

Disclaimer: The purpose of this paper is to provoke discussion to aid in effecting change to current dog and cat annual and triennial vaccination protocols. Concerned pet owners are encouraged to do their own research on this topic to support any decisions regarding vaccinating their pets.

Over-vaccination of pets – an unethical practice

Elizabeth Hart

Many veterinarians are ignoring international dog and cat vaccination guidelines, and continuing to send reminder letters compelling pet owners to have their pets unnecessarily revaccinated for diseases such as parvovirus, distemper virus and adenovirus.¹ This unethical practice of over-vaccination is of no benefit to the animal and puts it at needless risk of a range of adverse reactions, including death.

In many instances, pet owners are not being informed that there is long duration of immunity after vaccination with modified live virus (MLV) vaccines, which means regular revaccination is unnecessary. They are also not being informed that experts warn that vaccination should be minimised to reduce the risk of adverse reaction to vaccine products.² Pet owners are not being given the latest information on which to base an “informed decision” before consenting to revaccinate their pets.

Conscientious and caring veterinarians are trying to raise the alarm about the ramifications of this unethical practice, but their warnings are often unheeded. ***The veterinary profession will face a loss of credibility when pet owners discover crucial information about revaccination has been withheld from them for years.*** There are serious questions about professional responsibility and competence, transparency and accountability, ethical conduct, abuse of authority, and betrayal of trust that must be answered.

Dog and cat vaccination guidelines issued by the World Small Animal Veterinary Association (WSAVA)³ note that dogs properly vaccinated with MLV core vaccines for parvovirus, distemper virus and adenovirus have very high protection from infection and $\geq 98\%$ protection from disease.⁴ The WSAVA guidelines advise that duration of immunity after vaccination with these vaccines is seven years or longer, based on challenge and serological studies.⁵ The WSAVA guidelines note that “dogs that have responded to vaccination with MLV core vaccines maintain a solid immunity (immunological memory) for many years in the absence of any repeat vaccination”.⁶

Earlier vaccine guidelines issued by the AAHA Canine Vaccine Task Force in 2003 note that MLV vaccines are likely to provide lifelong immunity, stating “when MLV vaccines are used to immunize a dog, memory cells develop and likely persist for the life of the animal”.⁷

Ronald Schultz, a renowned expert in immunology and a member of the WSAVA Vaccination Guidelines Group and AAHA Canine Vaccine Task Force, says that if a puppy is immunized with the three MLV vaccines to prevent parvovirus, distemper virus and adenovirus “there is every reason to believe the vaccinated animal will have up to life-long immunity”.⁸ Schultz advises that puppies should be revaccinated at one year of age with the vaccines used earlier. After that he does not believe there is any immunologic need to revaccinate annually with these vaccines.⁹ He notes that annual vaccination significantly increases the risk of an adverse reaction.¹⁰

Veterinarians who ignore this advice use unproven vaccine product label revaccination recommendations to try and justify over-vaccination.¹¹ But these revaccination recommendations are arbitrary and have no scientific basis.^{12 13} This fact is well-known in the international veterinary community, after the alarm was raised in an article titled “Are we vaccinating too much?” published in the *Journal of the American Veterinary Medical Association* in 1995.¹⁴ This article acknowledged that there was little scientific documentation to back up vaccine product label claims for annual revaccination, noting that many vaccines would “last for years”.¹⁵

In 2002, an American Veterinary Medical Association report warned that “unnecessary stimulation of the immune system does not result in enhanced disease resistance and may expose animals

to unnecessary risks”.¹⁶ In 2003, the AAHA Canine Vaccine Task force compromised on a move from annual revaccination to revaccination every three years with vaccines for parvovirus, distemper virus and adenovirus.¹⁷ In 2006, the AAHA Canine Vaccine Task Force revised its revaccination recommendation to every three years **or longer**.¹⁸ To minimise the potential for adverse reactions to vaccine products, the 2007 WSAVA guidelines specifically warn that core vaccines **should not be given any more frequently** than every three years after the 12 month booster injection following the puppy/kitten series.¹⁹

