



**San Diego Zoo
Wildlife Alliance**

Gerenuk Morbidity & Mortality

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Goals of Evaluation

Define the problems – **morbidity**

Maximize years of life/quality - **sustainability**

Reduce the negative outcomes – **mortality**

Find new points of leverage – **interventions**



Population Since 2008

San Diego Zoo

- 34 total on site
- 17 deaths
- 17 births

San Diego Zoo Safari Park

- 62 total on site
- 39 deaths
- 48 births

Age at Death

- **SDZoo:**
 - Median 691 days
 - Excluding neonates 2052 days
- **SDZSP:**
 - Median 127 days
 - Excluding neonates 460 days



Significant Diseases

San Diego Zoo

17 deaths

- *Forestomach changes (29%)*
- Trauma (24%)
- Pneumonia (24%)

San Diego Zoo Safari Park

39 deaths

- Gastrointestinal disease (33%)
- *Forestomach changes (36%)*
- Trauma (28%)
- Pneumonia (8%)

SDZWA Births

San Diego Zoo

- 17 births (7.10)
 - 3 hand reared (18%)
 - 6 surviving
 - 2 lost to follow up
 - 7 died before 1y (41%)

San Diego Zoo Safari Park

- 48 births (22.26)
 - 34 hand reared (77%)
 - 9 surviving
 - 3 lost to follow up
 - 22 died before 1y (46%)

Neonatal Morbidity & Mortality

- **SDZoo:**

- 5 neonatal deaths
- including 4 stillbirths

- **SDZSP:**

- 10 neonatal deaths
- including 4 stillbirths



Common themes

- Dystocia/stillbirth
- Congenital abnormalities
- GI infections

Morbidity

San Diego Zoo

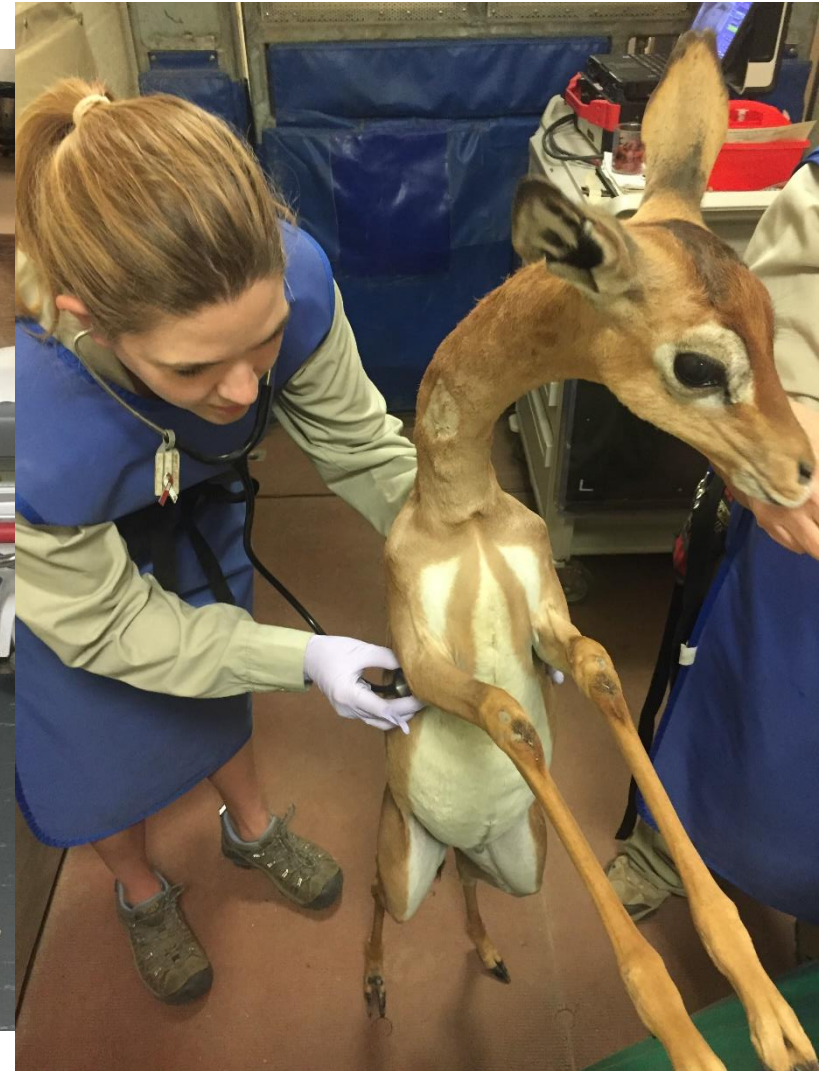
- 42 hospitalizations
- 27 individuals (79%)
- Median stay 14 days
- Average 23 days

