

**Summary of SARS-CoV-2 Episode in Gorillas
at the San Diego Zoo Safari Park
January – February 2021**



Clinical Signs in our Gorillas:

- Oldest gorillas (>40yo) most severe: coughing, lethargy/fatigue and reduced appetite
- Adolescent males (9-12yo) moderate: coughing, reduced vitality, nasal discharge
- Adult and juvenile females minor: nasal discharge, slightly subdued, infrequent coughing
- First clinical sign in the troop was seven days after the last possible exposure to an infected staff member
- Clinical signs lasted up to 21 days, with 49yo old silverback with longest clinical course
- 49yo silverback and 43yo female were of enough clinical concern to warrant intervention

Monoclonal Antibodies and Gorilla SARS-CoV-2 Vaccination:

- Monoclonal antibodies (mAbs) were acquired through contacts from our county public health department and with the approval of the FDA CVM.
- mAbs were locally sourced and were not from the human supply chain.
- mAbs antibodies bind the virus itself (specifically the spike protein)
- In human SARS-CoV-2 patients, mAbs are most effective five to ten days from the start of clinical signs, in patients that are ambulatory and not oxygen dependent.
- mAbs were given to our silverback as an intravenous infusion over one hour
- At the time of this episode at the SDZ Safari Park, we researched vaccination options for our great apes housed at our sister institution, the San Diego Zoo.
- Vaccines were procured for our highest risk apes who are amenable to voluntary injection.
- At our request, Zoetis provided a limited supply of experimental SARS-CoV-2 vaccines used under informed consent.
- Our contact is John Hardham, Director, Zoetis Center for Transboundary and Emerging Diseases, john.m.hardham@zoetis
- We anticipate vaccination of our gorilla troop at the Safari Park later this spring, after waiting the recommended 60 to 90 days between SARS-CoV-2 infection and vaccination

PPE and Best Practices:

- The table below outlines PPE protocols for gorilla staff at the SDZ Safari Park
- Detailed and intentional disinfection protocols (available upon request) in the gorilla building, both in keeper and animal areas, were important to reducing viral load in the building
- Using CDC requirements for human SARS-CoV-2 exposure and examples from Skilled Nursing Facilities (SNFs), and knowing that humans infected with SARS-CoV-2 shed the virus in feces for an average of 25 days, we will re-evaluate PPE four weeks after the last gorilla had clinical signs
- Distribution of face masks, face shields and Tyvek^(R) protective suits is only successful if the time is taken to ensure those using them are trained and comfortable with the process.
- Face masks should fit tightly to the face (pre-emptive fit-testing of N95s is strongly recommended)
- The principles of doffing and clean and dirty areas are second nature to most veterinarians but familiarity with these processes may be inconsistent across all areas.
- Proper ventilation in indoor animal housing areas is very important.
- Institutions looking for preventive measures to consider should evaluate air circulation in their ape houses, and how to increase it while also using administrating controls to reduce staff time indoors with gorillas.

Personal Protective Equipment and Practices at SDZ Safari Park					
Practices and PPE used when working with gorillas	Starting April 2020	After keeper SARS-CoV-2 Dx	After gorillas had clinical signs	After SARS-CoV-2 confirmed in gorillas	After gorilla troop considered cleared of SARS-CoV-2
Medical screening of staff daily	XX	XX	XX	XX	XX
Temperature of staff daily	XX	XX	XX	XX	XX
Dedicated Uniforms	XX	XX	XX	XX	XX
Shoes remain on site	XX	XX	XX	XX	XX
Footbath at building entrance	XX	XX	XX	entrance to Clean Zone	XX
Gloves	XX	XX	XX	XX	XX
Surgical masks (3 ply)	XX				XX
N95 masks		XX	XX	XX	
Fit testing gorilla keepers for N95s				XX	Will keep this up moving forward
Safety goggles or face shield	Use when cleaning	Use when cleaning	XX	XX	Use when cleaning
Tyveck® suits over uniforms				XX	
Clean/dirty zones				XX	
Boots in dirty zone				XX	
Doors to building kept open to increase airflow				XX	
Exhaust fan in use 24/7				XX	

By collaborating with multiple agencies and specialists, translating knowledge and advancements in management of humans impacted by SARS-CoV-2 into our veterinary patients, and prioritizing the health of our team members through responsible personnel protective equipment use and engineering controls, we were able to confidently support the health and welfare of the gorilla troop, allowing them to continue to thrive.

San Diego Zoo Safari Park Department of Veterinary Services

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