



## On Behavior

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### Striving for Puppy Wellness: Are Early Socialization and Infectious Disease Prevention Incompatible? by Jennifer Messer, BA Psych (Hons.), DVM

#### What is Puppy Wellness?

Wellness is more than simply freedom from disease; it is an overall state of physical and mental well-being. Puppy wellness depends on many factors, including genetics, nutrition, protection from parasites and infectious diseases, grooming, intellectual stimulation, exercise, socialization, and a loving and safe environment. When a puppy is both physically *and* behaviourally well, he is more likely to meet the expectations of his human family and is at decreased risk of re-homing or euthanasia.

One of the dilemmas in the pursuit of puppy wellness is balancing the need for early socialization with the need for protection from infectious disease. Traditionally, the puppy owner has been advised to restrict the puppy to the house and the yard, until completion of his vaccination series, in order to protect him from infectious diseases until he is well immunized, which can mean virtual isolation from the outside world until over four months of age. However, the window of opportunity to most effectively socialize a puppy usually closes before the puppy

is fully vaccinated, and delaying vital socialization often has negative long-term behavioural consequences. Research shows that lack of early socialization increases the likelihood of behaviour problems such as fear and aggression.

But is this degree of precaution

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still necessary? This "traditional" approach is based on the limitations of vaccines being used two decades ago. Vaccines have improved significantly in the last 15 years, as has our understanding of the importance of early socialization. Let us then re-examine traditional recommendations in the light of modern advances in immunology and insight into canine behaviour development.

This article will examine puppy socialization needs and the role of vaccination in the prevention

of infectious disease, and explore the actual risk associated with socializing puppies before completion of their puppy vaccination series.

#### The Value of Early Socialization

Mother Nature designed dogs to be especially receptive to interactions with novel people, dogs, places and new experiences, while very young, so that they grow up to be comfortable with the everyday elements of their environment.<sup>1</sup> This prevents them from wasting energy by responding fearfully to the common events and encounters of their day-to-day life.

Puppies are programmed to be most accepting of new experiences until the age of about 12 weeks.<sup>2,3,4,5,6</sup> Mother Nature decrees that anything the puppy hasn't encountered by 12 weeks old is odd enough to warrant caution! The period from three to approximately 12 weeks old is called the "sensitive period," whereby puppies are most able to easily acclimatize to novel stimuli. From 12 to 18 weeks old the window of opportunity to socialize the puppy closes rapidly, such that with each passing week

it becomes increasingly difficult to successfully socialize a dog. Once the dog reaches 18 weeks of age the window of socialization closes and it is then much harder—and sometimes impossible—to train a dog to like something new or acclimatize him to something that he finds frightening. Poorly socialized dogs are at much greater risk for responding fearfully to unfamiliar people, dogs, and experiences.<sup>2,4,6,7</sup>

Socialization<sup>8</sup> is a big project: it requires exposure to people, dogs, other pets, places, sounds and experiences they will be subjected to in the life they share with us. Depending on the owner's lifestyle, this might include trains, garbage trucks, schoolyards of screaming children, crowds, cats, crying infants, and much more. Most puppies will be subjected to people of both sexes, various ages and appearances, handling for routine grooming, and the noises of a variety of household appliances in their day-to-day life with us.<sup>9</sup> While it is impossible to expose a young puppy to absolutely everything he will ever encounter in life, the more bases that are covered while the window of socialization is open, the greater the chance that the puppy will be able to generalize from his prior experiences and find something reassuringly familiar in a new situation.

One way to promote socialization is through “puppy classes.”

## Puppy Classes

Puppy classes—the brainchild of Dr. Ian Dunbar—were developed as a way of enabling puppy socialization and training in a friendly and safe environment. In a

typical puppy class off-leash play and play-fighting helps socialize puppies to other dogs and allows them to learn to be gentle with their jaws, handling exercises acclimatize them to being touched by strangers, and exposure to odd sights and sounds (using props, CDs, and theatrics) accustoms them to a wide range of life experiences. Between socialization activities, topics such as housetraining, exercise, and environmental stimulation are addressed with owners and the puppies are taught some basic obedience skills.

