# Diagnosis and Management of Parvoviral Outbreaks

Cynda Crawford, DVM, PhD

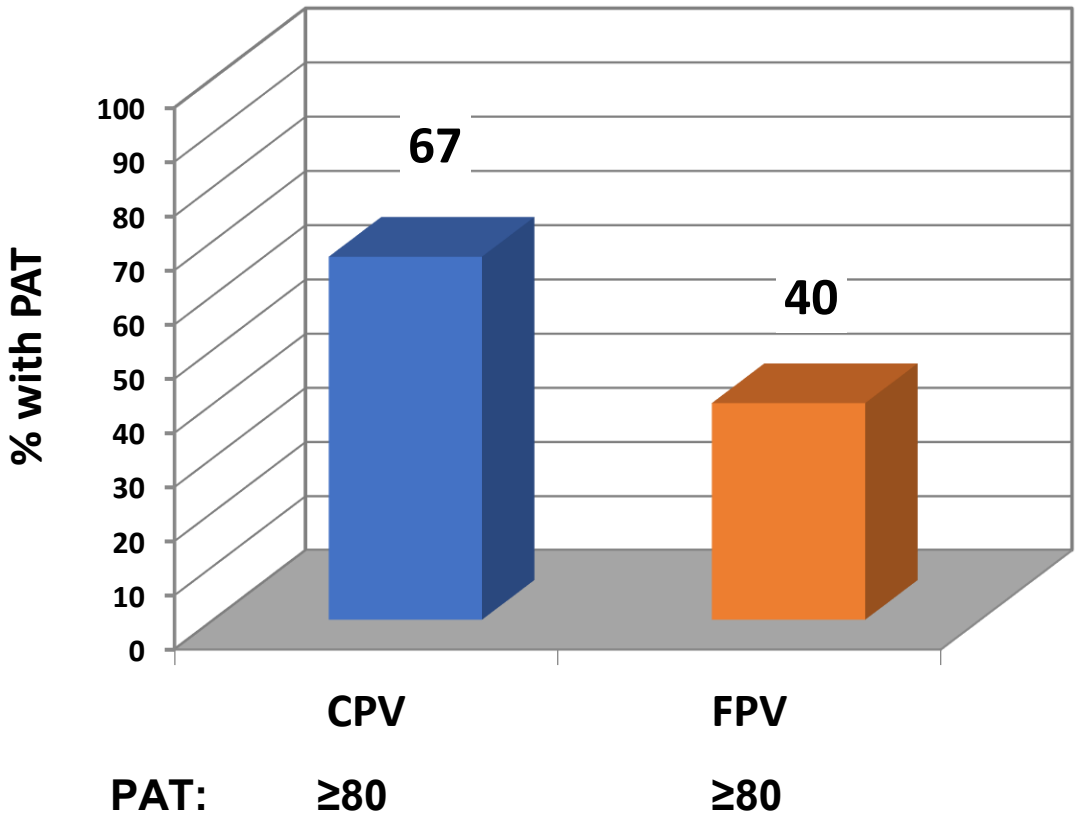
Fredrica Saltzman Endowed Professorship Chair in Shelter Medicine

UF | Shelter Medicine
UNIVERSITY of FLORIDA

# Risk Factors for Parvoviral Outbreaks

- Every shelter is a high-risk environment for exposure to CPV/FPV and most have been affected by outbreaks
- Puppies and kittens <6 mo old are at highest risk
  - No or incomplete immunity
  - Ineffective response to vaccination due to maternal antibody interference
  - Many have a window of susceptibility from 3 to 5 months of age
- "Kitten season" is prime time for FPV outbreaks
  - Inundation by large numbers of kittens with longer LOS
  - Housing all kittens in the same room is inviting a panleukopenia disaster
- Failure to vaccinate ALL dogs and cats for CPV/FPV on admission and again 2 weeks later

# Pre-Existing Immunity




| | % with PAT on Admission | |
|---|---|---|
| Age | CPV | FPV |
| < 6 mo | 36 | 34 |
| 1 to 2 yr | 76 | 54 |
| > 2 yr | 89 | 64 |

