# New vaccination recommendations for neonatal puppies and kittens

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UCDAVIS KORET SHELTER MEDICINE PROGRAM

# All about BENEFIT and RISK

How likely are serious side effects?

How well will my immune system respond?

Will the vaccine work quickly enough to protect me?

How much is this going to cost?

How effective is the vaccine?

Am I even likely to be exposed to this disease?

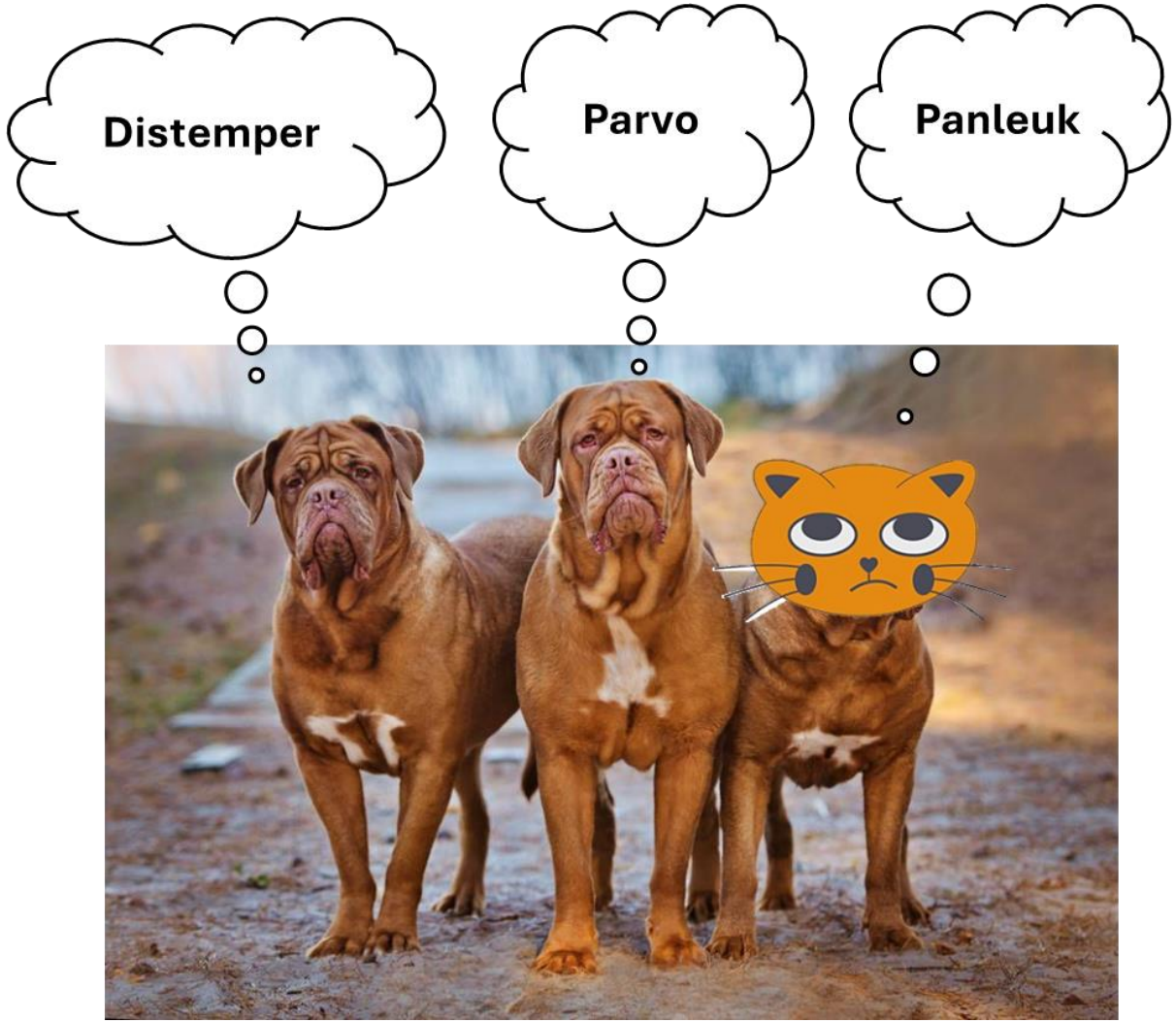
How long will protection last?

# Vaccine characteristics

- Efficacy
  - Sterilizing immunity versus reduction of signs/shedding
- Speed of onset
  - Single primary versus series
  - Time to meaningful protection
- Risk of side effects
- Cost
- Duration of protection

# The big three

- Single injection of MLV SC, in the absence of interference, induces sterilizing immunity
  - Canine distemper: hours – 3 days
  - Canine parvovirus: within 3-5 days
  - Feline Panleukopenia: within 1-3 days
- Long lasting immunity
- Very low incidence of adverse reactions

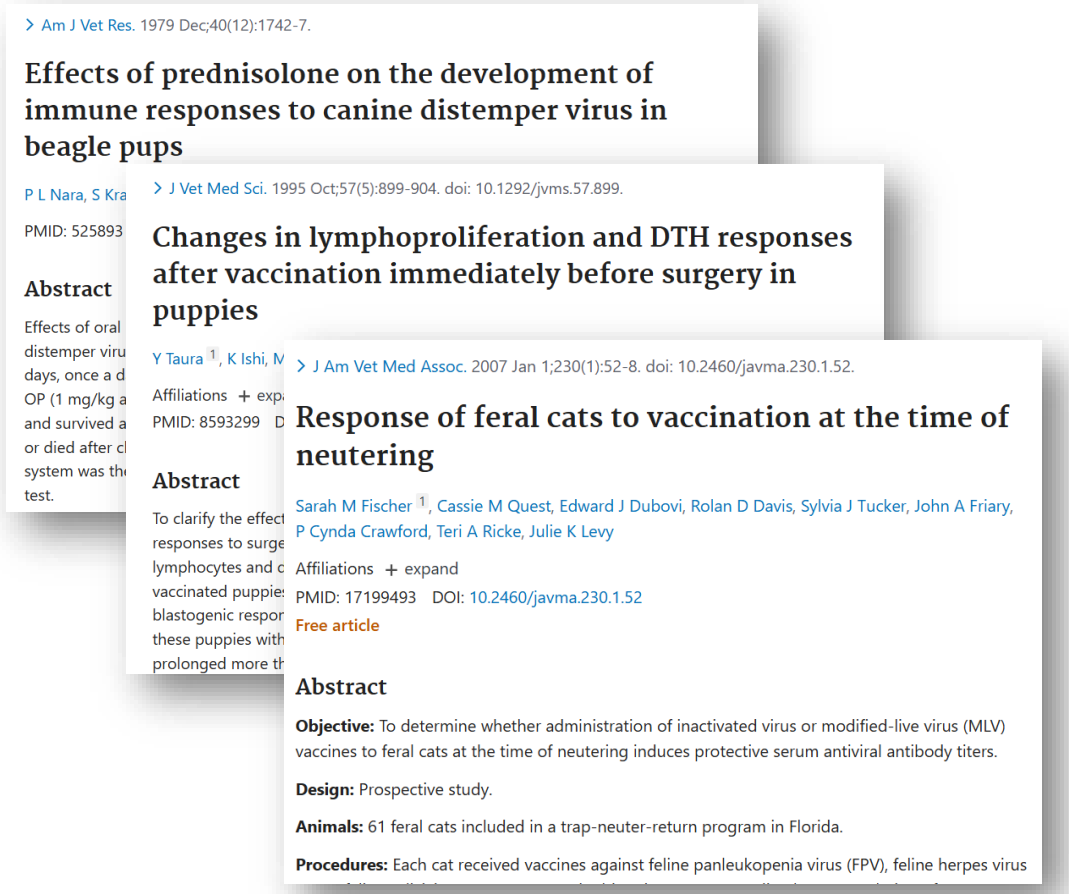


# Animal characteristics

- Likelihood of pre-existing immunity
  - From prior vaccination
  - From prior exposure to field strain infection
  - From maternal antibody in juveniles
- Likelihood of exposure
- Likelihood of having access to future vaccination
- Likelihood of response
  - Immunocompetence?
  - Concurrent disease?
  - Concurrent stressors?

# Vaccine response under challenging conditions

- Puppies given 10 mgs/kg prednisone x 3 weeks, then vaccinated
  - Challenged with canine distemper 3 days later
  - Depressed lymphocyte response but all were protected against virulent challenge
- Vaccination plus surgery did not impair response to distemper/parvo vaccination in puppies
- 90% of cats vaccinated at the time of TNR surgery responded robustly to vaccination for panleukopenia



› Am J Vet Res. 1979 Dec;40(12):1742-7.

**Effects of prednisolone on the development of immune responses to canine distemper virus in beagle pups**

P L Nara, S Kra

PMID: 525893

**Abstract**

Effects of oral
distemper viru
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› J Vet Med Sci. 1995 Oct;57(5):899-904. doi: 10.1292/jvms.57.899.

**Changes in lymphoproliferation and DTH responses after vaccination immediately before surgery in puppies**

Y Taura [1], K Ishi, M

Affiliations + exp

PMID: 8593299 D

**Abstract**

To clarify the effect
responses to surge
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› J Am Vet Med Assoc. 2007 Jan 1;230(1):52-8. doi: 10.2460/javma.230.1.52.

**Response of feral cats to vaccination at the time of neutering**

Sarah M Fischer [1], Cassie M Quest, Edward J Dubovi, Rolan D Davis, Sylvia J Tucker, John A Friary, P Cynda Crawford, Teri A Ricke, Julie K Levy

Affiliations + expand

PMID: 17199493 DOI: 10.2460/javma.230.1.52

Free article

**Abstract**

**Objective:** To determine whether administration of inactivated virus or modified-live virus (MLV) vaccines to feral cats at the time of neutering induces protective serum antiviral antibody titers.

**Design:** Prospective study.

**Animals:** 61 feral cats included in a trap-neuter-return program in Florida.

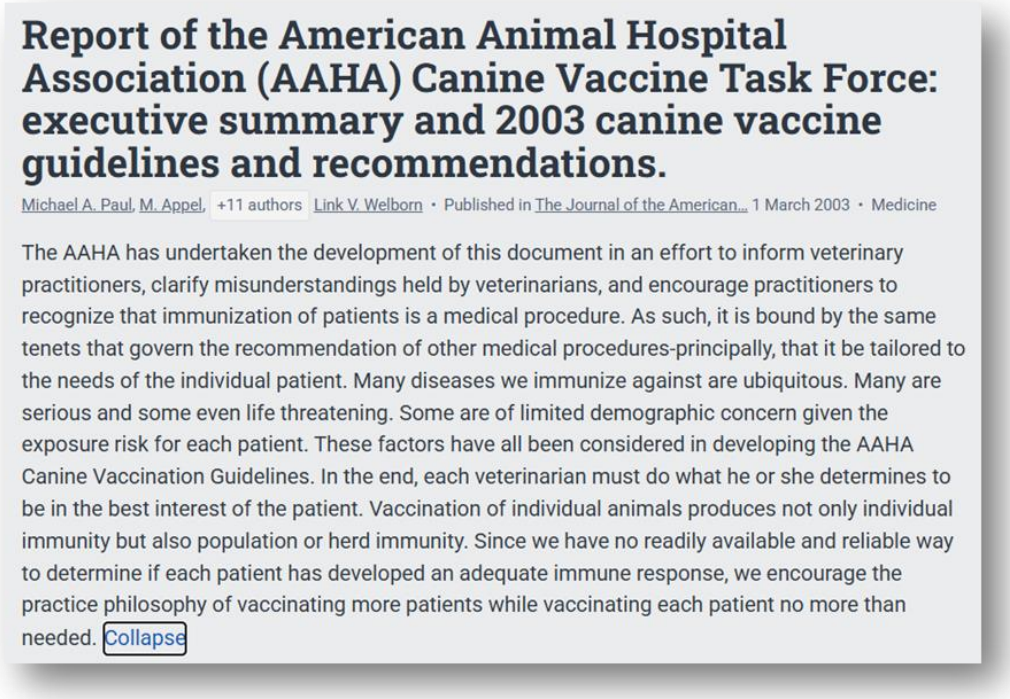
**Procedures:** Each cat received vaccines against feline panleukopenia virus (FPV), feline herpes virus

# “Pet animal” risk assumptions

- The pet’s immediate environment is not likely to be heavily contaminated with severe pathogens
- Exposure can largely be prevented until vaccine protection kicks in
- Animal will likely have another chance to be vaccinated some other day, so if conditions aren’t ideal it’s ok to wait