Puppy classes help puppies achieve wellness by facilitating socialization and by teaching the puppies' guardians how to assist the puppies in acquiring skills that are expected of them in order for them to be cherished members of their human family and of society. Since puppy classes are so important to the lifelong well-being of puppies, it is crucial that as many puppies as possible attend them. Despite this, many owners are discouraged from enrolling their dog because of recommendations from breeders or veterinarians who argue that puppies should not be exposed to other dogs until their full vaccination schedule is complete, something that doesn't occur until *after* the puppy is 12 weeks old, when his peak socialization period has already passed.

Puppy owners, faced with balancing the very real threat of their puppy becoming seriously ill against what may seem to them to be the nebulous benefits of puppy classes, cannot be blamed for choosing to keep their puppies at home. Yet, the relative risks have changed with improvements in vaccines. Although vaccination

does not guarantee protection from disease, newer vaccines allow more reliable protection at a younger age.

## Vaccines and How They Work (and Don't Work): Immunology 101

The diseases against which a puppy is vaccinated depends on the environment that he lives in, his lifestyle, and his health status. Puppies in North America are generally vaccinated against at least five infectious diseases: distemper, hepatitis, parvovirus, parainfluenza (these four are often administered as one combination vaccine), and rabies. Depending on their risk of exposure, some puppies are also vaccinated against leptospirosis,<sup>10</sup> *Bordetella* (kennel cough), *Borellia burgdorferi* (Lyme disease), and other disease agents. Of these, the disease that is usually of greatest concern when considering early exposure to other dogs is parvovirus. The reason for this is threefold: the virus is incredibly resilient in the environment, the disease is severe, and the older vaccines were not very reliable at providing protection in young puppies.

To understand why the older vaccines were less reliable, you must first understand something of how vaccines work.

### Antibodies

Antibodies are special proteins made by the body to neutralize disease before it can cause harm. A puppy gets maternal antibodies from his mother, partially through their shared blood supply while the puppy is still a fetus, but mostly through the milk he suckles from her after birth. The type and

amount of maternal antibodies a puppy gets depends on his mother's immune system, i.e., what diseases and vaccines she's been exposed to in her life. Maternal antibodies are temporary; they gradually break down and disappear completely by the time he is about four months old.

In order to have lasting immune protection, the puppy's immune system needs to make its own antibodies. The puppy's immune system can be stimulated to make antibodies in one of two ways: the puppy can be exposed to the disease and risk getting very ill, or he can be vaccinated against the disease. Vaccines are made with weakened, altered, or killed disease agents—still close enough to “the real thing” to stimulate the production of antibodies, but not capable of causing the disease itself.

The first time the body meets either the real disease or the vaccine against a disease it makes some antibodies, and the cells of the immune system register that they have encountered that particular disease intruder. When the puppy gets his next dose of the vaccine a few weeks later, his body makes many more antibodies even faster and an army of memory cells is made, ready to fight the disease at the drop of a hat if needed in the future. At this point, there is long-lasting immunity—up to a year for some disease agents, much longer for others.

### *Maternal Antibody Interference*

Maternal antibodies are especially important in the first six weeks of life when the puppy's immune system is too immature

to make its own antibodies in response to either vaccination or a real disease encounter. The downside of maternal antibodies is they can also interfere with the effectiveness of vaccines. This problem is called “maternal antibody interference.”

Since a vaccine is like a fake disease, the maternal antibodies neutralize it as if it was the disease itself, sometimes so well that the puppy's immune system isn't well enough stimulated by the vaccine, and not enough antibodies are made. This is one of the reasons why we vaccinate puppies every few weeks: for a given puppy we don't know exactly when the maternal antibody level is low enough for the vaccine to work properly. Because of the possibility of maternal antibody interference, there can be periods when the puppy has neither enough maternal antibodies nor enough of his own antibodies to fight off real disease if he encounters it. These periods are called “windows of vulnerability.”