431 dogs and 347 cats

Lechner. *JAVMA* 2010; 236:1317-1321
DiGangi. JAVMA 2012; 241:1320-1325

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# Virology 101

**Day 1-4**

- Oronasal exposure to virus
- Virus replication in oropharyngeal LN/tonsils

**Day 4-7**

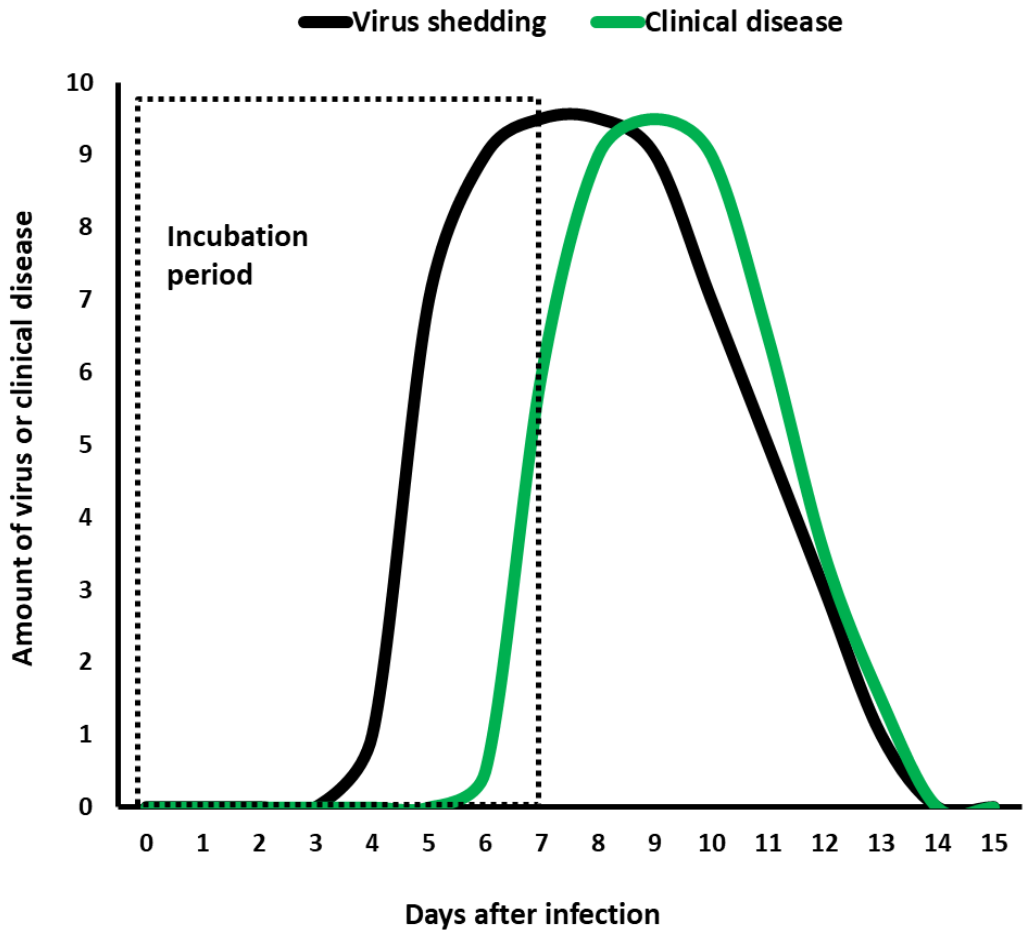
- Viremia (preclinical)
- Intestinal epithelium, WBC in bone marrow and lymphoid tissues
- Viral shedding in saliva and feces

**Day 5-7**

- Clinical signs

# Virology 101

- Viral shedding in saliva and feces prior to clinical signs
- Peak virus shedding at onset of clinical signs
- Virus shedding typically ceases with clinical recovery due to robust immune response
  - Day 14 of infection
  - Day 7 of treatment



# Clinical Features

- Fever
- Anorexia
- Vomiting/diarrhea (± blood)
- Severe dehydration
- Weakness/collapse
- Shock
- Sepsis
- Death
- **Most common case of sudden death in kittens**

# Diagnosis

- Not all cases of vomiting/diarrhea are due to CPV or FPV
  - Need diagnostics for confirmation
  - Important for patient and population management
- Point-of-care (POC) test for parvovirus antigens in feces
  - IDEXX SNAP® Parvo and Zoetis Witness® CPV tests
  - Detect both CPV and FPV
  - Sensitivity ~ 80% (detection threshold = 5 million virus particles)
  - Specificity >95%
  - Do not detect CPV and FPV vaccine strains shed in feces
- Timing of antigen testing
  - Peak virus shedding on 1st day of illness
  - Intermittent shedding may cause false negative results