In the United States, the veterinary community compromised on a triennial revaccination recommendation. But, like annual revaccination, there is no scientific evidence that even triennial revaccination is required to “ensure continuity of protection”.²⁰ In 2006, the AAHA canine vaccine guidelines advised that vaccines produced by the major biologics manufacturers against parvovirus, distemper virus and adenovirus **all** produce excellent immune responses and can be soundly and reliably administered at the discretion of the clinician in extended duration of immunity protocols.²¹ It is not necessary to use a “3 year vaccine” and it is not necessary to revaccinate “every three years”. Immunological memory does not automatically “switch off” after one or three years, so how can unnecessary ongoing revaccination be justified?

Ronald Schultz provides an analogy with human measles vaccination, noting we don’t regularly revaccinate people. Schultz notes “the immune system of a person is similar to that of an animal, and since immunity persists for the life of a person (average 70+ years), then why wouldn’t immunity from canine or feline vaccines persist for 10 to 15 years? The answer is that many canine and feline vaccines do provide the same lifelong immunity”.²²

Nevertheless, the veterinary industry continues to cling to unnecessary revaccination for financial motives. Revaccination is a valuable source of income for pharmaceutical companies and veterinarians alike.^{23 24 25} It appears revaccination is used as a practice management tool to lure clients into veterinary surgeries²⁶ - “a practice is a business after all”.²⁷ However, it is not ethical practice to urge clients to have medical interventions for their pets that are not needed and which may cause harm – Ronald Schultz calls this “an unacceptable medical procedure”.²⁸

It is interesting to consider this practice of “over-servicing” from an ethical viewpoint. Bioethicist Bernard Rollin discusses Aesculapian authority, which is the unique authority that accrues to medical professionals, and he suggests it is also applicable to veterinary medicine, particularly companion animal medicine. Rollin notes this powerful authority “must be deployed to further the best interest of the patient”. Aesculapian authority is abused when the veterinarian’s financial interest takes precedence over the interests of the patient.²⁹ For example, in his book, *An Introduction to Veterinary Medical Ethics*, Rollin queries whether it is ethical for vets to urge their clients to have heartworm treatments for their dogs in regions where the risk of heartworm is negligible.³⁰ This is particularly pertinent if there are any risks associated with a heartworm treatment. Over-servicing must be challenged, particularly if the health and welfare of animals is put at risk by the priorities of turnover and profit.

An article published in the Australian Veterinary Journal in 2008 warns there is an oversupply of vets in companion animal practice. Progressively increasing numbers of veterinarians are competing for a constant or diminishing resource – the dogs and cats of Australia.³¹ Is this leading to a culture of over-servicing as veterinary practices strive to maintain income? This is a situation that the veterinary profession must face and address.

It is estimated that only 30-50% of the pet animal population is vaccinated in developed countries.³² In the interests of “herd immunity”, the WSAVA guidelines strongly recommend “that wherever possible ALL dogs and cats receive the benefit of vaccination”.³³ Rosalind Gaskell points out “we need to target vaccination to a greater proportion of the population, rather than repeat-vaccinating the same individual animals”.³⁴ Dennis Macy warns “it doesn’t do any good to over-vaccinate one segment of the population and not vaccinate the rest. Your good clients’ pets

will have a higher risk of adverse reactions”.³⁵ Marian Horzinek adds: “It is of course more arduous to solicit new clients than to summon old ones, but it needs to be done.”³⁶

In 2006, eleven years after the publication of “Are we vaccinating too much?”, a special report on dog and cat vaccination published in the scientific journal *Veterinary Microbiology* questioned whether vaccination in fact causes significant side effects to the extent that **we are now doing more harm than good**.³⁷ It seems little had changed in the intervening eleven years.