# The first vaccine guidelines

- Late 90s, early 2000s
- Emphasis on extending vaccine intervals where prolonged protection was documented
- Introduced the concept of “core” and “non-core”
- Tailored to the needs of the individual patient



**Report of the American Animal Hospital Association (AAHA) Canine Vaccine Task Force: executive summary and 2003 canine vaccine guidelines and recommendations.**

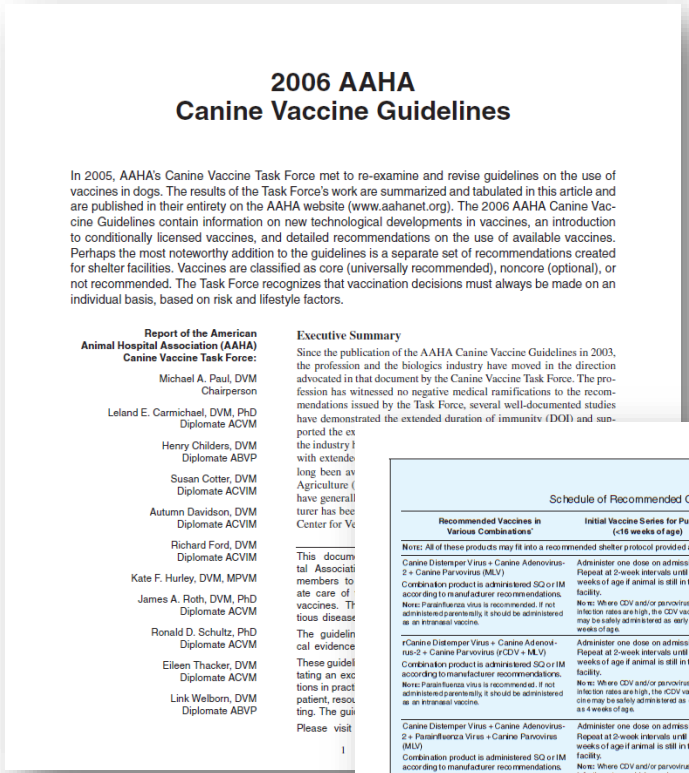
Michael A. Paul, M. Appel, +11 authors Link V. Welborn • Published in The Journal of the American... 1 March 2003 • Medicine

The AAHA has undertaken the development of this document in an effort to inform veterinary practitioners, clarify misunderstandings held by veterinarians, and encourage practitioners to recognize that immunization of patients is a medical procedure. As such, it is bound by the same tenets that govern the recommendation of other medical procedures-principally, that it be tailored to the needs of the individual patient. Many diseases we immunize against are ubiquitous. Many are serious and some even life threatening. Some are of limited demographic concern given the exposure risk for each patient. These factors have all been considered in developing the AAHA Canine Vaccination Guidelines. In the end, each veterinarian must do what he or she determines to be in the best interest of the patient. Vaccination of individual animals produces not only individual immunity but also population or herd immunity. Since we have no readily available and reliable way to determine if each patient has developed an adequate immune response, we encourage the practice philosophy of vaccinating more patients while vaccinating each patient no more than needed. Collapse

# “Shelter animal” risk differences

- The pet’s immediate environment may be contaminated with severe pathogens
- Exposure may occur soon after vaccination
- Animal may not have another chance to be vaccinated, so vaccination at point of contact is prioritized

# 2006: first shelter specific guidelines!



## 2006 AAHA
## Canine Vaccine Guidelines

In 2005, AAHA's Canine Vaccine Task Force met to re-examine and revise guidelines on the use of vaccines in dogs. The results of the Task Force's work are summarized and tabulated in this article and are published in their entirety on the AAHA website (www.aahanet.org). The 2006 AAHA Canine Vaccine Guidelines contain information on new technological developments in vaccines, an introduction to conditionally licensed vaccines, and detailed recommendations on the use of available vaccines. Perhaps the most noteworthy addition to the guidelines is a separate set of recommendations created for shelter facilities. Vaccines are classified as core (universally recommended), noncore (optional), or not recommended. The Task Force recognizes that vaccination decisions must always be made on an individual basis, based on risk and lifestyle factors.


**Report of the American Animal Hospital Association (AAHA) Canine Vaccine Task Force:**

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Diplomate ABVP


**Executive Summary**

Since the publication of the AAHA Canine Vaccine Guidelines in 2003, the profession and the biologics industry have moved in the direction advocated in that document by the Canine Vaccine Task Force. The profession has witnessed no negative medical ramifications to the recommendations issued by the Task Force, several well-documented studies have demonstrated the extended duration of immunity (DOI) and sup-

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**Table 3**

Schedule of Recommended Canine Vaccination for the Shelter Environment

| Recommended Vaccines in Various Combinations* | Initial Vaccine Series for Puppies (<16 weeks of age) | Initial Vaccine Series for Adults (>16 weeks of age) | Comments |
|---|---|---|---|
| Note: All of these products may fit into a recommended shelter protocol provided all core diseases are protected against. Also refer to Table 1. | | | |
| Canine Distemper Virus + Canine Adenovirus-2 + Canine Parvovirus (MLV)<br>Combination product is administered SQ or IM according to manufacturer recommendations.<br>Note: Parainfluenza virus is recommended. If not administered parenterally, it should be administered as an intranasal vaccine. | Administer one dose on admission. Repeat at 2-week intervals until 16 weeks of age if animal is still in the facility.<br>Note: Where CDV and/or parvovirus infection rates are high, the CDV vaccine may be safely administered as early as 4 weeks of age. | Administer one dose on admission. Repeat in 2 weeks. | Ideally puppies should be vaccinated beginning at 6 weeks of age. Nursing history is not always available. In the face of an outbreak, vaccination as early as 2-3 weeks (for distemper) or 5 weeks (for parvovirus) may be indicated.†<br>Passively acquired maternal antibodies (PAMA), if present, can interfere with immunization. |
| rCanine Distemper Virus + Canine Adenovirus-2 + Canine Parvovirus (rCDV + MLV)<br>Combination product is administered SQ or IM according to manufacturer recommendations.<br>Note: Parainfluenza virus is recommended. If not administered parenterally, it should be administered as an intranasal vaccine. | Administer one dose on admission. Repeat at 2-week intervals until 16 weeks of age if animal is still in the facility.<br>Note: Where CDV and/or parvovirus infection rates are high, the rCDV vaccine may be safely administered as early as 4 weeks of age. | Administer one dose on admission. Repeat in 2 weeks. | Ideally puppies should be vaccinated beginning at 6 weeks of age. In the face of an outbreak, vaccination as early as 2-3 weeks (for distemper) or 5 weeks (for parvovirus) may be indicated.†<br>The rCDV vaccine has been shown to demonstrate immunogenicity that is the same as MLV vaccines.‡<br>Note: The rCDV vaccine has been shown to immunize puppies despite the presence of PAMA.‡ |
| Canine Distemper Virus + Canine Adenovirus-2 + Parainfluenza Virus + Canine Parvovirus (MLV)<br>Combination product is administered SQ or IM according to manufacturer recommendations.<br>Note: Multivalent core vaccines are available without MLV parainfluenza virus.<br>Also, MLV parainfluenza vaccine is available in combination with all *B. bronchiseptica* approved for intranasal administration. | Administer one dose on admission. Repeat at 2-week intervals until 16 weeks of age if animal is still in the facility.<br>Note: Where CDV and/or parvovirus infection rates are high, vaccine may be administered as early as 4 weeks of age. | Administer one dose on admission. Repeat in 2 weeks. | Ideally puppies should be vaccinated beginning at 6 weeks of age. Nursing history is not always available. In the face of an outbreak, vaccination as early as 2-3 weeks (for distemper) or 5 weeks (for parvovirus) may be indicated.†<br>Passively acquired maternal antibodies (PAMA), if present, can interfere with immunization. |
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(Continued on next page)

## The 2006 American Association of Feline Practitioners Feline Vaccine Advisory Panel Report



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This article has not undergone peer review; opinions expressed are not necessarily those of the American Veterinar



Address correspondence to Dr. Richards.




Table 3—Summary of vaccination of cats in shelter environments.

| Vaccine | Kittens (≤ 16 weeks old) | Adult and adolescent (> 16 weeks old) | Comments |
|---|---|---|---|
| Panleukopenia virus (FPV) | Administer a single dose at the time of admission as early as 4 to 6 weeks of age, then every 2 to 4 weeks until 16 weeks of age if still in the facility.<br>The earlier recommended age (4 weeks) and short end of the interval (2 weeks) should be used in high-risk environments or during outbreaks. | Administer a single dose at the time of admission; repeat in 3 to 4 weeks (or at an interval of no less than 2 weeks) if still in the facility.[a] | Core<br>• MLV preparations are preferable.<br>• Usually administered in combination with modified-live FHV-1 and FCV vaccine.<br>• Use of FPV vaccines for IN administration is generally not recommended in shelter environments. |
| FHV-1 and FCV | Administer a single dose at the time of admission and as early as 4 to 6 weeks of age, then every 2 to 4 weeks until 16 weeks of age if still in the facility.<br>The earlier recommended age (4 weeks) and short end of the interval (2 weeks) should be used in high-risk environments or during outbreaks. | Administer a single dose at the time of admission; repeat in 3 to 4 weeks (or at an interval of no less than 2 weeks) if still in the facility.[a] | Core<br>• Usually administered in combination with modified-live FPV vaccine except when bivalent FHV-1 and FCV combined vaccines for IN administration are chosen.<br>• Use of MLV vaccines for IN administration may be preferable when rapid onset (48 hours) of immunity is important.<br>• NOTE: Postvaccinal sneezing, more commonly seen following IN administration of vaccine, may be impossible to distinguish from active infection. |
| Rabies virus | If the shelter administers rabies virus vaccine, a single dose should be administered to kittens > 12 weeks of age at the time of discharge from the facility, and the adopters should be advised that a booster vaccination in 1 year is indicated.<br>Long-term shelters or sanctuaries may consider vaccination against rabies at the time of admission. | If the shelter administers rabies virus vaccine, a single dose should be administered at the time of discharge from the facility, and the adopters should be advised that a booster vaccination in 1 year is indicated.<br>Long-term shelters or sanctuaries may consider vaccination against rabies at the time of admission. | Recommended at discharge<br>• Cats maintained in most indoor shelters are at low risk of infection; therefore, rabies virus vaccination is not generally recommended at the time of admission.<br>• If rabies virus vaccine is administered, a single dose of either the recombinant or a 1-year rabies virus vaccine is recommended at the time of discharge; a booster is recommended 1 year later.<br>• State or local statutes apply. |
| *C felis* | If used, administer the initial dose at the time of admission and as early as 9 weeks of age; a second dose is administered 3 to 4 weeks later if still in the facility. | If used, administer the initial dose at the time of admission; a second dose is administered 3 to 4 weeks later if still in the facility. | Noncore<br>• Vaccination may be considered as part of a control regime in facilities in which disease caused by *C felis* infection has been confirmed. |
| *B bronchiseptica* | If used, administer a single dose IN at the time of admission. | If used, administer a single dose IN at the time of admission. | Noncore<br>• Vaccination may be considered when cats are likely to be at specific risk of acquiring infection.[b]<br>• NOTE: Postvaccinal sneezing or coughing can be impossible to distinguish from active infection.[c] |
| FeLV | | | Not generally recommended[d] |
| FIV | | | Not generally recommended |
| *G lamblia* | | | Not generally recommended |
| FIP (FCoV) | | | Not generally recommended |

[a]If adult cats were ill or otherwise compromised at the time of initial vaccination, consider repeating the vaccine a single time when the cat is in good health (no sooner than 2 weeks after the initial vaccine). [b]For example, prior to confinement in environments where *B bronchiseptica* infection is confirmed by culture from an unusually high percentage of cats with URD, where dogs on the same premises have confirmed *B bronchiseptica*–induced kennel cough, or when characteristic bronchopneumonia is diagnosed by necropsy. [c]Vaccinated animals can shed *B bronchiseptica* for several weeks and, in some cases, up to a year after vaccination and may spread the organism to other cats and possibly other susceptible species. [d]In facilities where cats are group-housed, such as in some shelters and foster homes, FeLV vaccination is recommended; the protocol recommended for the general cat population should then be followed.

*See* Table 2 for remainder of key.