# Diagnosis

- WBC count
  - Panleukopenia
  - WBC counts from blood smears or CBC machines
  - Not all infected animals are leukopenic
- PCR
  - Very sensitive
  - Detects vaccine strain DNA for ≥2 weeks post vaccination (false positives)
  - Strong positive PCR + compatible clinical signs or known contact with infected animals = true infection instead of a false positive

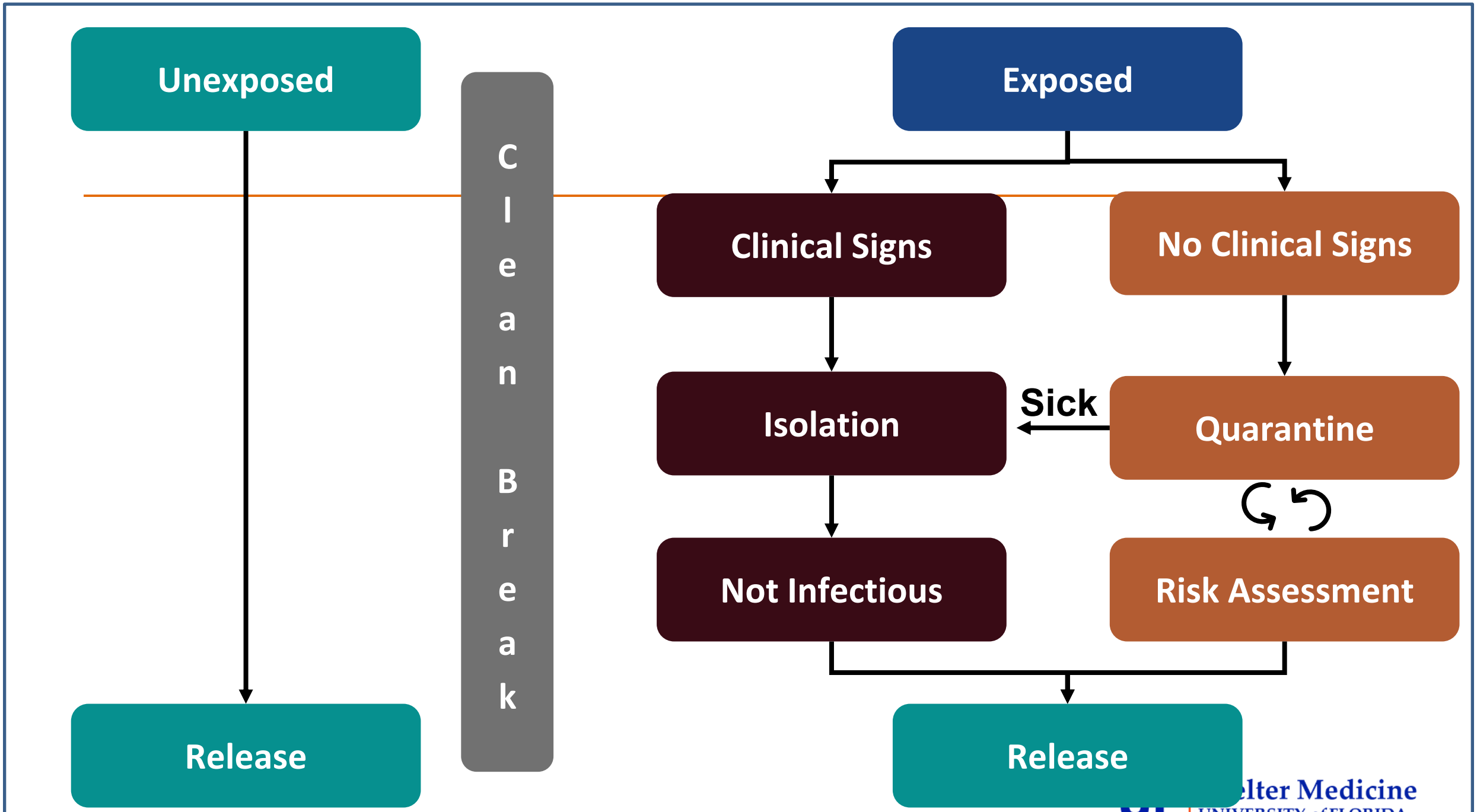
# Diagnosis

- Necropsy
  - Sudden death cases or unexplained deaths
  - Especially important during kitten season
  - Severe gastroenteritis
  - POC test on rectal or intestinal scrapings
  - Formalin-fixed intestine for histopath

