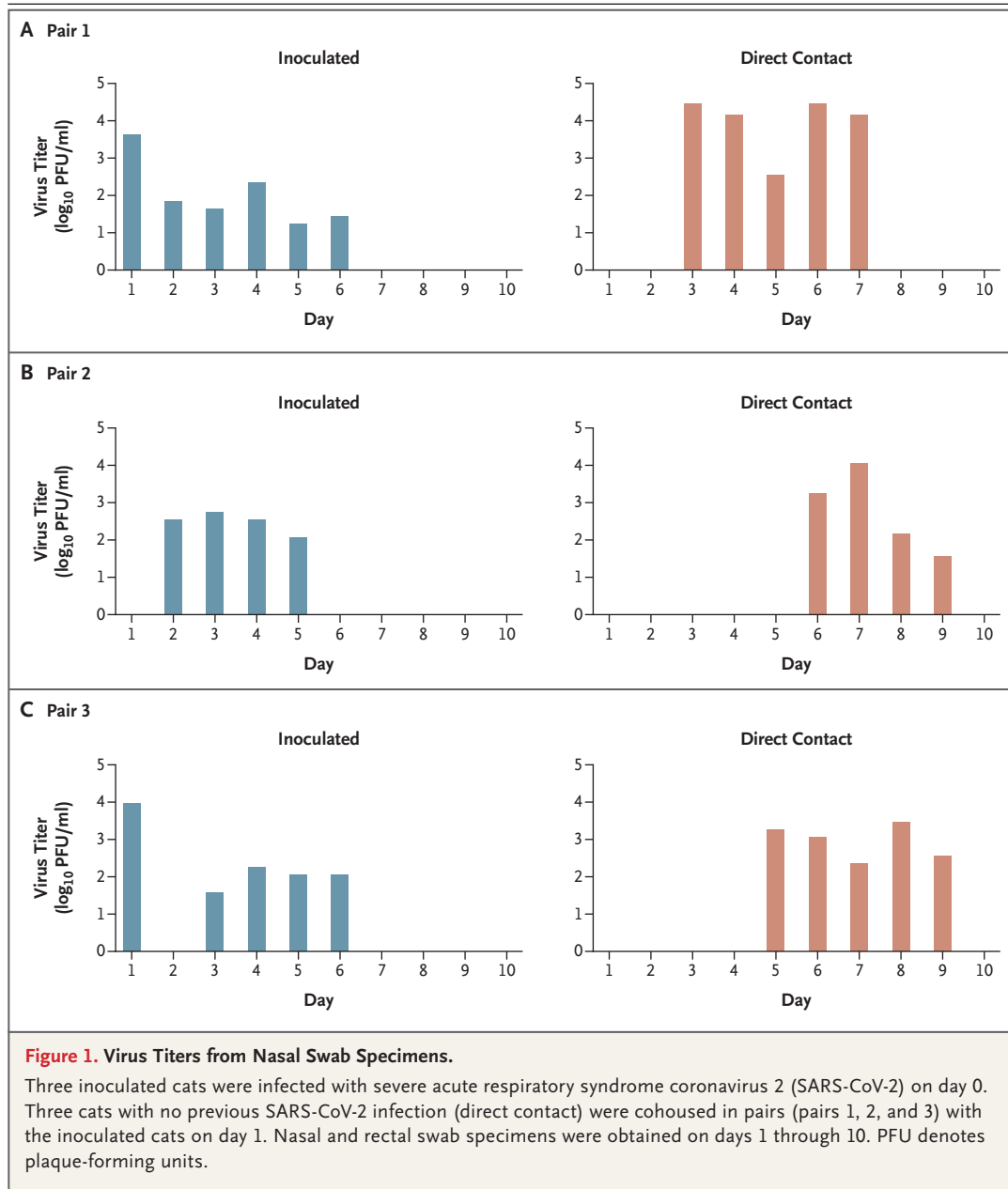
**TO THE EDITOR:** Reports of human-to-feline transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)<sup>1</sup> and of limited airborne transmission among cats<sup>2</sup> prompted us to evaluate nasal shedding of SARS-CoV-2 from inoculated cats and the subsequent transmission of the virus by direct contact between virus-inoculated cats and cats with no previous infection with the virus. Three domestic cats were inoculated with SARS-CoV-2 on day 0. One day after inoculation, a cat with no previous SARS-CoV-2 infection was cohoused with each of the inoculated cats to assess whether transmission of the virus by direct contact would occur between the cats in each of the three pairs (Table S1 in the Supplementary Appendix, available with the full text of this letter at NEJM.org). Nasal and rectal swab specimens were obtained daily and immediately assessed for infectious virus on VeroE6/TMPRSS2 cells.<sup>3</sup>