# Shelter recommendations

- Prioritize rapid onset of immunity
  - MLV usually preferred
- Use fewer antigens
  - Focus on pathogens with shelter transmission or public health risk
- Vaccinate an **expanded population**
  - Mildly sick, injured, pregnant

# Shelter specific risk/benefit equation

### 6.4.2 Core vaccines in shelters

A core vaccine is one given to all eligible animals and is withheld only in extraordinary circumstances.[27] For all core vaccines except rabies, shelters should use modified live virus or recombinant vaccines (MLV) rather than killed products because they provide a faster immune response.[33–35] This includes vaccines for puppies, kittens, animals with FeLV or FIV, and pregnant and nursing animals.[30,36] Cerebellar hypoplasia is a theoretical complication of MLV panleukopenia vaccination of pregnant cats; however, the risk of abortion, maternal, and kitten death due to panleukopenia generally outweighs this concern in shelters.[37,38]

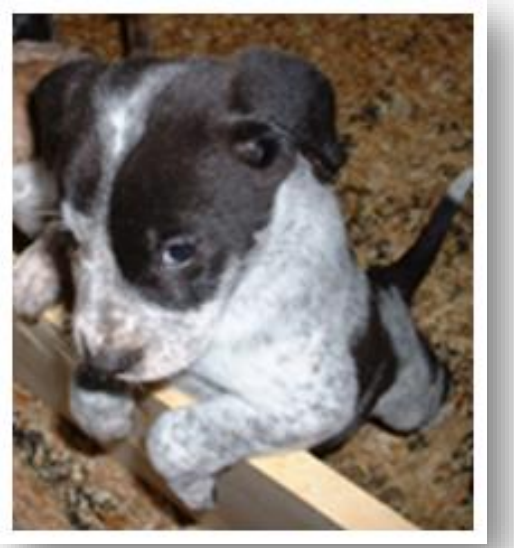
Cerebellar hypoplasia is a theoretical complication of MLV panleukopenia vaccination of pregnant cats; however, the risk of abortion, maternal, and kitten death due to panleukopenia generally outweighs this concern in shelters.

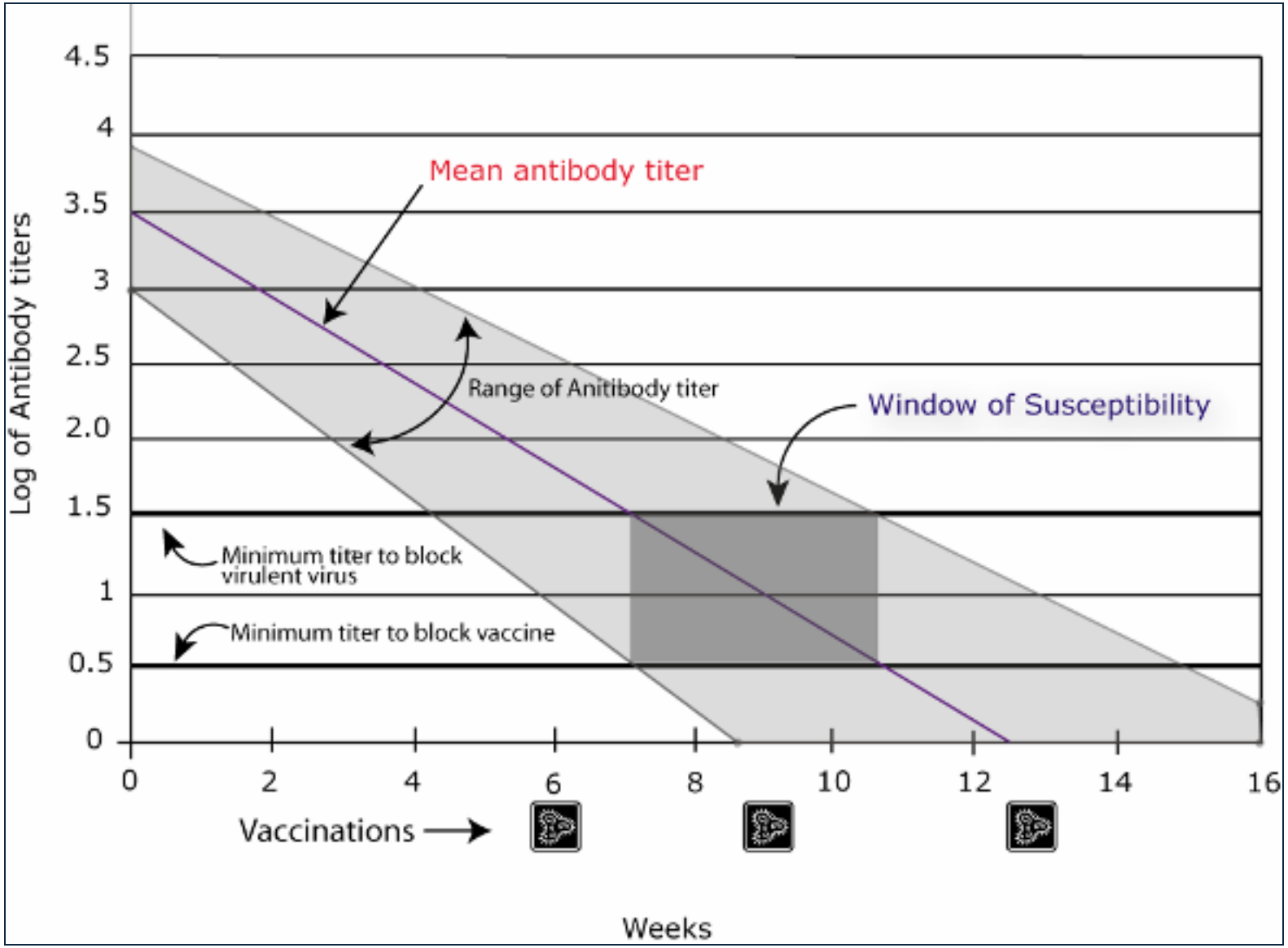
# What about juveniles?

Maternally derived antibody (MDA), if present, provides protection from infection in early life

Maternally derived antibody (MDA), if present, can prevent vaccination for some time