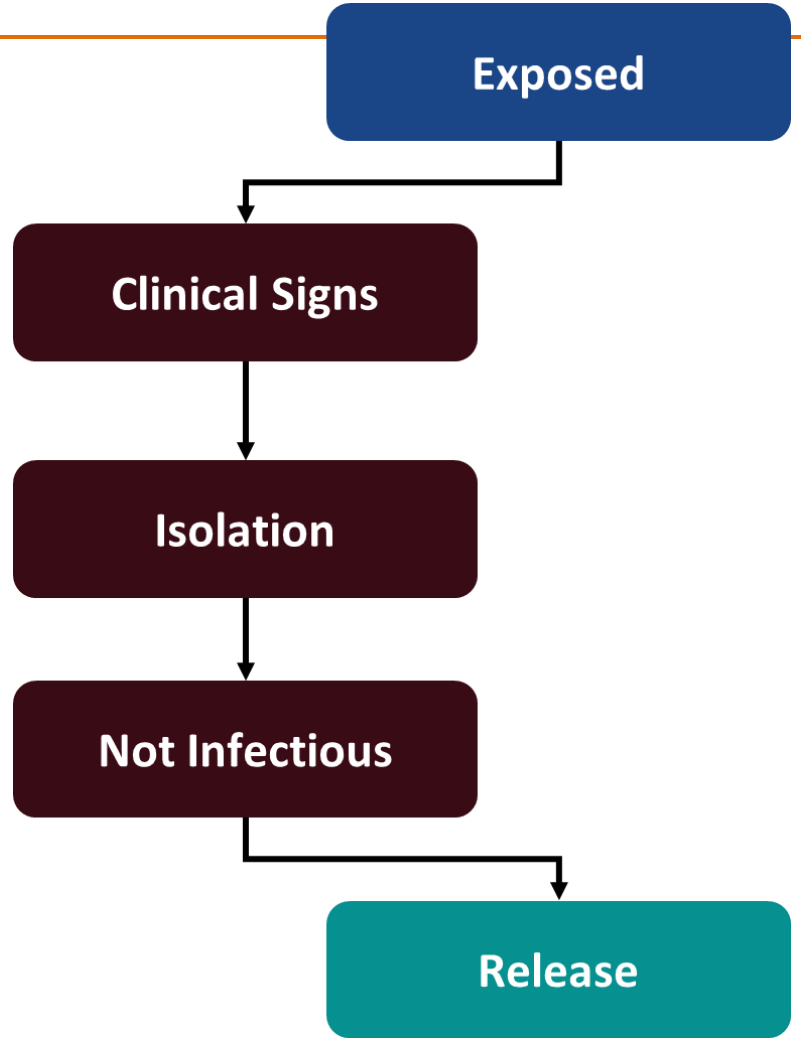
# Disease Outbreak Management Goals

- Maximize life-saving
- Minimize disruption of shelter operations
- Achieve the quickest resolution possible
- Be financially responsible

***Overarching goal: create an effective break between the infected/exposed population and the unexposed population without resorting to mass depopulation via euthanasia***

