

## **Results for Maddie's Fund San Francisco SPCA Feline Panleukopenia Study**

### **Introduction:**

Cats and dogs in a shelter setting are commonly affected by illnesses that causes diarrhea. In a shelter, diarrhea can lead to negative outcomes ranging from severe dehydration to increased length of stay or difficulty finding placement in a home, and can create a labor and financial burden on shelters. Puppies and kittens are especially at risk of severe clinical signs secondary to diarrhea, whether the cause is related to viral or bacterial infection, parasitism, or other causes. Feline and canine parvoviruses infect dividing cells such as the gastrointestinal tract, leading to vomiting and diarrhea, among other serious clinical signs; pediatric and unvaccinated animals are at highest risk of this disease.

Fecal microbiota transplantation (FMT) has been reported to be effective in treating numerous GI disease in humans, such as autoimmune diseases and chronic bacterial infection. In dogs, FMT has had limited study, a study of puppies infected with canine parvovirus showed that fecal transplantation shortened hospitalized time and led to faster resolution of diarrhea. Here, kittens in a shelter who were found to be infected with feline panleukopenia were enrolled in a study to test whether FMT improved clinical outcomes compared to supportive care alone, which is the mainstay of treatment for this viral illness in a shelter.

### **Project Design:**

Our study of fecal transplants in kittens positive for panleukopenia as tested by point of care Parvo SNAP test (Idexx).

Patients testing positive for panleukopenia were divided into control and test groups with random assignments using a random number generator. Animals remained cohoused (in cases where multiple cohoused kittens tested positive at the same time) when possible to maintain welfare and socialization, all cohoused animals were assigned the same treatment group.

All kittens diagnosed with panleukopenia received supportive care consisting of anti-emetic, subcutaneous fluids, appetite stimulants, and pain medications if deemed necessary. Kittens assigned to the FMT group were administered an enema consisting of fecal material from a healthy adult cat (no history of antibiotic usage, unremarkable fecal testing and fecal PCR) daily for 3 days. Kittens were evaluated daily by medical staff to assess weight, stool quality, and severity of illness. Kittens were tested for panleukopenia daily until they tested negative, passed away, or were humanely euthanized based on veterinarian's evaluation of compromised welfare due to the severity of their disease.

### **Results:**

A total of 38 animals were entered into the study, with 22 in the control group and 16 in the FMT test group. Kittens entered into the study were domestic shorthair and longhaired kittens transferred into the shelter.

The average time from diagnosis to resolution (with negative Parvo snap test) was 1.82 days for control group, and 2.6 days for FMT test group. Normalized stool was reported for 27.3% of control subjects and 44.4% of FMT subjects, and weight gain trend was reported for 54.5% of control subjects and 77.8% of FMT subjects.

The overall mortality rate was 40% with 38% of control group and 43% of FMT group animals. 40.5% of kittens received antibiotic treatment during their time under treatment for panleukopenia, there was no

significant difference in survival between groups that did and did not receive antibiotics, and no significant difference between control and FMT group for antibiotic treatment.

Chi-square analysis was not significant for any of the measured comparisons between the groups for survival, stool, and weight gain trend. Mann-Whitney U test was not significant for average time from diagnosis to resolution.

**Discussion:**

In 2019, 37 kittens diagnosed with panleukopenia were entered into the study, based on prior years' data and number of kittens who present with panleukopenia, this was a lower number of available subjects than expected. Nonetheless, the data collected does not show a significant difference between FMT and Control group for the measured tests. Resolution of diarrhea and upward weight trend was seen in the kittens being treated with FMT, however this did not rise to significance.

Mortality rate was similar between the two groups. One possible reason for this is that in addition to effects on the gastrointestinal system, feline panleukopenia also affects dividing cells in the bone marrow, leading to panleukopenia which is a risk factor for sepsis. FMT would not be anticipated to have an impact on the development of sepsis.

The mortality rate for kittens with panleukopenia in 2019 was noted to be higher than for data collected in previous years. At this stage we do not know whether the higher mortality rate for panleukopenia is related to a different strain of the virus compared to that from previous years, or is related to the treatment protocol for control and experimental groups. In previous years antibiotic therapy was instituted for most patients undergoing supportive treatment for panleukopenia, it is possible that this confers an advantage against sepsis from bone marrow suppression in these kittens. CBC was not measured in this study, however measuring this may be a useful prognostic indicator for kittens.