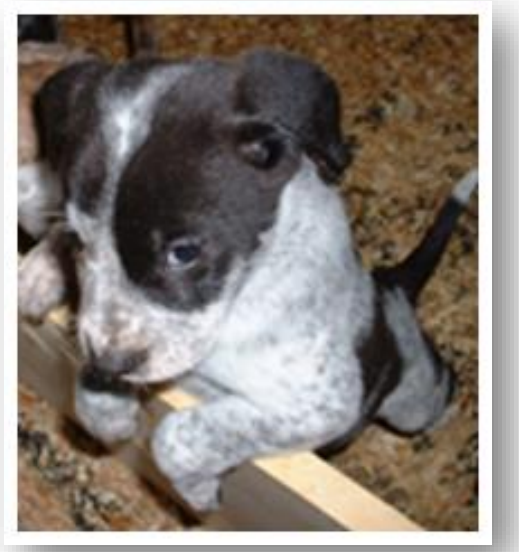
# The deal with MDA

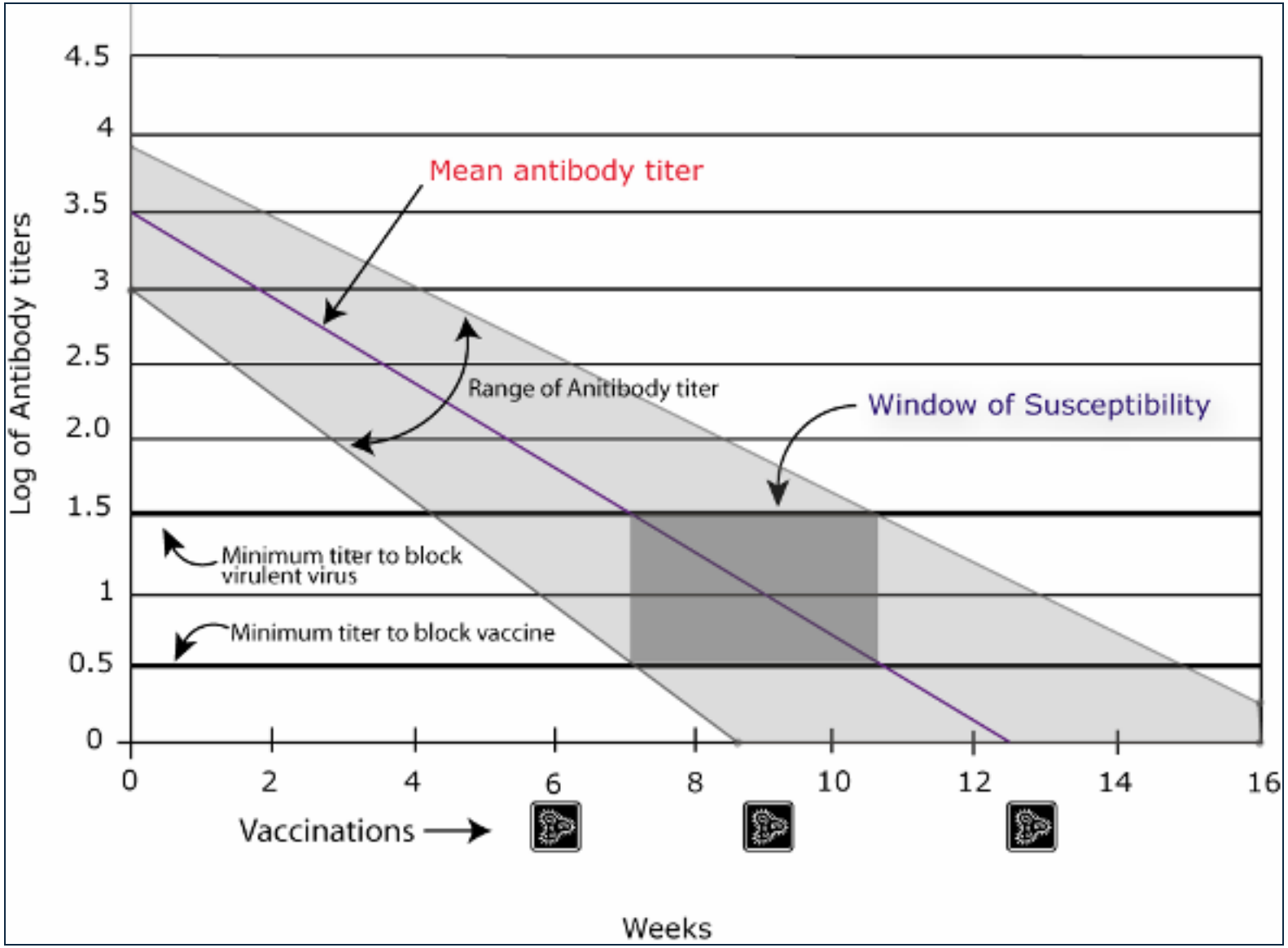





Adapted from Greene's Infectious Diseases of the Dog and Cat

**This assumes mom had antibodies from being vaccinated!**

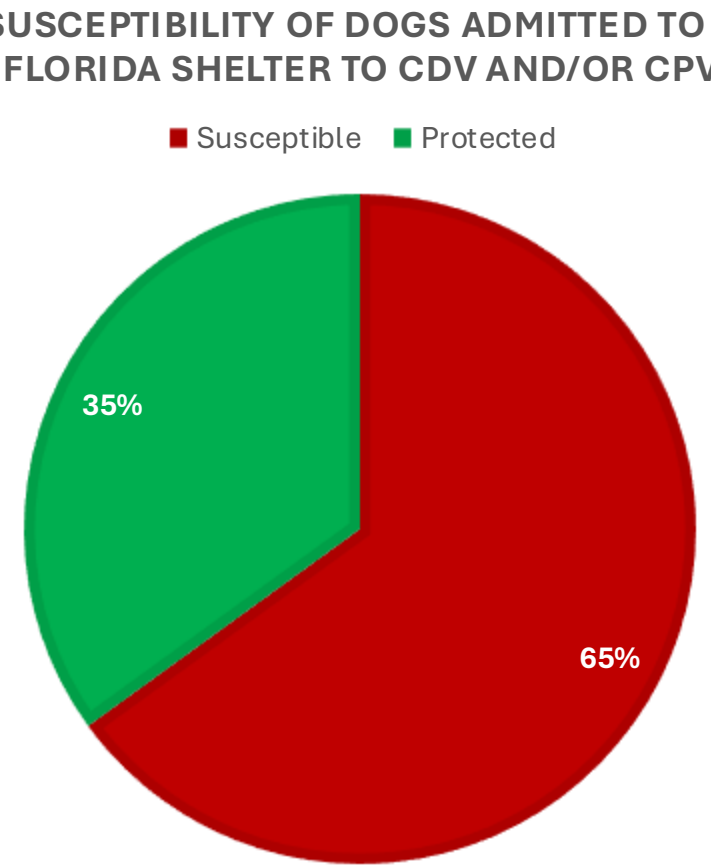





Adapted from Greene's Infectious Diseases of the Dog and Cat

# Susceptibility of dogs entering shelters

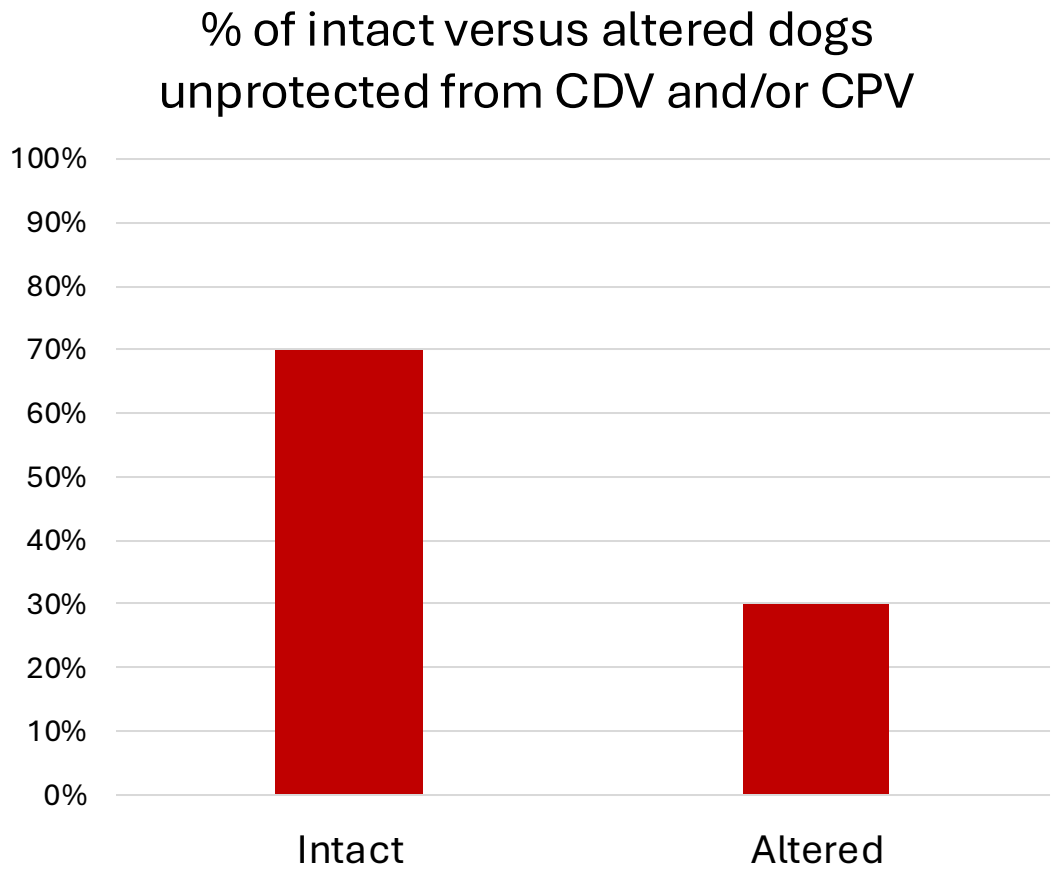
- Majority of dogs lacked immunity to distemper and/or parvo*
- Owner surrendered dogs were no more likely to be protected than strays
- “Type of community” also not predictive
- BUT…




[1]Prevalence of protective antibody titers for canine distemper virus and canine parvovirus in dogs entering a Florida animal shelter. Lechner E, et. al. JAVMA Vol 236(12): 1317-1321

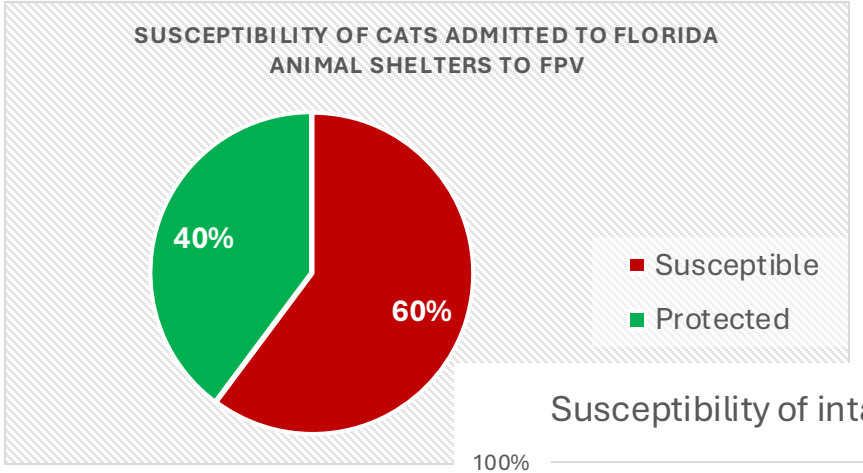
# Susceptibility of **intact** dogs entering shelters

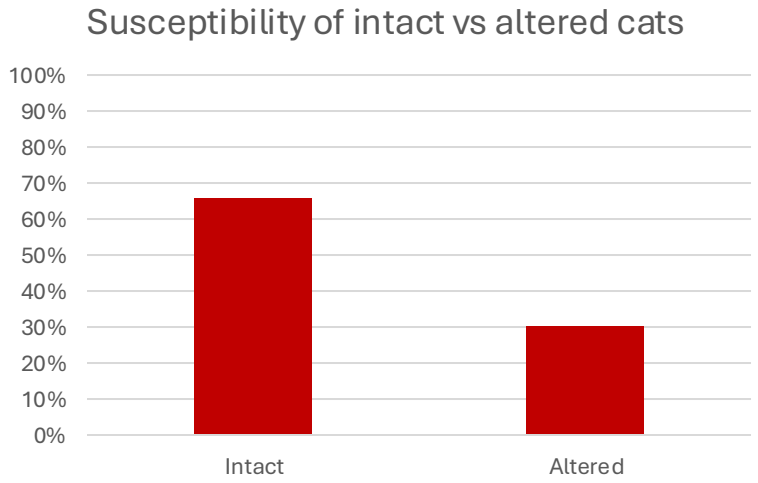
- Intact dogs were over twice as likely to lack immunity to CDV and/or CPV than dogs that were spayed or neutered
  - 70% vs 30%
- Younger dogs were also more likely to lack immunity than older dogs
  - 83% susceptible < 1 year



# Susceptibility of cats entering shelters

- Majority of cats entering a Florida shelter lacked immunity to panleukopenia
- Intact cats were over twice as likely to lack immunity compared to spayed/neutered cats
  - 66% of intact cats vs 30% of altered cats

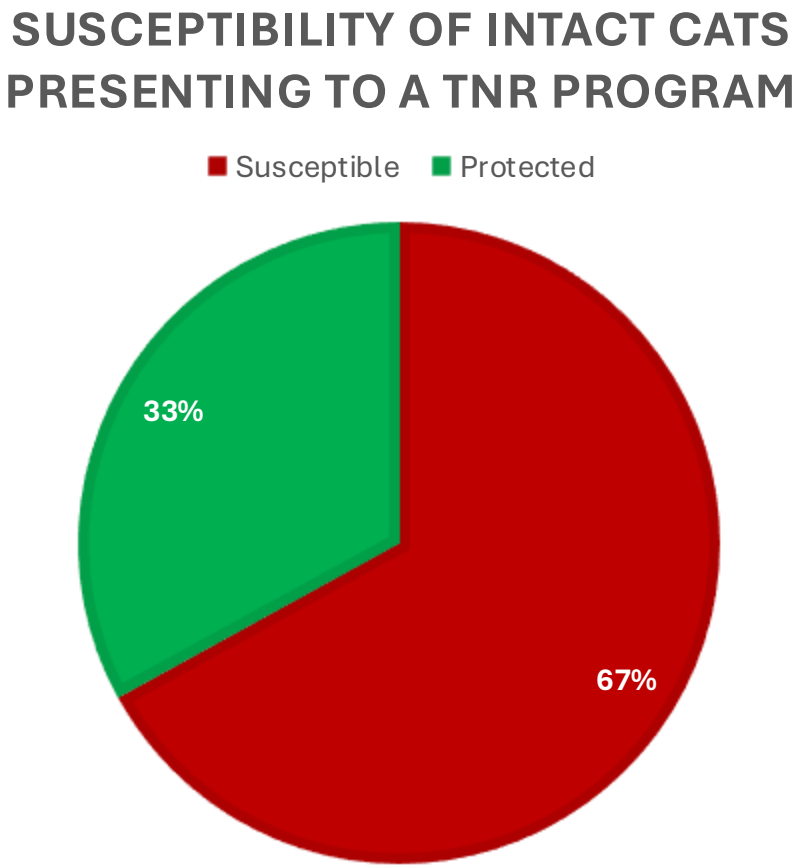



**Prevalence of serum antibody titer against feline panleukopenia virus, feline herpesvirus 1, and feline calicivirus in cats e ntering a Florida animal shelter.** DiGangi B et. al. JAVMA 2022 Vol 241(10): 1320-1325.

# Susceptibility of cats presenting to a TNR program

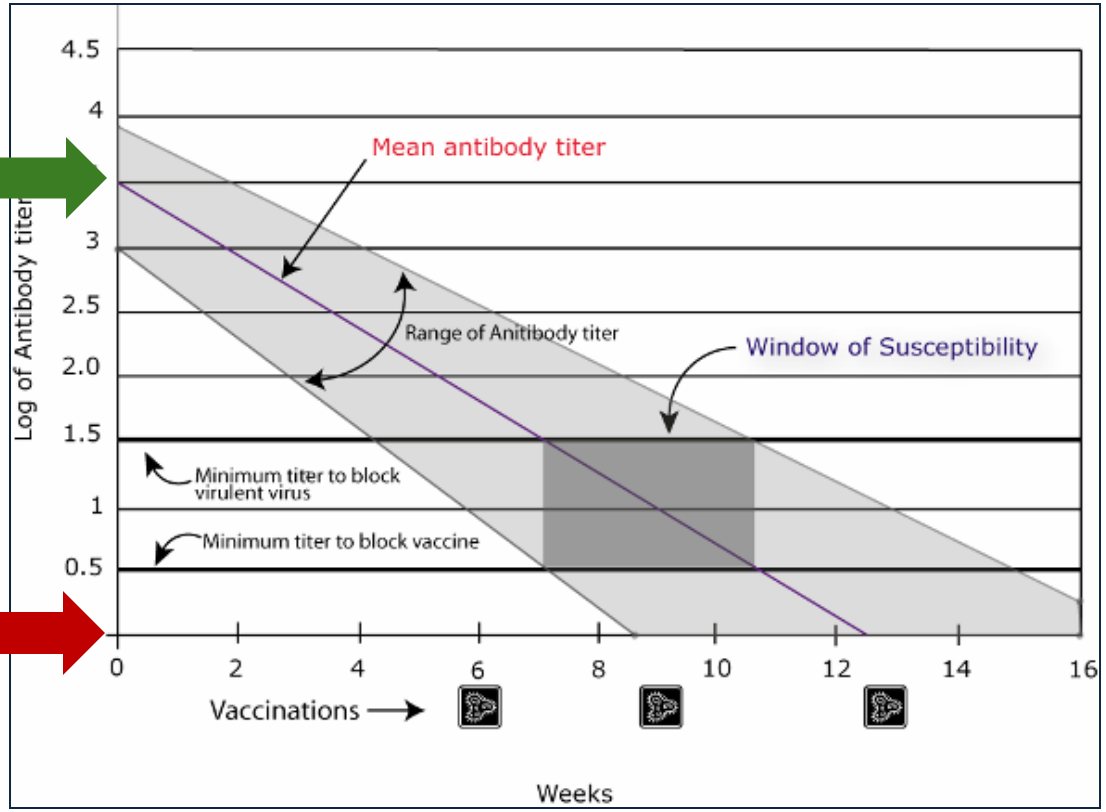
- 67% of trapped cats presented to a TNR clinic also lacked immunity to panleukopenia
  - Intact by definition
  - The other 33% almost certainly positive from exposure to field strain virus rather than vaccination




**Response of feral cats to vaccination at the at the time of neutering**. Fischer S, et. al. JAVMA 2007 Vol 230(1); 52-58.