In 2009, pets are still being exposed to needless and often unidentified risk. Due to inadequate testing of vaccine products, the full range of immediate and delayed adverse reactions to vaccination is unknown. Kathryn Meyer advises that the results of safety testing are not routinely required on product labeling. This means that “rare events, events that occur after repeated exposure, and events that occur in a subgroup (e.g. specific breed, age)” are not noted on product labels.³⁸ David Husted notes there is a dearth of information on the responses that vaccines are likely to induce in older animals.³⁹

George Moore *et al* advise that “adverse events that are relatively uncommon or that occur in high-risk subgroups (e.g. elderly animals or specific breeds) are usually only detected through post-marketing surveillance. The full safety profile for a given vaccine can only be determined after the vaccine has been licensed and administered to large numbers (often millions) of individuals”.⁴⁰

In other words, dogs in the community are the guinea pigs for these vaccines. They (and their owners) are unknowingly part of a huge unregulated trial, the results of which are not being reported.

Post-marketing surveillance of adverse reactions is poor. The WSAVA guidelines note that “there is gross under-reporting of vaccine-associated adverse events which impedes knowledge of the ongoing safety of these products”.⁴¹ Reporting is voluntary, and veterinarians appear reluctant to report adverse reactions.^{42 43 44} Adverse reaction information derived from post-marketing surveillance is also not routinely required on the vaccine product label.⁴⁵

Veterinary experts have undertaken studies to evaluate duration of immunity and monitor adverse effects after vaccination. Jean Dodds warns that adverse reactions can occur up to 45 days after vaccination.⁴⁶ Ronald Schultz notes that adverse reactions can range from mild, self-limiting illness to chronic disease or death. Post-vaccination neurologic disorders, immunosuppression, dermatologic abnormalities, and other problems have been demonstrated to occur after administration of canine and feline vaccines.⁴⁷ The most common signs of local reactions are facial edema, hives and itching. Signs of a systemic reaction include urination, vomiting, diarrhea (sometimes bloody), dyspnea and collapse. Pain, soreness, stiffness, lethargy, swelling, a persistent lump, irritation, hair loss and/or colour change of hair at the injection site have also been observed as common reactions. Change of behaviour has also been reported after vaccination.⁴⁸

Jean Dodds reports that a wide variety of breeds of dogs, ranging from Shih Tzus to Great Danes, and a great many in between, may be more vulnerable to suspected adverse reaction to vaccination.⁴⁹ Recent studies warn that small-breed dogs in particular are at greater risk of adverse reaction with multivalent vaccines.^{50 51}

Bernard Rollin cites immunologist Kent Deitemeyer, who has “explained that vaccines need to be used judiciously, if only because activation of the immune system involves not inconsiderable degrees of what he calls ‘immunological stress’, stressors on the organism resulting from activation of the immune system”.⁵²

Rollin warns there is increasing evidence that over-vaccination can actually be conducive to disease development, not only as a consequence of immunological stress, but also more directly.

For example, frequent vaccination has been implicated in the development of autoimmune hemolytic anemia in dogs and injection-site sarcomas in cats, both of which can be fatal.⁵³ The true incidence of vaccine-associated sarcoma in cats is unknown, but is estimated to range between 1 in 10,000 and 1 in 1,000 vaccinated cats.⁵⁴

Could over-vaccination also be a cause of cancer in dogs? Cancer is reported as being the single biggest cause of death in dogs over two years old.⁵⁵ According to information from Texas A&M University, dogs and cats have a higher incidence of many tumors than do humans. Dogs have 35 times as much skin cancer, 4 times as many breast tumors, 8 times as much bone cancer, and twice as high an incidence of leukemia as do humans.⁵⁶

A paper published in 2001 suggests long-term over-activation of the immune system may be a major cause of cancer.⁵⁷ This research refers to cancer in humans, but given we are all mammals with similar genes,⁵⁸ perhaps this possibility is also relevant to dogs? Could over-vaccination, and the constant assault on the immune system, be causing a variety of cancers in dogs and cats over the long term? It is certainly something to ponder, especially as the scientific literature records the problem of injection site sarcomas in cats. This possibility is also another reason to cease unnecessary revaccination of animals.

