Shelter Medicine
SCHOOL OF VETERINARY MEDICINE
UNIVERSITY OF WISCONSIN-MADISON

UCDAVIS KORET SHELTER MEDICINE PROGRAM

Use of the modified live canine distemper virus and canine parvovirus vaccine in neonatal puppies and use of modified live feline panleukopenia vaccine in neonatal kittens in animal shelters and other environments with meaningful risk of exposure.

When exposure to panleukopenia, parvo or distemper is a meaningful risk, immediate vaccination of puppies and kittens in shelters with DAPP and FVRCP respectively, beginning at the time of birth, intake, or prior to intake is a potentially life-saving practice that poses only very rare and largely theoretical risks. Neonatal vaccination may also be indicated for puppies and kittens in any environment where access to care is limited and exposure risk is significant. While early vaccination may not effectively immunize all pups or kittens, for neonates with low levels of maternal antibodies, the chance to start making antibodies earlier could save them from severe disease and likely death from CDV and CPV-2 should they be exposed[1,2].

Previous vaccine recommendations have distinguished between animals living in homes and those entering shelters, with an assumption that in home settings puppies and kittens have received maternal antibodies from their vaccinated mothers and therefore maternal antibody will both protect neonates and prevent vaccine efficacy in the early weeks of life. However, many dogs and cats entering shelters have never been previously immunized, and so would confer no immunity to their offspring.

One study of dogs found nearly two thirds of dogs entering a Florida shelter had very low to no protective antibodies to distemper, parvo, or both, with intact dogs at higher risk than those who had been neutered or spayed[3]. In a study of cats presented to animal shelters, also in Florida, only 40% of cats had a protective titer (>1:40) against FPV [4]. Likewise, a study of trapped cats from the community, presented for sterilization, found that only 33% of the free roaming cats had a protective titer against FPV [5]. The absence of protective antibodies found in dogs entering shelters reflects a similar lack of protection in the community from which the animals originated.

One of the factors that predicted if a cat would have a protective titer against FPV was having a status of being already sterilized, suggesting that unsterilized cats who have delivered kittens near the time of being presented to a shelter are substantially less likely to confer maternal immunity to their kittens[4]. Even when maternal antibodies are theoretically present due to prior vaccination or exposure to field strain virus, transfer of antibodies to puppies and kittens may be insufficient e.g. due to poor maternal nutrition or inadequate nursing.

DAPP vaccination for puppies and FVRCP for kittens in shelter settings has commonly begun at four weeks of age with revaccination every 2 weeks[6]. Although many vaccines are only labeled for use in cats and dogs 6 weeks and over, recommendations for this off-label use of the vaccine products reflect the benefit of potentially providing immunity to fully virulent field strain virus which far outweighs any risk from current MLV vaccines. The recommendations to start vaccination at 4 weeks of age rather than even younger have been paired with recommendations to keep animals below that age out of shelters.

This historical age cut off must be reconsidered in light of the reality that foster care safety nets do not yet always match the needs for placement, leaving many shelters to house neonatal animals in environments with meaningful risk rather than euthanizing them. In addition, many puppies and kittens are born and raised in community environments where there is a need to protect them from risk. Although the immune system is not fully matured, it is known that vaccination can be safe and effective in newborns of many species[7].

Research demonstrates that danger from vaccination, even in neonatal puppies, is uncommon and minimal, especially when compared to disease resulting from exposure to field strains. In a study by Gerber et al. in 1976, no adverse responses were noted after pups were vaccinated at two weeks of age with canine distemper vaccine (CDV) and human measles virus vaccine (HMV)[8]. Chappuis (1998) studied the ability of neonatal puppies to respond to vaccination and the author was able to safely vaccinate groups of one day old puppies with MLV CPV-2 vaccines. None of the puppies had adverse reactions to the vaccines, and many were able to mount an immune response that kept neutralizing antibody levels steady over the course of 90 days, unlike the unvaccinated control puppies who had a steady drop in neutralizing antibody as maternal antibodies waned over time[9].