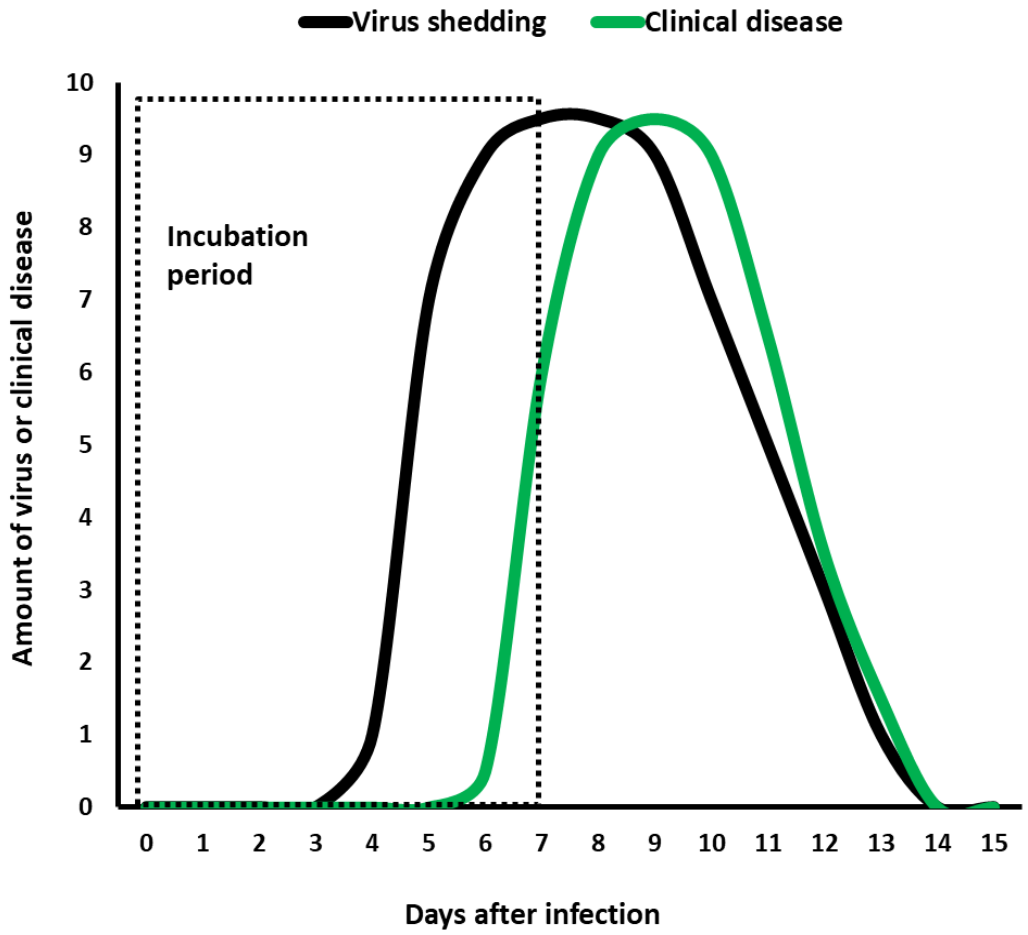

Unexposed
Exposed
Clean Break
Clinical Signs
No Clinical Signs
Isolation
Sick
Quarantine
Not Infectious
Risk Assessment
Release
Release

# Isolation



# Isolation of Sick Animals

- Single most important step
  - Physical containment of the virus
  - Reduces infectious dose in the general population
  - Reduces transmission to more animals
- Isolation time = CPV/FPV shedding period
- PPE required



# In-Shelter Isolation

- Best option: enclosed isolation kennel/room
- No isolation room?
  - Makeshift isolation enclosure in general housing areas
  - Run or cage doors covered with impervious material
  - Signage indicating contagious disease
  - Staff wear PPE when cleaning and clean last
- Poor option: crates in hallways, break rooms, offices, bathrooms
- Alternative option: transfer to another agency with good iso facilities and medical support

# Treatment of Sick Animals

- Treatment in the shelter is resource- and time-intensive with inherent risk for virus spillover to susceptible dogs
  - Requires excellent containment
  - Strict biosecurity protocols
  - Sufficient medical support
- Shelter vet must develop end points for in-shelter treatment based on available resources
  - Euthanasia may be the only humane option if no off-site options

# Weber County Animal Shelter

**Weber County Animal Shelter euthanizes about 20 dogs due to parvo outbreak**

by Kaigan Bigler
KUTV
February 4th 2025

OGDEN, Utah — Weber County Animal Shelter officials said they had to euthanize about 20 dogs due to an outbreak of parvovirus in the shelter. The shelter is no-kill.