# The deal with MDA in “shelter settings”

- Mom may have a medium amount of antibody from vaccination
- Mom may have an enormous amount of antibody from exposure and recovery to field strain virus
  - 30-60 times more than from vaccination
- Mom may not have any antibody because she was never vaccinated
  - **More than 2 out of 3 dogs and cats entering shelters fall in this category**
- Puppies and kittens may not have nursed adequately, regardless



# Previous recommendations for shelter puppies and kittens

- Vaccinate to a **later** age in case maternal antibodies were high
  - 20 weeks vs 16 weeks of age
- Vaccinate **more frequently** due to greater exposure risk and greater variability of MDA levels
  - Every 2 weeks vs 3-4 weeks
- Start vaccines **earlier** in case maternal antibodies were low to nonexistent
  - 4 weeks vs 6-8 weeks of age
  - Risks below 4 weeks thought to outweigh benefits

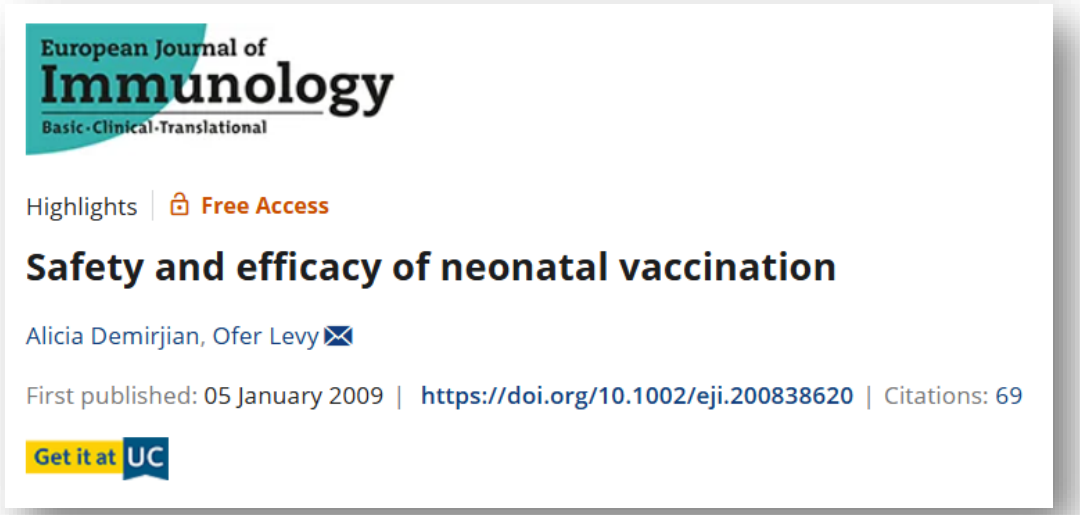
*Table 6.1.* Vaccination schedule for animals housed in shelter facilities

| Core vaccines | Route | Species | Starting age | Frequency <20 weeks |
|---|---|---|---|---|
| MLV DAPP | SQ | Dog | 4 weeks | Intake, every 2 weeks |
| MLV FVRCP | SQ | Cat | 4 weeks | Intake, every 2 weeks |
| MLV Bord/PI | IN | Dog | 3 weeks | Once at intake |
| Rabies | SQ | Dog and cat | 12 weeks | Once |

MLV, modified live virus; DAPP, distemper-, adeno-, parvo-, and parainfluenza; FVRCP, feline viral rhino
*Bordetella* and parainfluenza virus; SQ, subcutaneous; IN, intranasal.

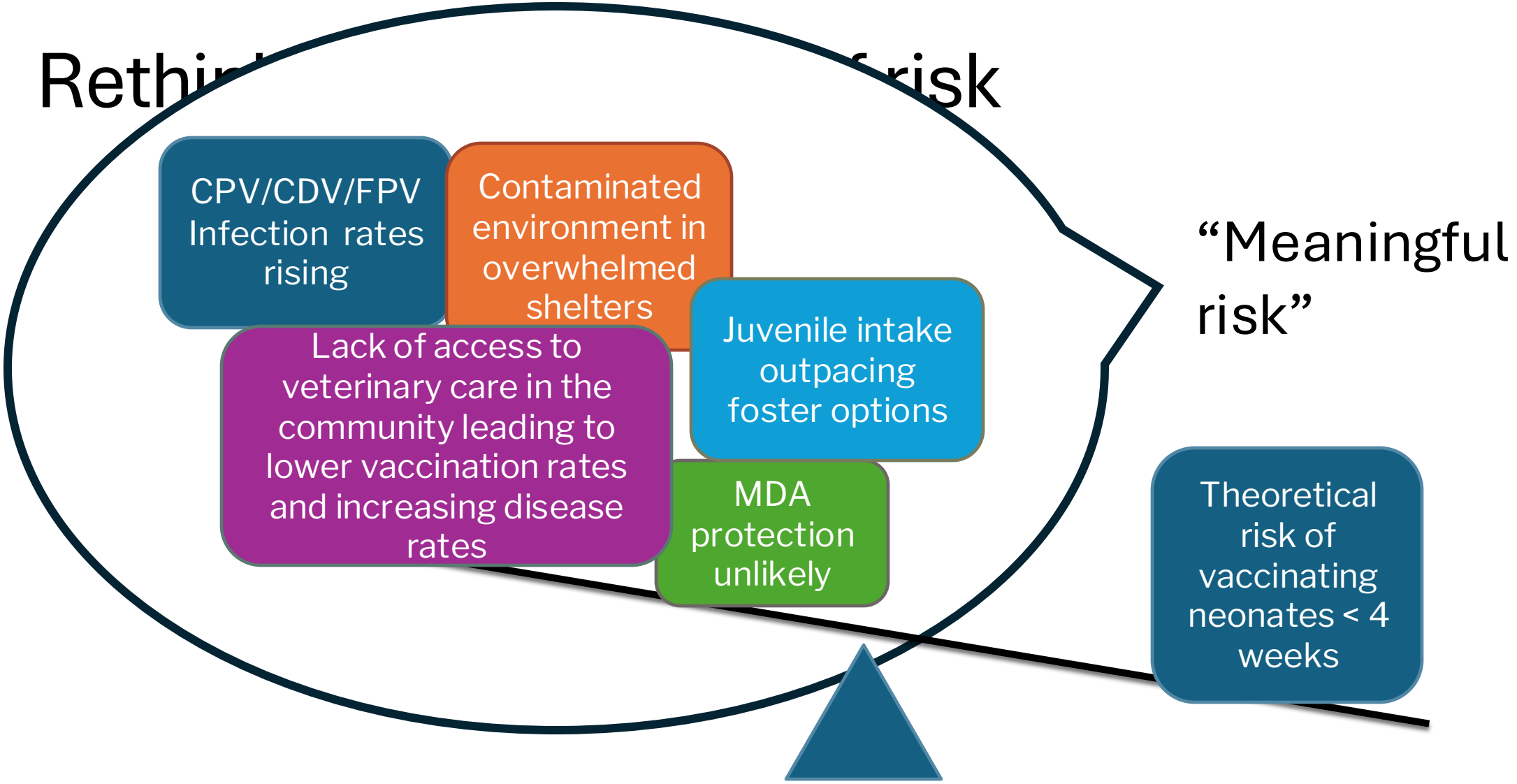
# Neonatal vaccination can be safe and effective

- Bacillus Calmette-Guérin (BCG) used in millions of days old neonates worldwide to prevent childhood tuberculous meningitis and miliary disease
- Hepatitis B (HVB) used in millions and first dose given at birth
- Diptheria, Pertussus, and Tetanus (DPT combo vaccine) – in experimental clinical setting safe to give in first week of life

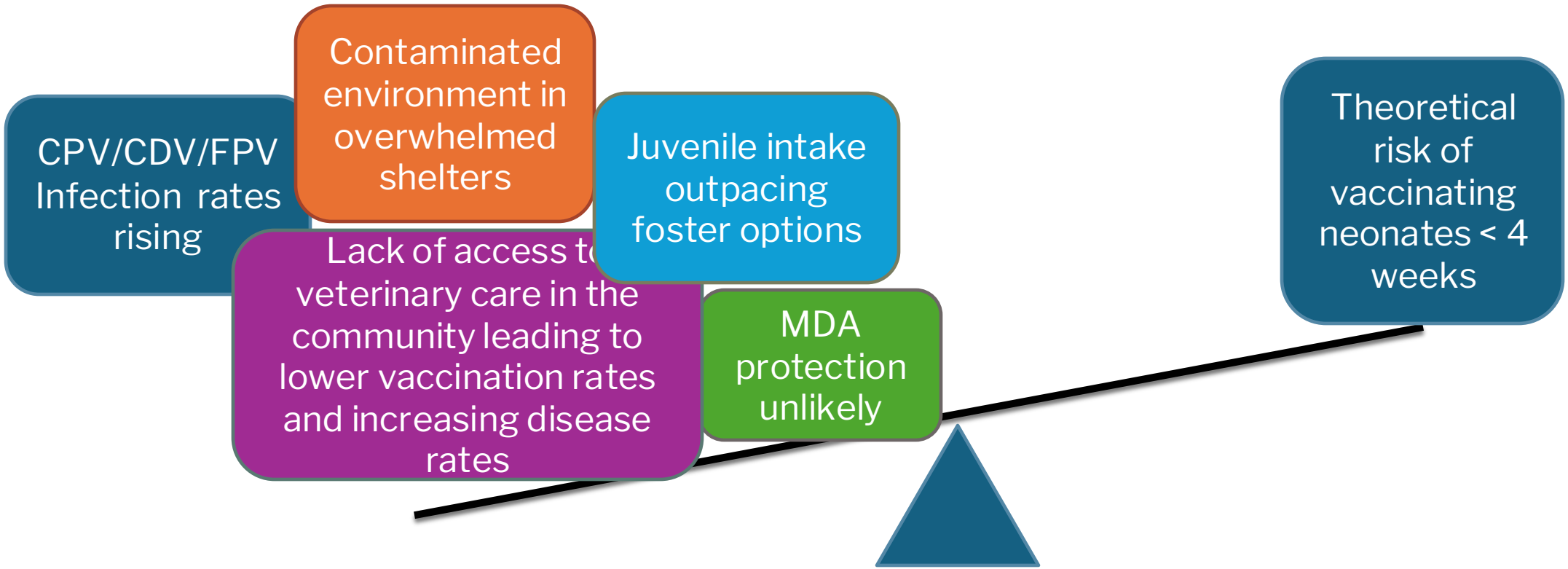



"birth is a major point of healthcare contact globally meaning that effective neonatal vaccines achieve high population penetration."

# Rethi[illegible]f risk


CPV/CDV/FPV Infection rates rising
Contaminated environment in overwhelmed shelters
Lack of access to veterinary care in the community leading to lower vaccination rates and increasing disease rates
Juvenile intake outpacing foster options
MDA protection unlikely
"Meaningful risk"
Theoretical risk of vaccinating neonates < 4 weeks

# When does the balance tip?



# Why not start even earlier than 4 weeks?

- Vaccines not effective if MDA is present
- Preference for placement in foster care for many reasons
- Concerns that vaccinating neonates might not be effective
- Various statements about risk of vaccinating neonates
  - Linking back to long ago and hard to find original sources

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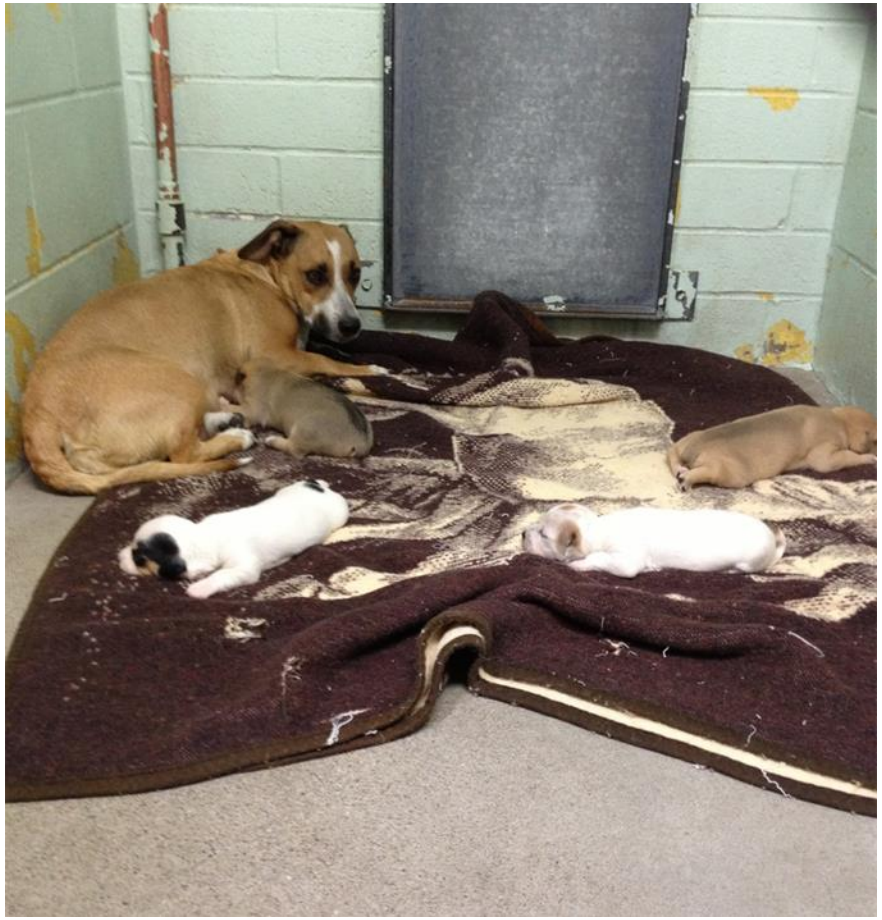
# Limits on foster care placement right now