There are no published reports of modern vaccines inducing disease in neonatal puppies or kittens. One study, that has been cited to support delaying vaccination of kittens for FPV until after four weeks of age, is actually a case report describing a pregnant stray cat with unknown history who was vaccinated with a MLV paneleukopenia vaccine[10]. The kittens in the report were never vaccinated. Two kittens had cerebellar hypoplasia. The authors noted that the infection was likely due to exposure of the mother to field strain during the prenatal period.

The most substantial risk of vaccination in neonates would come from assuming that all animals are fully immunized following vaccination while minimizing the importance of protecting them from environmental risk. While some neonates will be effectively immunized, a larger proportion may fail to mount a protective response due to maternal antibody or inability of the immature immune system to fully respond. The likelihood of responding immunologically improves with age (and declining maternal antibody levels) and, because neonates cannot completely thermoregulate on their own, may be improved by ensuring neonatal puppies and kittens are kept adequately warm.

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. This is similar to recommendations, and the supporting rationale, already commonly accepted for pregnant dogs and cats entering shelters[6]. Minimizing the time that puppies, kittens, and pregnant animals are in the shelter environment also reduces the risk from the myriad other infectious threats and risks to well-being for which no vaccine is available.

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.

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References:

[1] Gillespie JH, Baker JA, Burgher J, Robson D, Gilman B. The immune response of dogs to distemper virus. Cornell Vet 1958;48:103–26.

[2] Krakowka S, Long D, Koestner A. Influence of Transplacentally Acquired Antibody on Neonatal Susceptibility to Canine Distemper Virus in Gnotobiotic Dogs. The Journal of Infectious Diseases 1978;137:605–8. https://doi.org/10.1093/infdis/137.5.605.

[3] Lechner ES, Crawford PC, Levy JK, Edinboro CH, Dubovi EJ, Caligiuri R. Prevalence of protective antibody titers for canine distemper virus and canine parvovirus in dogs entering a Florida animal shelter. Journal of the American Veterinary Medical Association 2010;236:1317–21.

[4] DiGangi BA, Levy JK, Griffin B, McGorray SP, Dubovi EJ, Dingman PA, et al. Prevalence of serum antibody titers against feline panleukopenia virus, feline herpesvirus 1, and feline calicivirus in cats entering a Florida animal shelter. J Am Vet Med Assoc 2012;241:1320–5. https://doi.org/10.2460/javma.241.10.1320.

[5] Fischer SM, Quest CM, Dubovi EJ, Davis RD, Tucker SJ, Friary JA, et al. Response of feral cats to vaccination at the time of neutering. J Am Vet Med Assoc 2007;230:52–8. https://doi.org/10.2460/javma.230.1.52.

[6] The Guidelines for Standards of Care in Animal Shelters: Second Edition. Journal of Shelter Medicine and Community Animal Health 2022:1–76. https://doi.org/10.56771/ASVguidelines.2022.

[7] Morris MC, Surendran N. Neonatal vaccination: Challenges and intervention strategies. Neonatology 2016;109:161–9. https://doi.org/10.1159/000442460.

[8] Gerber JD, Marron AE. Cell-mediated immunity and age at vaccination associated with measles inoculation and protection of dogs against canine distemper. Am J Vet Res 1976;37:133–8.

[9] Chappuis G. Neonatal immunity and immunisation in early age: lessons from veterinary medicine. Vaccine 1998;16:1468–72. https://doi.org/10.1016/S0264-410X(98)00110-8.

[10] Sharp NJH, Davis BJ, Guy JS, Cullen JM, Steingold SF, Kornegay JN. Hydranencephaly and Cerebellar Hypoplasia in Two Kittens Attributed to Intrauterine Parvovirus Infection. Journal of Comparative Pathology 1999;121:39–53. https://doi.org/10.1053/jcpa.1998.0298.