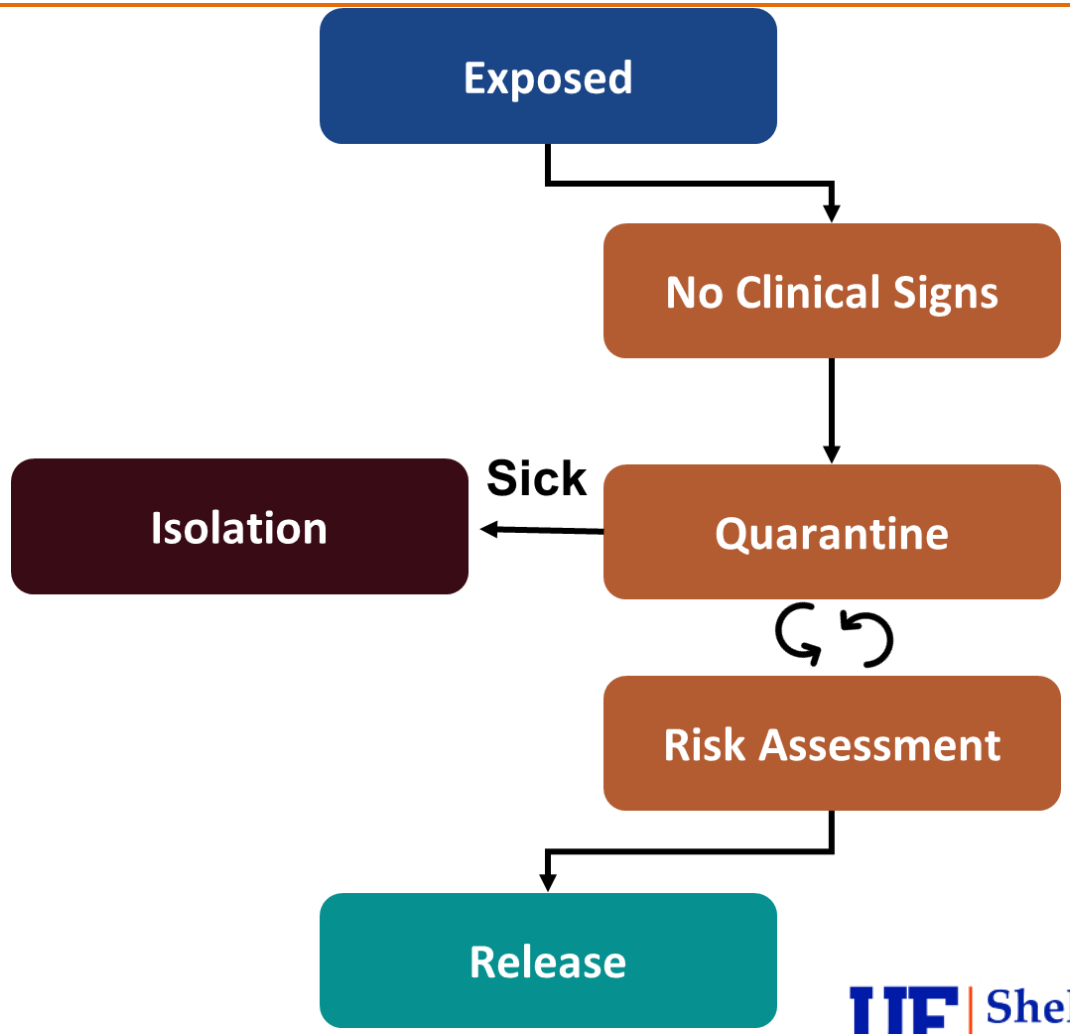
Officials said the parvo outbreak started on January 27 and infected 18 dogs who had already been vaccinated against the virus. Due to requirements from the American Veterinary Medical Association, the dogs had to be put down in order to follow protocol for disease control and prevention, shelter officials said.

Shortly after, two dogs who were being watched in quarantine also tested positive for the virus and were subsequently euthanized.