Due to the failure of the regulatory process, and the unethical veterinary practice of over-vaccination, pet owners are unlikely to be made aware of the risks of revaccination. Not only are they not being informed about long duration of immunity with core MLV vaccines, information on possible adverse effects is also being withheld. This non-disclosure means pet owners are not being allowed to make an “informed decision” before consenting to revaccinate their pets.

In 2007, the WSAVA Dog and Cat Vaccination Guidelines were launched before its annual international Congress held in Sydney, Australia that year.⁵⁹ During the Congress, Australian veterinary expert Steven Holloway, Head of Small Animal Medicine at the University of Melbourne, warned ***it is not possible to defend the practice of annual revaccination for parvovirus, distemper virus and adenovirus, given the volume of data available.***⁶⁰

Unaccountably, it seems many Australian vets ignored the WSAVA vaccination guidelines and Holloway’s admonishment, as the practice of annual revaccination continues here today. In its recent draft vaccination policy (dated March 2009), the Australian Veterinary Association admitted that “annual vaccination is the currently accepted practice in Australia”.⁶¹ This practice continues despite the fact that, in a previous draft vaccination policy published 10 years ago, the AVA acknowledged that “the duration of immunity delivered by some immunobiologicals and against some diseases may be variable”.⁶²

Why has the veterinary profession allowed so many of its members to continue the unnecessary and possibly harmful practice of over-vaccination, despite the scientific evidence? Why aren’t veterinarians being held accountable for this unethical practice? Why are they failing to keep informed about relevant advances in veterinary science?⁶³ Why are they not ensuring that veterinary procedures and recommendations are based on sound evidence-based science and practice?⁶⁴ Science knows no borders - how can they justify ignoring expert international guidelines on vaccination of dogs and cats and, most importantly, withholding this information from their clients? Ongoing unnecessary revaccination is even supported by State Veterinary Surgeons’ Boards “strongly recommending” that boarding kennels require proof of annual vaccination of pets from their clients.⁶⁵

What are the legal implications if vets continue to insist their clients revaccinate their dogs with core MLV vaccines “to ensure continuity of protection”? This recommendation is not evidence-based. Surely the onus is on the veterinary profession to provide proof that an intervention is necessary? What are the legal implications if vets continue to withhold published information on long duration of immunity? What are the legal implications if veterinarians fail to pass on information about the possibility of short-term and long-term adverse reactions which have been

recorded in the scientific literature, but which are not listed on vaccine product labels? Surely there should be full disclosure of these important facts to give clients the opportunity to make their own “informed decision” before deciding whether or not to revaccinate their pets? A consent form listing these important points should be understood and signed by the client before revaccination takes place.

Professional conduct and self-regulation in the veterinary profession must come under scrutiny. Jane Hern notes that professional bodies are granted the privilege of self-regulation, but only in return for an assurance their members set standards of competence and ethical behaviour to protect consumers.⁶⁶ Who protects the consumer when the veterinary profession’s “standards of competence and ethical behaviour” are putting pets needlessly at risk? By allowing over-vaccination to continue, the veterinary profession has failed in its duty to protect the rights of pet owners and the health of their pets.

The consequences of over-vaccination for pet owners and their pets are significant. If an animal becomes sick, or worse, after unnecessary revaccination, the pet owner bears the emotional and financial cost, which in some cases can be considerable.

Over-vaccination is putting pets at needless risk and this practice must be stopped. After persistent lobbying by a group of concerned pet owners, the President of the Australian Veterinary Association, Dr Mark Lawrie, advised: “We are reviewing the AVA policy, and it may be that the new one will contain similar guidelines as those in the World Small Animal Veterinary Association Guidelines for the Vaccination of Dogs and Cats”.⁶⁷ Subsequent advice indicates the new vaccination policy is due to go to the AVA Board for ratification within the next two months. The AVA has advised that “once it becomes official policy, we will implement a communication strategy to inform veterinarians and the public that our policy has changed”.⁶⁸

