



How To Turn Orphan Kittens into Senior Cats

Interventions and observations associated with survival of kittens undergoing treatment for diarrhea

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Science & Collaboration



Wake County Animal Center



NC STATE Veterinary Medicine  
THINK AND DO THE EXTRAORDINARY



Make a difference

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Wake County Animal Center

- Open intake municipal shelter
- 11-12k annual animal intake
- 1800 orphan kittens per year
- Robust foster program
- Dedicated rescue/transfer partners
- Mortality of kittens
  - Gastrointestinal
  - Respiratory



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## Challenges with orphan kittens

- 74 million "owned" and ~70 million feral cats in the U.S. (AVMA Pet ownership and demographics sourcebook 2012)
- 180 million kittens per year (www.feralcatproject.org)
- 4,000-6,000 U.S. animal shelters (Humane Society of the United States)
- ~21% foster kittens die or are euthanized due to illness before they reach 12-wks of age (Scott FW 1998, Young C 1973, Sparkes AH 2006, Root MV 1995)
- Obvious cause unknown in as many as 50% of kittens (Cave TA 2002, Natter FB 2004)



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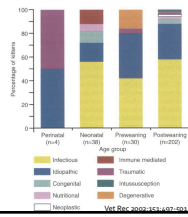
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## Causes of kitten mortality

- Weaning period most vulnerable
  - Stress, failure of passive transfer, crowding, sanitation, diet
- Infectious disease is most common cause of death
  - 71% viral – esp panleukopenia
  - 20% bacterial
- Often die with clinical signs or post-mortem evidence of intestinal disease (Murray JK 2008, Cave TA 2002)

**Kitten mortality in the United Kingdom: a retrospective analysis of 274 histopathological examinations (1986 to 2000)**

T. A. Cave, H. Thompson, S. W. J. Rice, D. R. Hodgson, D. D. Aplin



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## Study objective

- Identify significant associations between empirical treatment interventions and survival of foster kittens with diarrhea



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### Shelter Intake Procedure

- Vaccination Feline 1-HCP (herpes, calicivirus, panleukopenia)
- Ponazuril (Marquis)
- Pyrantel Pamoate
- Selamectin Revolution topical
- Brief exam by technician
  - (age, sex, weight, abnormalities)



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### Diarrhea treatments

- Vitamin supplement
- Probiotics
- Marquis Paste (Ponazuril)
- Antibiotics
  - Metronidazole, Penicillin
- Nutrition
- Supportive care
  - fluids, appetite stimulants, warmth



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### Interventions and observations associated with survival of orphaned shelter kittens undergoing treatment for diarrhea

- **1,718** orphan kittens relinquished to a large, open-intake, municipal animal shelter (April 2016 and July 2017)
  - unowned, < 12 weeks of age, and < 0.9 kg (2 lbs) body weight
- 172 (10%) kittens underwent treatment for diarrhea
  - 153 (89%) kittens survived to adoption
  - 19 (11%) died or were humanely euthanized

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Original Article

Journal of Feline Medicine and Surgery  
© 2019  
DOI: 10.1177/1098612319859101  
jfm.sagepub.com/home/jfm  
This paper was reviewed and processed by the American Editorial Office (AAEP) for publication in JFMS

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Original Article

**Interventions and observations associated with survival of orphaned shelter kittens undergoing treatment for diarrhea**

*fms* Journal of Feline Medicine and Surgery  
 Volume 13, Number 10, October 2019  
 DOI: 10.1097/JFM.0000000000000441  
 PetSmart Charities  
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**Treatment administered**

- Vitamin and mineral supplement
- Probiotic
- Ponazuril
- Subcutaneous fluids
- Penicillin G
- Metronidazole
- Tube feeding

- Kittens that received a **vitamin and mineral supplement** were 12.8 times more likely to survive (95% CI 3.1 to 52.5, P=0.0004)
- Kitten age >4 weeks were 24.7 times more likely to survive (95% CI 6.8–89.8, P <0.0001)

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**Treatment administered**

- Vitamin and mineral supplement
- Probiotic
- Ponazuril
- Subcutaneous fluids
- Penicillin G
- Metronidazole
- Tube feeding

- No impact of Fortiflora on survival
- SQ fluids, penicillin G, and tube feeding associated with non-survival
- No impact of ponazuril on survival
- No impact of metronidazole on survival

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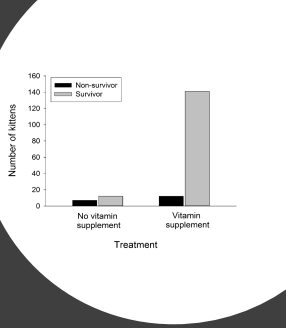
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**Recommendations**

- Vaccination on intake at 4 weeks of age
- Pyrantel, Ponazuril
- Easily digestible canned food
- Probiotics ??
- Vitamin and mineral supplement = 12 fold increase in survival
- Supportive care



Treatment	Non-survivor	Survivor
No vitamin supplement	~10	~10
Vitamin supplement	~10	~140

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### Future directions

- Micronutrients
- Diet
- Microbiome
- Gut immunity
- Environment

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