# Release from Isolation

- Cessation of virus shedding by clinical resolution
  - Robust immune response curtails virus replication
  - Typically occurs after 7 days of treatment
  - Puppies treated with canine monoclonal CPV antibody (Elanco) stop shedding around 4 days after injection
- Release based on negative POC CPV antigen test
  - Practical rule-of-thumb is 2 consecutive negative results
  - Bathe prior to release
  - Consider housing in areas without other puppies/kittens

# Quarantine


Exposed
No Clinical Signs
Sick
Isolation
Quarantine
Risk Assessment
Release

# Quarantine of Exposed Animals

- No clinical disease – why?
  - Pre-clinical incubation period
  - Subclinical infection
  - Immune to infection
  - Not infected
- Must be considered an infectious risk pending assessment
  - Quarantine in place vs segregated housing
  - Quarantine time = 7 days (max maximum incubation period)
  - Staff should wear PPE

# Quarantine of Exposed Animals

- Monitor for clinical signs twice daily
  - Promptly remove sick animals to isolation to reduce infectious dose in environment
  - Restart the 7-day quarantine clock after every new clinical case
- Restarts can extend the quarantine time for weeks
  - Strain on housing and staffing capacity
  - Extends the response time and prolongs resolution
- Effective quarantines can save lives and increase staff morale

# Risk Assessment

- Determine risk of infection for each quarantined animal
- Humane and cost-effective method for quickly moving animals out of quarantine
- 2 approaches to predict which animals are safe to release
  - CPV/FPV antibody titer testing
  - Age and vaccine status at time of exposure