It will be interesting to see the details of the Australian Veterinary Association’s new dog and cat vaccination policy. Will it live up to our society’s ideal of “freedom of information”, transparency and accountability? Will it include the latest scientific information on long duration of immunity, probably lifelong, for MLV vaccines for dogs? Will the AVA make a commitment to keep abreast of new developments in immunology to ensure the most effective and safest vaccination methods are used?⁶⁹ Will the new policy stipulate that pet owners must be given the opportunity to make an *informed decision* before consenting to any further revaccination of their pets, and recommend the use of signed consent forms? How will the new policy be regulated, particularly as only 50% of vets in Australia are members of the AVA⁷⁰, **and there is currently no effective government regulation of the veterinary profession?**

Given that the mantra of ongoing revaccination has been drummed into pet owners over the years, they may be reluctant to reduce revaccination. It will be up to the veterinary profession to convince their clients that ongoing revaccination with core MLV vaccines is unnecessary and may be harmful.

The federal government regulator, the Australian Pesticides and Veterinary Medicines Authority, also has to act on this problem. The APVMA has repeatedly been asked to provide evidence⁷¹ to support vaccine product label revaccination recommendations, but has refused to respond to these requests.⁷² According to international immunology experts, there is **no** scientific evidence to back revaccination recommendations on MLV vaccine product labels⁷³, so why have these false and misleading claims been allowed to pass through the regulatory process? It is interesting to note that most of the APVMA’s operational income is collected from registrants of pesticides and veterinary medicines⁷⁴ – is there a conflict of interest here?

In the United States, the government regulator, the United States Department of Agriculture (USDA)⁷⁵, and the American Veterinary Medical Association (AVMA) are finally moving to address the problem of vaccine product labeling that makes “false and misleading” claims. In

particular, the AVMA has urged revaccination recommendations should be removed from biologic labels where the statement lacks a scientific basis.⁷⁶

In response to pet owners' concerns⁷⁷, the Australian Pesticides and Veterinary Medicines Authority convened a meeting of senior scientific staff to discuss the problem of over-vaccination on 15 April 2009. The APVMA has advised they are preparing a "position statement" on the subject of pet vaccination.⁷⁸ It is not known when this position statement will be made available to the public.

The Australian Veterinary Association and the Australian Pesticides and Veterinary Medicines Authority have dragged their heels on this issue for far too long. There is a serious problem in that unproven vaccine product label recommendations are conflicting with published scientific information on duration of immunity and adverse reactions. This ambiguity has to be acknowledged and addressed. Somebody has to take responsibility to co-ordinate a solution to this problem.

In a paper titled "Vaccination guidelines: a bridge between official requirements and the daily use of vaccines", Etienne Thiry and Marian Horzinek support "off-label" use of vaccines in light of "new scientific data". In particular, Thiry and Horzinek make the important point that veterinary practitioners must follow the most "efficacious" vaccination schedules.⁷⁹

Veterinary experts acknowledge that veterinarians are not constrained by label recommendations when administering vaccines.⁸⁰

The Australian Pesticides and Veterinary Medicines Authority also notes that veterinarians may "make treatment recommendations which are inconsistent with the instructions on labels of registered veterinary chemical products".⁸¹

Given that the veterinary profession should be aware that ongoing revaccination with core MLV vaccines is unnecessary and possibly harmful, why has it not taken action to recommend its members follow the most "efficacious vaccination schedules" rather than unproven vaccine labels? Why has it not taken action to address this problem over the past ten years?

In Australia, it has taken the efforts of a small group of concerned and determined pet owners to prod the AVA and APVMA into admitting there is a problem. How many people's pets may have been adversely affected over the past years of inaction, particularly as vets are reluctant to acknowledge and report adverse reactions?^{82 83 84}

Many members of the apparently "self-regulating" veterinary profession are taking advantage of the trust of pet owners. Pet owners are being exploited by those veterinarians who manipulate their clients into having unnecessary and possibly harmful interventions for their pets. The government regulator, the Australian Pesticides and Veterinary Medicines Authority, has been complicit in this practice by allowing vaccine products with unsubstantiated revaccination recommendations on the market.