On day 1, we detected virus from two of the inoculated cats. By day 3, virus was detectable in all three inoculated cats, with continued detection of virus until day 5 in all cats and until day 6 in two of the three cats (Fig. 1).

The cats with no previous infection were cohoused with the inoculated cats on day 1. Two days later (day 3), one of the cats with no previ-

ous infection had infectious virus detected in a nasal swab specimen, and 5 days later, virus was detected in all three cats that were cohoused with the inoculated cats (Fig. 1). Virus titers in the cats that were cohoused with the inoculated cats peaked at 4.5 log<sub>10</sub> plaque-forming units per milliliter, and virus shedding lasted 4 to 5 days (Fig. 1). No virus was detected in any of the rectal swabs tested. Although there have been reports of symptomatic infected cats, none of the cats in our study showed any symptoms, including abnormal body temperature, substantial weight loss (Fig. S1), or conjunctivitis. All the animals had IgG antibody titers between 1:5120 and 1:20,480 on day 24 after the initial inoculation.

With reports of transmission of SARS-CoV-2 from humans to domestic cats<sup>1</sup> and to tigers and lions at the Bronx Zoo,<sup>4</sup> coupled with our data showing the ease of transmission between domestic cats, there is a public health need to recognize and further investigate the potential chain of human–cat–human transmission. This is of particular importance given the potential for SARS-CoV-2 transmission between family members in households with cats while living under “shelter-in-place” orders. In 2016, an H7N2 influenza outbreak in New York City cat shelters<sup>5</sup> highlighted the public health implications of



cat-to-human transmission to workers in animal shelters. Moreover, cats may be a silent intermediate host of SARS-CoV-2, because infected cats may not show any appreciable symptoms that might be recognized by their owners. The Centers for Disease Control and Prevention has issued guidelines for pet owners regarding SARS-CoV-2 ([www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/animals.html](http://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/animals.html)). Given the need to stop the coronavirus disease 2019 pandemic through various mechanisms, including breaking transmission chains, a better understanding of the

role cats may play in the transmission of SARS-CoV-2 to humans is needed.

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## Five-Year Outcomes with Transcatheter Aortic-Valve Replacement

**TO THE EDITOR:** The key message of the report by Makkar et al.<sup>1</sup> and the editorial by Van Belle<sup>2</sup> (Feb. 27 issue) on the Placement of Aortic Transcatheter Valves (PARTNER) 2 cohort A trial is the effectiveness of transcatheter aortic-valve replacement (TAVR) in terms of death from any cause or disabling stroke at 5 years. Nonetheless, on critical appraisal, other important results are noted. The landmark analysis of events occurring between 2 and 5 years after the procedure (Fig. S4 in the Supplementary Appendix of the article, available at NEJM.org) shows that TAVR was associated with a higher risk of death or disabling stroke after 2 years than was surgical aortic-valve replacement, with a hazard that was 27% higher. Moreover, the intersection of the time-to-event curves (Fig. 1 of the article) and the wide differences between the hazard ratio at 0 to 2 years (0.89; 95% confidence interval [CI], 0.73 to 1.09) and that at 2 to 5 years (1.27; 95% CI, 1.06 to 1.53) suggest that the hazards were not constant over time. Therefore, the reported 5-year hazard ratio is not an accurate reflection of the findings, which require landmark analysis or time-varying modeling.<sup>3,4</sup> The key message of the trial is also overshadowed by the disadvantage of TAVR in terms of reoperations and rehospitalization, which underscores concerns about the durability of TAVR devices. In summary, the 5-year results

from the PARTNER 2 cohort A trial are not a swan song for surgery.

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