### **How Vaccines and Vaccination Schedules Have Changed**

The windows of vulnerability used to pose a huge problem with regards to parvovirus in puppies. In recent years these windows have become much smaller and, therefore, less problematic because the newer vaccines are much better at stimulating the immune system even while the puppy still has maternal antibodies in his system. These newer vaccines are called “high-titer, low-passage” vaccines because the disease substance used in making the vaccine is put through fewer “passages” to weaken it and, therefore, the

vaccine product is capable of stimulating the immune system better, resulting in more antibodies being made (measured as a “titer”). Even the breeds that have historically been more susceptible to parvovirus, such as the black-and-tan-coated breeds, don't seem to be at increased risk anymore when the newer, “stronger” vaccines are used.

Before the “high-titer, low-passage” vaccines<sup>11</sup> were introduced, the likelihood of maternal antibody interference in young puppies was much greater, and it was quite common for puppies to receive vaccinations at eight, 12, and 16 weeks of age and, sometimes, even a final booster at 18 to 20 weeks of age for puppies at increased risk.

Both manufacturers of the newer vaccines and independent investigators have demonstrated that three doses of the high-titer, low-passage vaccines given at six, nine, and 12 weeks of age are at least as effective at immunizing a puppy as were the older vaccines given at three-week intervals until the puppy was 18 to 20 weeks old.<sup>12</sup> This is reflected in the *American Animal Health Association 2006 Vaccine Guidelines*<sup>13</sup>, which now recommends vaccinating puppies starting at six to eight weeks of age and revaccinating every three to four weeks<sup>14</sup> until the last dose of vaccine is given at 12 weeks of age or older.<sup>15</sup>

With an accelerated schedule (starting at six rather than eight weeks of age) using the newer vaccines (high-titer, low-passage), puppies can now be effectively vaccinated at an earlier age. While this should have paved the road to getting puppies into socialization

classes while the window of socialization is still wide open, there still is great hesitation in the veterinary, breeder, and training community to encourage the attendance of puppies under 12 weeks of age in these classes.

### **Expert Opinion on the Relative-Risk Dilemma**

While it has long been recognized that behavioural illness kills more dogs than infectious disease, the first veterinary expert to promote getting puppies into socialization classes after a minimum of one vaccination was Dr. R.K. Anderson, a veterinarian, board certified in both population medicine and behaviour. In an open letter to his colleagues titled “Puppy Vaccination and Socialization Should Go Together”<sup>16</sup> he emphasizes that we have a responsibility to enable early learning and socialization in young puppies, and that they should be enrolled in a socialization program as a key part of any preventive medicine program.

Dr. Anderson recommends that puppies start puppy class at eight to nine weeks of age, with a minimum of one vaccination. He further argues that:

Experience and epidemiologic data support the relative safety and lack of transmission of disease in these puppy socialization classes over the past 10 years in many parts of the United States. In fact, the risk of a dog dying because of infection with distemper or parvo[virus] disease is far less than the much higher risk of a dog dying (euthanasia) because of a behaviour problem.”

Dr. Anderson concludes by stating that 10 years of good experience

and data with few exceptions allows veterinarians to generally recommend early socialization and training classes, beginning when puppies are eight to nine weeks of age.

The University of Minnesota<sup>17</sup> (where Dr. Anderson is a Professor Emeritus)<sup>18</sup> is not the only veterinary school starting puppies in class after one vaccination. At the Purdue University School of Veterinary Medicine, puppies between seven and 14 weeks of age can start class so long as they have been administered their first vaccination against distemper, parvovirus, and *Bordetella* at six weeks of age or older, and at least ten days before class. Dr. Andrew Leuscher, veterinary behaviourist and director of the Animal Behaviour Clinic at Purdue University, and Steve Thompson, APBV, director of the Pet Wellness Clinic at Purdue University, state in their open letter to the public that many more puppies currently lose their homes due to behaviour reasons than die of viral diseases, and that they are not aware of any parvovirus problems in puppy classes since the high-titer vaccines gained mainstream use in 1995. They state that:

There have been no puppy class participants infected with Parvovirus in any puppy classes offered at Ohio State [where puppies 8 to 16 weeks can enroll] or Purdue University, and these are both facilities that treat high humane society caseloads and numerous Parvo[virus] cases annually.<sup>19</sup>

For over ten years at Montessaurus Puppy School in Guelph, Ontario, Canada, we have been accepting puppies from eight

weeks of age with a minimum of one vaccination against parvovirus and distemper. The additional precautions we take are simple: owners are asked to keep their pup at home if he is unwell or has diarrhea, and the floor is cleaned with a dilute bleach solution if a puppy defecates in class. We have not had a single incident of suspected infectious disease transmission to this day.

### **Socialization and Infectious Disease Prevention Work Hand in Hand for Puppy Wellness**

There is a growing consensus that puppies are NOT getting ill in puppy classes that enroll puppies who are seven weeks and older and who have been vaccinated at least seven to ten days before starting class. However, this is not to suggest that young puppies should be exposed *indiscriminately* to other dogs and outdoor areas. It is still prudent to avoid exposing a puppy to dogs of unknown health status, or to parks and other areas likely contaminated with dog feces until the puppy is fully vaccinated. In regions where parvovirus is rampant,<sup>20</sup> or where other infectious disease agents may be present,<sup>21</sup> it may even be warranted to keep the puppy from walking on public property until fully vaccinated. Keep in mind that socialization to dogs is but one aspect of socialization, and that puppies can be safely exposed to people, places, sights, smells, and sounds without significant risk of exposure to infectious disease (*see* sidebar below).

Puppyhood remains the single greatest opportunity to positively

influence a dog's behavioural development. Since more dogs are euthanized for behavioural reasons than for all medical causes combined,<sup>2,7</sup> it would be unwise to allow unfounded fear of exposure to infectious disease to interfere with efforts towards early socialization. Advising puppy owners to wait until the puppy is over 12 weeks of age before exposing him to the world he will be living in might have been appropriate a decade ago but is now clearly outdated. In striving towards puppy wellness, socialization and infectious disease prevention must go hand in hand.

*This article is intended to provide general information on the topic of vaccination of puppies, socialization of puppies, and the relative risks of behavioural illness and infectious disease when puppies are exposed to other dogs before the completion of their vaccination series. The information contained within is not intended as veterinary recommendations, and should not replace the advice of your veterinarian.*

## References

1. While the focus of this article is on the "nurture" aspect of socialization, both "nature" (genetics) and "nurture" (environment) influence the socialization process. The extent to which environment affects behaviour is determined by genetics, which cannot be influenced after conception.
2. Landsberg, G., Hunthausen W. & Ackerman L. (2003). *Handbook of Behavior Problems of the Dog and Cat, 2nd Ed.*, Elsevier Saunders.
3. Horwitz, D., Mills, D., & Heath, S., eds., (2002). *British Small Animal Veterinary Association Manual of Canine and Feline Behavioural Medicine*, British Small Animal Veterinary Association.
4. Lindsay, S.R. (2001). *Applied Dog Behavior and Training, Volume 2: Etiology and Assessment of Behavior Problems*. Iowa State University Press.
5. Beaver, B.V. (1999). *Canine Behavior: A Guide for Veterinarians*. W.B. Saunders Company.
6. Scott, J.P. & Fuller, J.L. (1965). *Genetics and the Social Behavior of the Dog*. University of Chicago Press.
7. Seskel, K. (1997). Puppy socialization classes. progress in companion animal behavior. *Veterinary Clinics of North America: Small Animal Practice*. 27(3):465-477.
8. Formal use of the term "socialization" does not actually extend to non-social attachments. For the purpose of this article I have included localization (attachment to non-living parts of the environment) when referring to socialization, as it is thought to represent the same process but applied to different objects. The similarity between socialization and localization is addressed in the chapter titled "Early Experience and the Development