San Diego Zoo Safari Park

- 57 hospitalizations
- 36 individuals (58%)
- Median stay 6 days
- Average 20 days

Major Causes of Morbidity

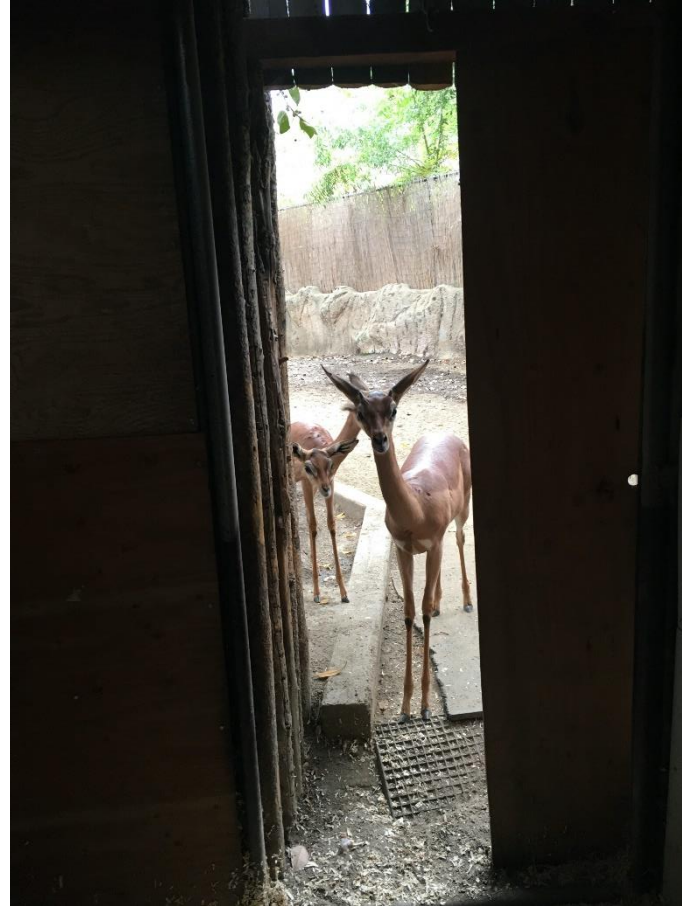
- Pneumonia
- Gastrointestinal
 - Forestomach disease
 - Endoparasitism



But what do they look like?

- Thin body condition
- Bloat
- Loose stool

- Nasal discharge



- Hypophosphatemia
- Low total protein
- Hyperlactatemia

- Left shift

How to best intervene?

- Reverse the negative metabolic state
 - Intravenous fluids
 - Antibiotics
 - Parenteral nutrition
 - +/- Transfaunation



> [J Zoo Wildl Med.](#) 2020 Jan 9;50(4):853-860. doi: 10.1638/2019-0034.

RETROSPECTIVE EVALUATION OF THE USE OF PARENTERAL NUTRITION IN HOSPITALIZED NONDOMESTIC RUMINANTS

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Affiliations + expand

PMID: 31926515 DOI: [10.1638/2019-0034](#)

Other Key Intervention Points

- Dystocia
- Angular limb deformity



Copper

- Deficiency
 - 37% SDZSP population
 - 6% SDZ
- Toxicity
 - 3 SDZSP deaths
 - Numerous SDZ at high levels
 - Supplement at conservative levels: maximum dose of 25mg/kg



Next Steps

- Broaden scope beyond SDZWA
- Continue investigations
 - Why dystocia or stillbirth?
 - How to best feed?
- Leverage "Big Data" via ZIMS



Areas of Focus 2021—

- Neonatal Health
 - Passive transfer → colostrum or plasma
 - Vaccination → Rota/Coronavirus, Clostridium
 - Cryptosporidiosis management → Ponazuril

Areas of Focus 2021—

- Rumen Health & Macronutrients
 - Browsers need browse
 - Minerals beyond just Cu





Questions?
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