- Lack of shelter bandwidth to recruit, train and manage skilled foster caregivers
- Shortage of fosters with space, time and availability to care for juveniles
- Special health care needs of moms and litters
- Lack of access to care leading to rising juvenile intake in many areas



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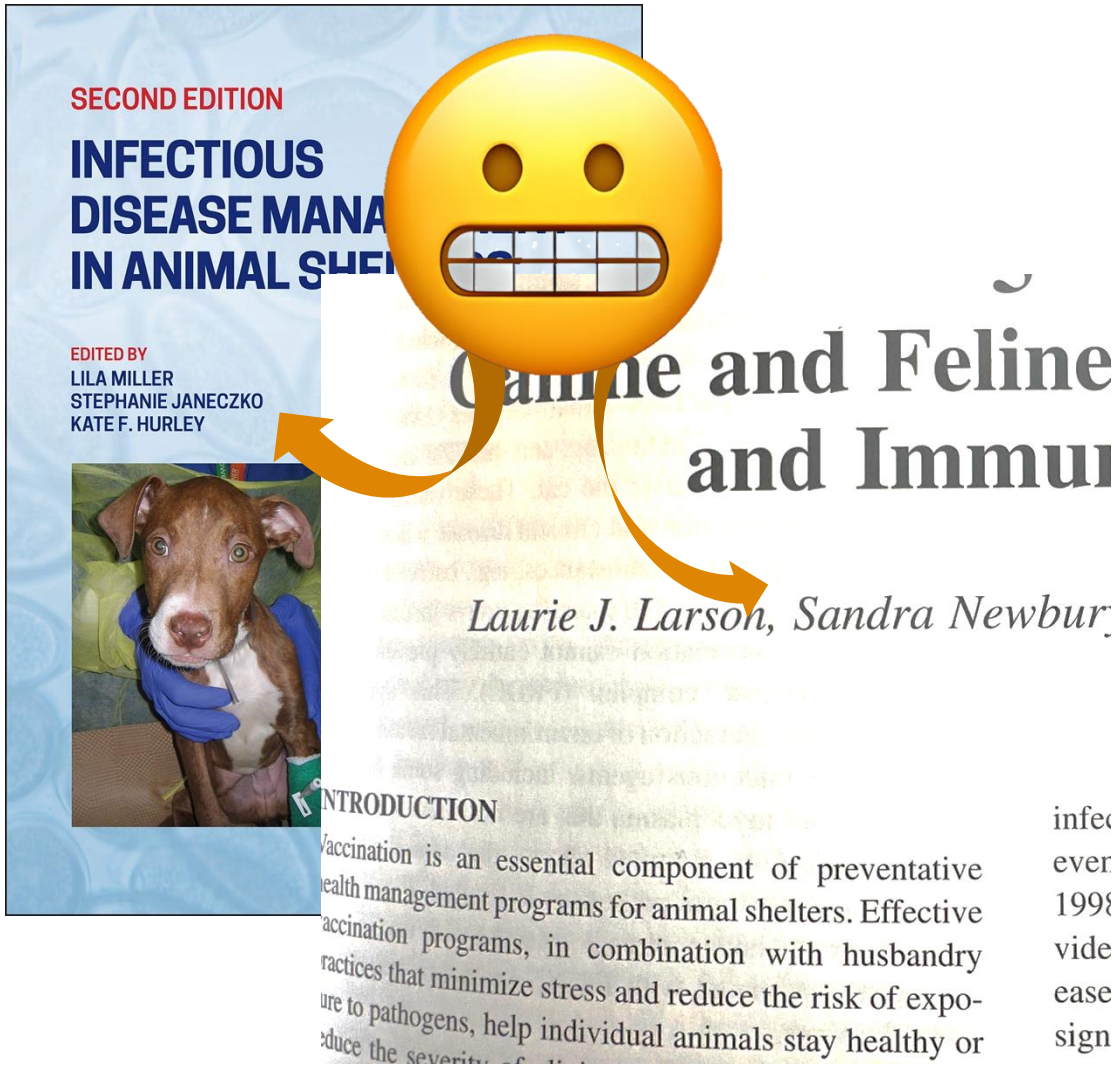
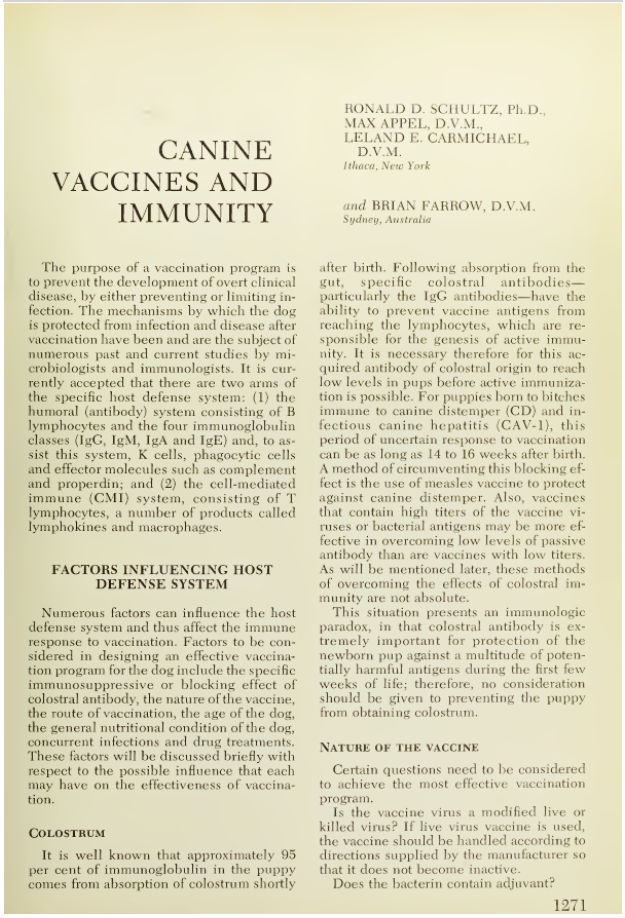
# Where did that assumption about risk come from?

- “Prior to two weeks of age, the immune system is unlikely to mount an effective immunizing response to many vaccines, and the vaccine virus can cause disease and death at this early age” (Schultz et al, **1977**)



# Digging deeper

- (Schultz et al, 1977): “The age of the dog is important not only because of colostral antibody, but also because…body temperatures of less than 37 C are **not uncommon** in the puppy during the first week or so of life, and this lower body temperature is **capable of suppressing the cell mediated** immunity system, although humoral immunity **(antibody production) does not appear to be affected to the same extent** as CMI.”
- “Vaccination during this early period is not recommended”.



CANINE VACCINES AND IMMUNITY

RONALD D. SCHULTZ, Ph.D.,
MAX APPEL, D.V.M.,
LELAND E. CARMICHAEL, D.V.M.
*Ithaca, New York*

*and* BRIAN FARROW, D.V.M.
*Sydney, Australia*

The purpose of a vaccination program is to prevent the development of overt clinical disease, by either preventing or limiting infection. The mechanisms by which the dog is protected from infection and disease after vaccination have been and are the subject of numerous past and current studies by microbiologists and immunologists. It is currently accepted that there are two arms of the specific host defense system: (1) the humoral (antibody) system consisting of B lymphocytes and the four immunoglobulin classes (IgG, IgM, IgA and IgE) and, to assist this system, K cells, phagocytic cells and effector molecules such as complement and properdin; and (2) the cell-mediated immune (CMI) system, consisting of T lymphocytes, a number of products called lymphokines and macrophages.

**FACTORS INFLUENCING HOST DEFENSE SYSTEM**

Numerous factors can influence the host defense system and thus affect the immune response to vaccination. Factors to be considered in designing an effective vaccination program for the dog include the specific immunosuppressive or blocking effect of colostral antibody, the nature of the vaccine, the route of vaccination, the age of the dog, the general nutritional condition of the dog, concurrent infections and drug treatments. These factors will be discussed briefly with respect to the possible influence that each may have on the effectiveness of vaccination.

**COLOSTRUM**

It is well known that approximately 95 per cent of immunoglobulin in the puppy comes from absorption of colostrum shortly after birth. Following absorption from the gut, specific colostral antibodies—particularly the IgG antibodies—have the ability to prevent vaccine antigens from reaching the lymphocytes, which are responsible for the genesis of active immunity. It is necessary therefore for this acquired antibody of colostral origin to reach low levels in pups before active immunization is possible. For puppies born to bitches immune to canine distemper (CD) and infectious canine hepatitis (CAV-1), this period of uncertain response to vaccination can be as long as 14 to 16 weeks after birth. A method of circumventing this blocking effect is the use of measles vaccine to protect against canine distemper. Also, vaccines that contain high titers of the vaccine viruses or bacterial antigens may be more effective in overcoming low levels of passive antibody than are vaccines with low titers. As will be mentioned later, these methods of overcoming the effects of colostral immunity are not absolute.

This situation presents an immunologic paradox, in that colostral antibody is extremely important for protection of the newborn pup against a multitude of potentially harmful antigens during the first few weeks of life; therefore, no consideration should be given to preventing the puppy from obtaining colostrum.

**NATURE OF THE VACCINE**

Certain questions need to be considered to achieve the most effective vaccination program.

Is the vaccine virus a modified live or killed virus? If live virus vaccine is used, the vaccine should be handled according to directions supplied by the manufacturer so that it does not become inactive.

Does the bacterin contain adjuvant?

# That's it?

- Dogs over 7-9 years old may have similar issues mounting an optimal response, but vaccination still recommended (actually more frequent vaccination)
- **Nothing** about vaccines early (or late) in life causing harm
- And current vaccines are even safer than vaccines in the 1970s

**AGE OF THE DOG**

The age of the dog is important not only because of persistence of colostral antibody, but also because the relative hypothermia that exists during the first week or two of life can cause a state of CMI unresponsiveness. Optimum body temperatures between 38 and 39° C. are very critical for T cell as well as macrophage function in the dog. Body temperatures of less than 37° C. are not uncommon in the puppy during the first week or so of life, and this lower body temperature is capable of suppressing the CMI system, although humoral immunity (antibody production) does not appear to be affected to the same extent as CMI. Vaccination during this early period (i.e., less than 2 weeks of age) with live attenuated vaccines is not recommended.

There is also evidence to suggest that certain dogs in the later stages of life (i.e., 7 to 9 years of age) may have a decreased ability to produce antibody as well as a decreased CMI response. Annual revaccination during these later years therefore would be particularly important to maintain an active state of immunity.

