

## Does a Smaller Dog Need a Smaller Vaccine?

by Dr. Patty Khuly

Great question! It's one I almost never get asked. Rather, I'm often told I must administer only half the recommended dose (one cc) because that's what the breeder, friend, relative, or Dr. Google says veterinarians should do. Which almost invariably makes most veterinarians roll their eyes ... because everyone knows that the drug companies perform extensive tests on Great Danes and Chihuahuas and everything in between so that it's crystal clear who needs what and why. Right?

Well ... not exactly...

Truth be told, there's only so much testing a biological (vaccine) manufacturer can be reasonably expected to undertake. Mostly, they need only to prove their vaccine is safe and effective in the species for which the vaccine is intended. The fact that extreme variation within the species exists, however, throws a significant monkey wrench into the works. So it is that most canine vaccines are tested on "average" dogs. And average dogs are well ... average sized. They're not usually Yorkies, Maltese, Pomeranians, Chihuahuas, or any other sub-ten-pound breed or breed-mix.

Which is perhaps why a greater percentage of small dogs suffer vaccine reactions. Here's a detailed explanation from a 2005 study on this which appeared in JAVMA:

The risk of a VAAE (vaccine-associated adverse events) in this study population was inversely related to a dog's weight. This weight-response relationship was previously suggested by results of a [2002] study in which dogs of toy breeds had significantly more suspected VAAEs than other dogs, although body weight was not evaluated. The manufacturers' recommended dose for all vaccines administered in our study was 1 mL regardless of body weight, and all vaccines were from single-dose vials. Vaccines, in contrast to virtually all veterinary pharmaceuticals, are prescribed on a 1-dose-fits-all basis, rather than by body weight. Prelicensing clinical trials investigate the safety of vaccines with doses in excess of label directions but only in a limited number of dogs. The results of this study suggest that trials in dogs that weigh > 10 kg underestimate the expected VAAE rate in smaller dogs.

Prelicensing clinical trials also investigate the safety of vaccines in several hundred dogs at multiple hospital locations, but specific breeds may be under- or overrepresented. Mature weights of dogs of different breeds may vary by 5 to 10 times and occasionally by > 50 times. Therefore, a 1-mL vaccine dose results in a ratio of vaccine volume received per kilogram of body weight that can vary widely. Ultimately, in this retrospective study evaluating 3.5 million full vaccine doses administered to 1.2 million dogs, 38.2 adverse vaccine reactions were observed for every 10,000 dogs. Which is not a big number of vaccine reactions. What was surprising, however, were the following observations: The VAAE rate decreased significantly as body weight increased. Risk was 27% to 38% greater for neutered versus sexually intact dogs and 35% to 64% greater for dogs approximately 1 to 3 years old versus 2 to 9 months old. The risk of a VAAE significantly increased as the number of vaccine doses administered per office visit increased; each additional vaccine significantly increased risk of an adverse event by 27% in dogs ≤ 10 kg (22 lb) and 12% in dogs > 10 kg.

So it is that — as I think stands to reason — the injection of multiple vaccines at one time is likelier to yield adverse vaccine events. Moreover, it confirmed (and this time quantified) a previous study's finding on the higher risks in smaller dogs. Then it went one further with the unexpected timing of greater reaction risk (more for 1-3 year-olds than for 2-9 month-olds), and, the most surprising finding of all (I think), that the risk was higher for spayed and neutered dogs.

So what's the upshot of all this? Do we not spay and neuter? Do we forego vaccines from 1-3 years of age? Do we alter the timing of vaccines? Do we administer half doses? I think these findings are interesting as a basis for greater study.

By themselves, these numbers do little to alter my already highly individualized take on recommending spays and neuters in my patients. Forgoing vaccines at 1-3 is also a recommendation I'd never consider. Splitting up vaccines so no one gets more than one vaccine per visit is something I'm already jiggy with. But on the half vaccine thing?

Here's my take:

1. While I do firmly believe that a half dose is likely to be less adverse vaccine event-inducing when administered to any dog, I can't be sure that a half-dose will be effective in every dog. It's simply not been investigated.

2. While vaccine manufacturers have not necessarily studied the safety of their vaccines in every size of dog, by now the sheer numbers of vaccinated dogs should serve as a powerful basis on which to assume safety in a wide variety of dogs at the recommended dosage.

So what will I do when the next client in search of a half-dose comes knocking?

- I'll explain all of the above. (Maybe I'll even print it out and give them a few minutes to read it before popping back into the exam room.)
- If they won't relent I'll make a note of it in their chart after administering the half-dose vaccines. All vaccines, that is, except the rabies vaccine.
- The rabies vaccine will be administered at the full recommended dose. Because — guess what? — I risk my license when I don't comply with the law on administering the rabies vaccine at the manufacturer's recommended dose and schedule.

I'd like to think I'm pretty malleable for the most part. I'm willing to take lots of unsolicited advice from my clients and investigate its true worth and make concessions even when I don't believe the science is there. But I do draw the line at putting my license at risk as some clients have demanded I do.

A handwritten signature in black ink, appearing to read 'Patty Khuly', enclosed within a circular flourish.

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