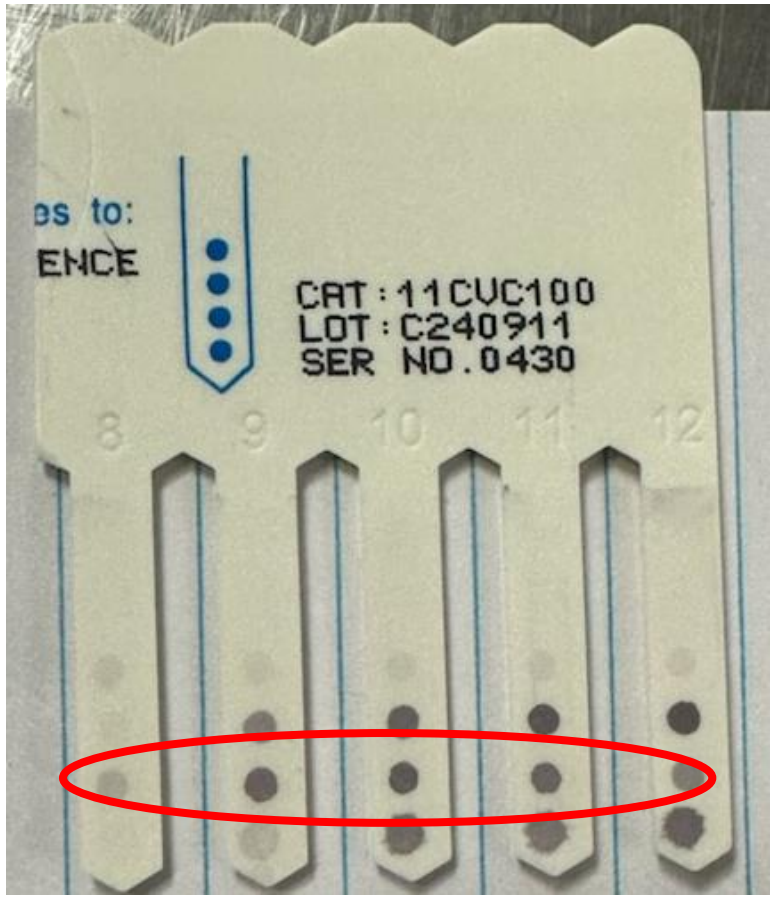
# CPV/FPV Antibody Titer Testing

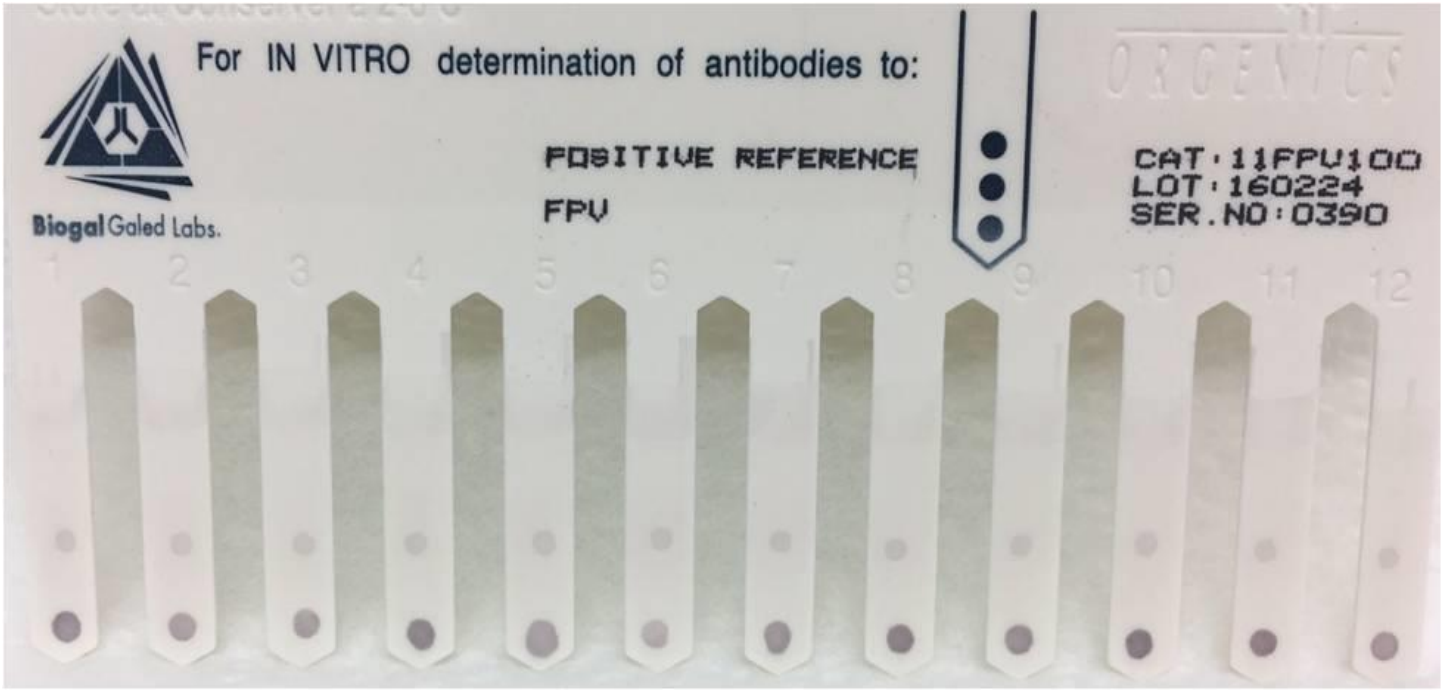
- Test all exposed *asymptomatic* animals for PAT
- Use the point-of-care CPV/FPV antibody titer tests ($17/test)

# CPV/FPV Antibody Titer Testing

- PAT is a good, but not perfect, indicator of protection from infection
  - More reliable when the exposure period is <7 days (pre-existing immunity vs immune response to infection)
  - Most puppies/kittens <6 months old do not have PAT (window of susceptibility)
- Asymptomatic animals with PAT are low risk for infection and can be released from quarantine

# Canine and Feline Vaccicheck



# CDV/FPV PAT for Exposed Animals

| Age | # DAPP doses | Postexposure | CPV PAT | # Dogs | Action |
|---|---|---|---|---|---|
| ≥6 mo | 1 - 2 | 1 to 6 days | Yes | 124 (89%) | Release |
| | | | No | 15 (11%) | Quarantine |

| Age | # FVRCP doses | Postexposure | FPV PAT | # Cats | Action |
|---|---|---|---|---|---|
| ≥6 mo | 1 - 2 | 2 to 5 days | Yes | 87 (70%) | Release |
| | | | No | 38 (30%) | Quarantine |

# Risk Assessment Based on Age and Vaccine Status

- Triage animals based on age, vaccination status, and available housing

- Puppies/kittens <6 mo old
  - ***High risk*** regardless of vaccine status
  - Most have no immunity on admission
  - Slow response to vaccination (>2 weeks)
  - Highest risk for infection and clinical disease
  - Need safe housing for duration of the quarantine period

# Risk Assessment Based on Age and Vaccine Status

- Adults exposed within 1 week of intake vaccination
  - ***Moderate*** *risk*
  - 50% enter the shelter with no immunity
  - Response to intake vaccine may take 2 weeks
  - House with well-vaccinated adult dogs

- Adults exposed >1 week after intake vaccine or has 2 vaccinations
  - ***Low*** *risk*
  - Highest probability of protective immunity
  - Release with no housing restrictions