# What about this?

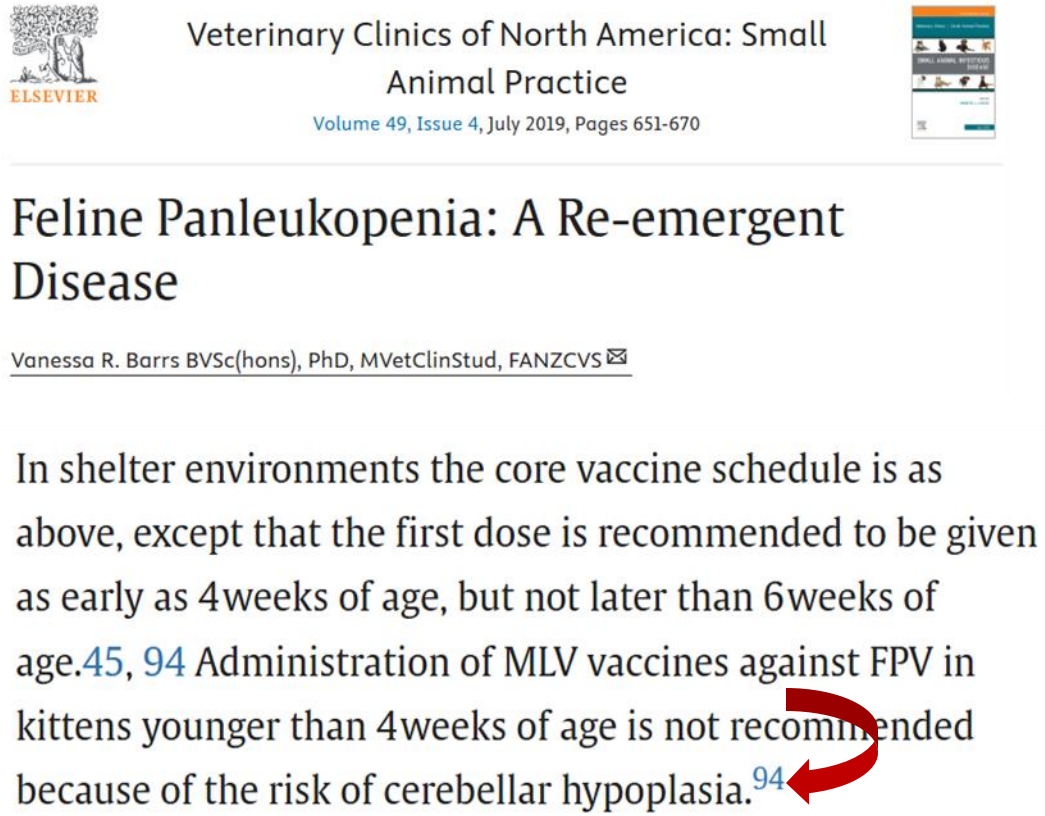
### 6.4.2 Core vaccines in shelters

A core vaccine is one given to all eligible animals and is withheld only in extraordinary circumstances.[27] For all core vaccines except rabies, shelters should use modified live virus or recombinant vaccines (MLV) rather than killed products because they provide a faster immune response.[33–35] This includes vaccines for puppies, kittens, animals with FeLV or FIV, and pregnant and nursing animals.[30,36] Cerebellar hypoplasia is a theoretical complication of MLV panleukopenia vaccination of pregnant cats; however, the risk of abortion, maternal, and kitten death due to panleukopenia generally outweighs this concern in shelters.[37,38]

Cerebellar hypoplasia is a theoretical complication of MLV panleukopenia vaccination of pregnant cats; however, the risk of abortion, maternal, and kitten death due to panleukopenia generally outweighs this concern in shelters.

# Theoretical risk of cerebellar hypoplasia

- References provided in the ASV guidelines linked to general overviews of feline panleukopenia, not specific to risks of vaccination
- Reference from those references on risk of vaccinating pregnant cats or kittens went to 2013 AAFP guidelines
- 2013 AAFP guidelines referenced a 1999 report involving a single cat



Veterinary Clinics of North America: Small Animal Practice
Volume 49, Issue 4, July 2019, Pages 651-670

## Feline Panleukopenia: A Re-emergent Disease

Vanessa R. Barrs BVSc(hons), PhD, MVetClinStud, FANZCVS

In shelter environments the core vaccine schedule is as above, except that the first dose is recommended to be given as early as 4weeks of age, but not later than 6weeks of age.45, 94 Administration of MLV vaccines against FPV in kittens younger than 4weeks of age is not recommended because of the risk of cerebellar hypoplasia.[94]

# That one cerebellar hypoplasia case report

- Single article cited in many sources as caution against vaccinating neonates
- Did not involve vaccination of neonates
- Pregnant cat was found as stray, vaccinated with MLV FVRCP on ~ day 21 of pregnancy
- 3 kittens died/euthanized at or near birth
- 2 kittens had cerebellar hypoplasia; FPV isolated from brain tissue

ELSEVIER

Journal of Comparative Pathology

Volume 121, Issue 1, July 1999, Pages 39-53

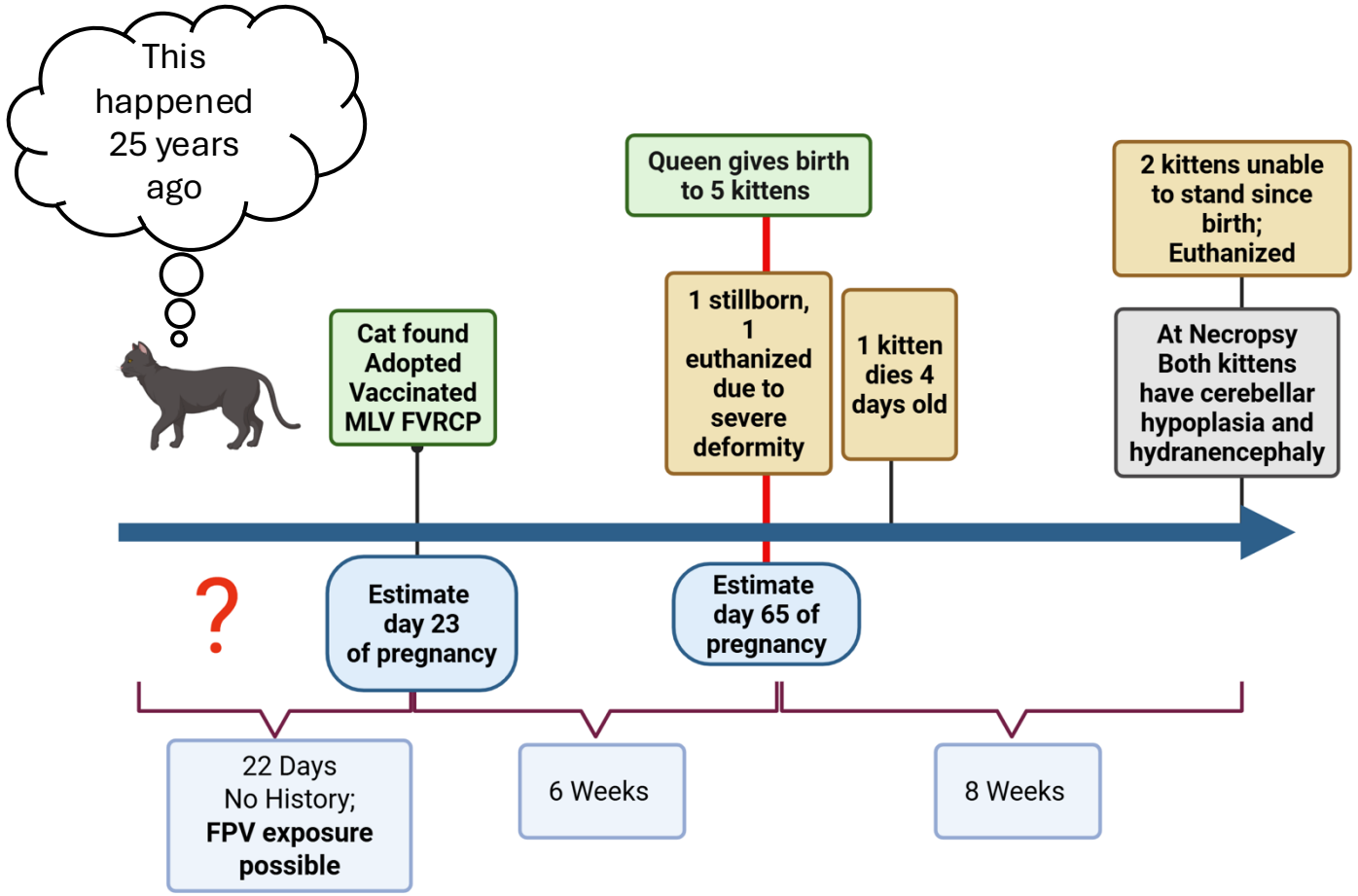
Regular Article

## Hydranencephaly and Cerebellar Hypoplasia in Two Kittens Attributed to Intrauterine Parvovirus Infection

N.J.H. Sharp [a], B.J. Davis [b], J.S. Guy [c], J.M. Cullen [c], S.F. Steingold [a], J.N. Kornegay [d]

Show more

# That one cerebellar hypoplasia case report




**Authors conclusion: "It was not possible to ascertain whether the viral isolate was vaccine-derived or a field virus."**

# What about puppies?

- 1 day old puppies with no MDA vaccinated with MLV SC parvo vaccine
- No harmful effects and immunity developed similarly to older puppies
- Same findings with rabies vaccine
- Authors conclude: “Vaccination at an early age is advisable because infectious diseases and their consequences are a great risk for young animals”

## Neonatal immunity and immunisation in early age: lessons from veterinary medicine

G Chappuis [1]

Affiliations + expand

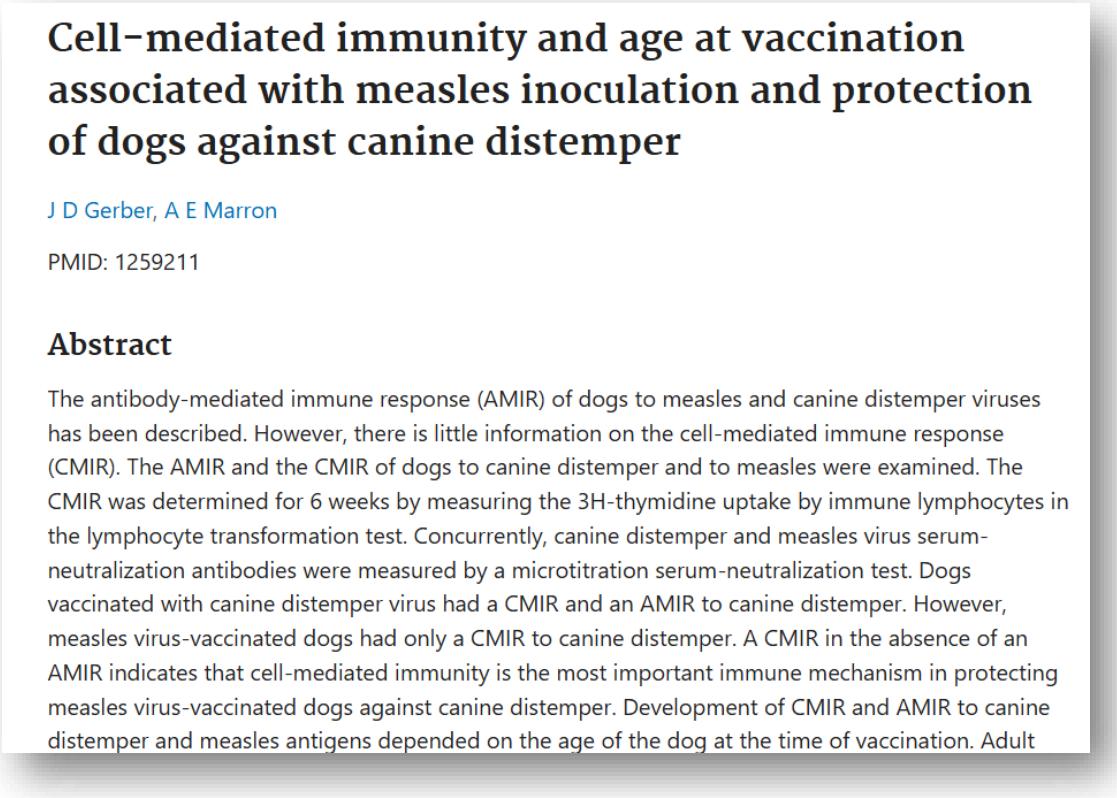
PMID: 9711790 PMCID: PMC7130764 DOI: 10.1016/s0264-410x(98)00110-8

### Abstract

The objective of this paper is to review adaptive immunity of young animals using examples from my own experience and from the literature. Trials carried out by us with a modified live and inactivated canine parvovirus vaccine in newborn puppies provide evidence of the immune capacity of these puppies. With regard to transfer of immunity from mother to offspring, there is a role for transplacental and colostral immunity. Examples of passive protection of young animals against different infections include passive protection of kittens against the feline immunodeficiency virus. However, passive immunity, though very useful at an early age, varies in duration and makes implementation of standard vaccination schedules difficult. Other experiments demonstrate that, under certain conditions, it is possible to overcome residual maternally-derived antibodies and to induce post-vaccinal immunity.