## "Safe" Socialization "Do's"

- Drive to a busy mall and hang out with your pup on a mat at the entrance. Strangers will flock to you, manhandle your pup, and willingly feed him treats.
- Host a puppy party: invite friends and family over, play some music, toss some streamers, and pass your pup around.
- Bring your puppy to indoor Scouts or Brownies meetings. Supervise children interacting with him.
- Play sound-desensitization CDs or cassettes. A whole range of everyday noises such as sounds of motorcycles, stormy weather, and crying infants are available. Feed lots of treats for scary noises.
- Park yourself with your puppy at an outdoor café along a busy street. The puppy can rest on a pillow/bed at your feet. Allow strangers to pet your dog, and offer him biscuits.
- Take drives to different parts of town and country with your pup safely seatbelted in the back seat. Visit countryside, different neighborhoods with people of various ethnicities, and go through the carwash and some drive-thrus. Have the window open so that he can take in all of the sights and sounds and smells (car wash excepted!).
- Take your puppy for long strolls tethered in a wagon, stroller, or body sling (depending on size/weight!).

of Behaviour" by James Serpell and J.A. Jagoe in *The Domestic Dog: Its Evolution, Behaviour and Interactions With People* edited by James Serpell, (1995) Cambridge University Press.

9. Socialization hit lists are available on many Web sites and in many books including: [www.dogpact.com](http://www.dogpact.com); *The Kinderpuppy Course: A Curriculum Manual for Instructors* by Dr. Jennifer Messer; *After You Get Your Puppy* by Dr. Ian Dunbar; *The Culture Clash* by Jean Donaldson; and *Handbook of Behavior Problems of the Dog and Cat* by G. Landsberg, W. Hunthausen, and L. Ackerman.

10. Puppies under nine weeks of age are not routinely vaccinated for leptospirosis due to the higher risk of adverse reactions in younger puppies.

11. "Vaccines" in this section refers to distemper, hepatitis, parvovirus, and parainfluenza (usually administered as one combination vaccine).

12. Smith-Carr, S., Macintire DK, & Swango, LJ. (1997). Canine parvovirus. Part I. Pathogenesis and vaccination, *Compen Contin Educ Pract Vet* 19(2):125-133.

13. 2006 American Animal Health Association Canine Vaccine Guidelines available at [www.aahanet.org](http://www.aahanet.org).

14. I consider it worthwhile pointing out that although the immune system responds

to boosters in the same way, regardless of whether they are done ten days apart or four weeks apart, the vaccine manufacturer will make a recommendation on the period between boosters for their product based on the research conducted in the process of having their vaccine product approved [personal communications with vaccine manufacturers]. Veterinarians will generally want to follow these recommendations. This is why some vaccines are boosted at two to four week intervals, and others at three to four week intervals.

15. Rabies is administered only once to puppies at least 12 weeks of age. Because of the risk of rabies to humans, the rabies vaccine is made to be so strong that the puppy only needs one exposure to it.

16. Open letter by Dr. R.K. Anderson posted on many Internet sites, including [www.apdt.com](http://www.apdt.com), and available upon request through the University of Minnesota; phone (612) 644-7400.

17. [www.cvm.umn.edu/newsandevents/events/puppy\\_classes/home.html](http://www.cvm.umn.edu/newsandevents/events/puppy_classes/home.html).

18. Dr. R.K. Anderson, DVM, DACVPM, DACVB is a professor Emeritus, College of Veterinary Medicine; Past Director, Animal Behavior Service of the College of Veterinary Medicine and Current Director, Center to Study Human Animal Relationships and Environments, University of Minnesota.

19. [www.vet.purdue.edu/animalbehaviour](http://www.vet.purdue.edu/animalbehaviour).

20. Your veterinarian can advise you of the incidence of parvovirus in your area.

21. For example, leptospirosis is transmitted through the urine of an infected animal and can be ingested through contaminated water.

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