# MDA is still a thing

- 10 puppies with MDA  vaccinated with distemper or measles at 16-30 days of age
  - Measles can induce cross reactive immunity to distemper
- No antibodies developed, as we would expect – MDA can protect puppies *and* block vaccine
- BUT no harm came to any puppies – all monitored to day 42



## Cell-mediated immunity and age at vaccination associated with measles inoculation and protection of dogs against canine distemper

J D Gerber, A E Marron

PMID: 1259211

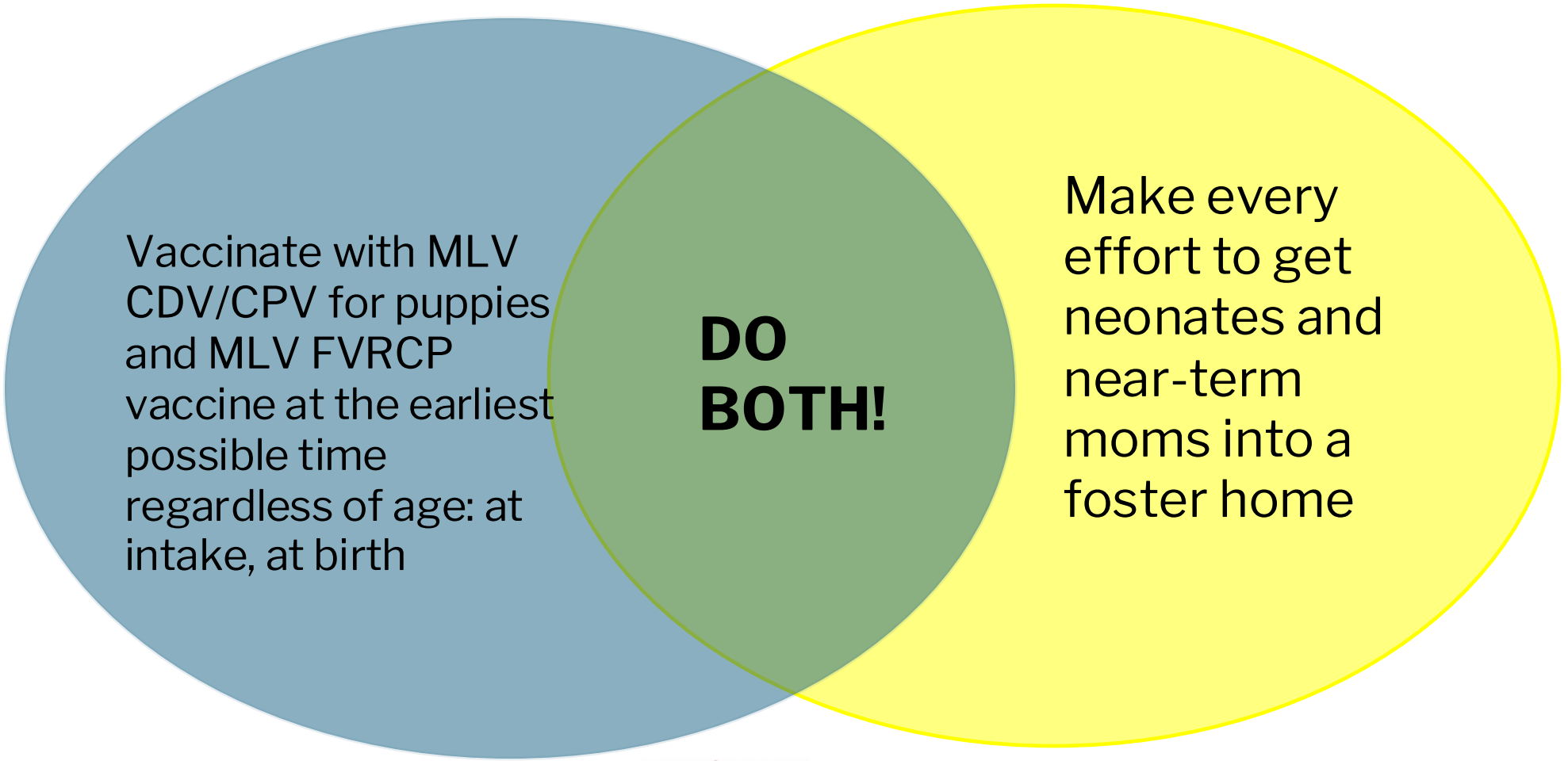
### Abstract

The antibody-mediated immune response (AMIR) of dogs to measles and canine distemper viruses has been described. However, there is little information on the cell-mediated immune response (CMIR). The AMIR and the CMIR of dogs to canine distemper and to measles were examined. The CMIR was determined for 6 weeks by measuring the 3H-thymidine uptake by immune lymphocytes in the lymphocyte transformation test. Concurrently, canine distemper and measles virus serum-neutralization antibodies were measured by a microtitration serum-neutralization test. Dogs vaccinated with canine distemper virus had a CMIR and an AMIR to canine distemper. However, measles virus-vaccinated dogs had only a CMIR to canine distemper. A CMIR in the absence of an AMIR indicates that cell-mediated immunity is the most important immune mechanism in protecting measles virus-vaccinated dogs against canine distemper. Development of CMIR and AMIR to canine distemper and measles antigens depended on the age of the dog at the time of vaccination. Adult

# Why not start even earlier than 4 weeks?

- ~~Vaccines not effective if MDA is present~~
- ~~Preference for placement in foster care for many reasons~~
- ~~Various statements about risk of vaccinating neonates~~
  - ~~Linking back to long ago and hard to find original sources~~
- ~~Concerns that vaccinating neonates might not be effective~~

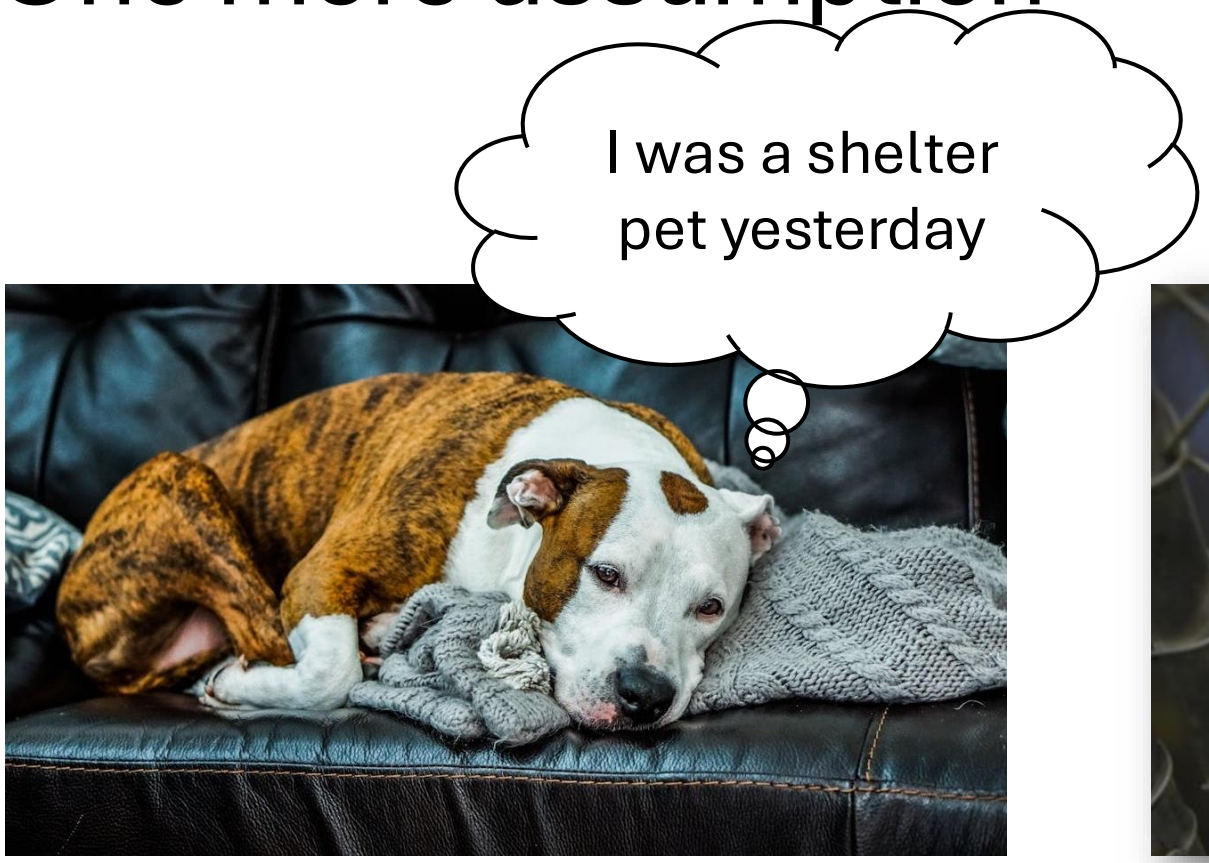
# New recommendations




# Neonatal vaccination is not a replacement for the specialized care that neonates need!

- When pathogens are present in the environment both vaccination at the earliest possible time and minimizing exposure should be used in combination to the greatest extent possible.
- Some puppies and kittens with MDA will not respond to early vaccination due to MDA
- Even juveniles with enough MDA to block vaccine may be, or may soon become, susceptible to infection as MDA wanes
- Puppies and kittens need help with temperature regulation AND good nutrition in the neonatal period in order to effectively produce protective antibodies – and to stay healthy and safe in general

# One more assumption




# Rethinking context as a determinate of vaccination protocol

"Shelter vaccine protocols differ from protocols used in **private practice** because **shelter animals** are **subject to an increased risk** of infectious disease. **Risk factors include stressors, exposure to other animals, age, previous preventive care, and pathogen levels in the environment.**

[4]The Guidelines for Standards of Care in Animal Shelters: Second Edition. JSMCAH 2022. Pgs 1-76. Table 6.1

Are stressors, exposure to other animals, young animals, animals lacking previous preventive care, and high pathogen levels in the environment found only in animal shelters?

# Rethinking context as a determinate of vaccination protocol

- “While populations of animals might seem to fall neatly into these two categories of home or shelter, **many dogs and cats entering or presented to shelters have lived in homes but have never been previously immunized**. Studies of animals presented to animal welfare organizations have found immunity in as few as one third of cats and dogs in communities studied. **Intact animals are more likely to lack immunity and by definition are the source puppies and kittens**.”

# Is there meaningful risk?

- How likely is the animal to be exposed to a contaminated environment?
  - Yard, sidewalk, park…
- How likely is it that the animal (or the animal's mother) already has immunity?
- How likely is the animal to have another chance at vaccination?
- Given that individual animal's circumstances, does the benefit of vaccination today outweigh the risk?

“Meaningful risk exists in any environment where access to care is limited and exposure risk is significant.”

# Conclusion:

“The increasingly severe access to care crisis in veterinary medicine leaves a growing number of owners unable to get their dogs and cats vaccinated or spayed/neutered. As a result, the **infectious disease risk in areas where access to care is limited may more closely resemble the risk seen in shelters** than the scenario envisioned by traditional vaccine recommendations. **Therefore, these recommendations for early vaccination are also applicable and important for puppies and kittens outside of shelters, in any context where environmental exposure poses a meaningful risk.** Vaccination of neonatal puppies and kittens is also indicated when that may be the only time the animals are seen, such as at a temporary clinic.”

# Field experience

**From:** Cristie Kamiya <cristie.kamiya@hssv.org>
**Subject:** Re: shelters doing neonatal vaccines

**We were super excited about** CPMA (Canine Parvo Monoclonal Antibody) and **being able to treat parvo** more effectively and even received funding to treat 10-20 puppies per month onsite, but **then we got even more excited** when our partners (Tulare County, Madera County, Kings County, Fresno County) **started vaccinating neonates and now we aren't seeing very many parvo puppies at all**.

Cristie Kamiya, DVM, MBA, CAWA (she, her, hers)
Chief of Shelter Medicine
Humane Society Silicon Valley

# Field experience

Dr. Allie Stevens, Milwaukee Area Domestic Animal Control Commission

# Field experience

Dr. Sarvis, San Diego Humane Society

# News

## Articles

### Neonatal Vaccination Recommendations

**Recommendation: When meaningful risk is present, both vaccination at the earliest possible time *and* minimizing exposure should be used in combination to the greatest extent possible.**

April 16, 2025

https://sheltermedicine.wisc.edu/news/

https://sheltermedicine.wisc.edu/neonatal-vaccination-recommendations/