There is a total lack of effective regulation, transparency and accountability, and this raises serious questions about the efficacy and safety of other possibly harmful products that are routinely pushed by vets.

The pet owning public has been exploited for far too long – it's time someone sounded the alarm.

Acknowledgements: To Bea Mies and Pat Styles for their inspiring dedication and perseverance. And deep gratitude to those immunologists, veterinarians, and people who care for pets who have campaigned for so long to expose the problem of over-vaccination.

* This paper is based on my report “*Is over-vaccination harming our pets? Are vets making our pets sick?*” which includes more detail on this subject. The report is freely available at: <http://users.on.net/~peter.hart/Is%20over-vaccination%20harming%20our%20pets.pdf>

For the latest international guidelines on core and non core vaccines, refer to the WSAVA Dog and Cat Vaccination Guidelines: http://www.wsava.org/PDF/Misc/VGG_09_2007.pdf

ENDNOTES:

¹ Many veterinarians are sending annual reminder letters to pet owners compelling them to revaccinate their pets. For example, these reminder letters might be cutely addressed personally to dogs, saying they need annual boosters against parvovirus, adenovirus and distemper virus to “stay healthy”. According to the latest scientific evidence, pets **do not** need ongoing revaccination with MLV vaccines to “stay healthy”.

² Day, M.J., Horzinek, M.C., Schultz, R.D. Guidelines for the Vaccination of Dogs and Cats, compiled by the Vaccination Guidelines Group (VGG) of the World Small Animal Veterinary Association (WSAVA). *Journal of Small Animal Practice* . 2007. 48 (9), 528-541: http://www.wsava.org/PDF/Misc/VGG_09_2007.pdf

³ The WSAVA guidelines are built on those developed by the American Animal Hospital Association (AAHA) Canine Vaccine Task Force and the American Association of Feline Practitioners (AAFP) Feline Vaccine Advisory Panel. The WSAVA guidelines were developed for **global** application. These guidelines “have been drafted with the objective of educating and informing the profession and to recommend rational vaccine use for individual pets and dog/cat populations”. The guidelines are “based upon a consensus among experts” and “reflect a combination of opinion, experience, and scientific data, published and unpublished”. The guidelines note that it is “necessary to continually re-evaluate vaccination practice.”

⁴ *Ibid* (see Frequently Asked Questions: No. 35)

⁵ *Ibid*

⁶ *Ibid*

⁷ Paul, M.A., Appel, M.J., Barrett, R., Carmichael, L.E., Childers, H., Cotter, S., Davidson, A., Ford, R., Keil, D., Lappin, M., Schultz, R.D., Thacker, E., Trumpeter, E., Welborn, L. Report of the American Animal Hospital Association (AAHA) Canine Vaccine Task Force: 2003 Canine Vaccine Guidelines, Recommendations, and Supporting Literature: http://www.britfield.com/health/canine_vaccine_guidelines.pdf

⁸ Schultz, R.D. What everyone needs to know about canine vaccines and vaccination programs. 2007 National Parent Club Canine Health Conference: <http://www.spinoneus.org/forum/uploaded/Admin/Vaccinations2007.pdf>

⁹ Schultz, R.D. Current and future canine and feline vaccination programs. *Veterinary Medicine*. March 1998, 233-254.

¹⁰ Schultz, R.D. What everyone needs to know about canine vaccines and vaccination programs. 2007 National Parent Club Canine Health Conference: <http://www.spinoneus.org/forum/uploaded/Admin/Vaccinations2007.pdf>

¹¹ I raised the issue of annual revaccination with Bruce Twentyman, Deputy Veterinary Director of the Australian Veterinary Association earlier this year and received the following response: “As to the frequency of vaccination, our members our [*sic*] advised to follow the manufacturer’s recommendations as it is they that have done the scientific work and experimentation to enable the product to be registered in the first place. To go outside these recommendations would be to use the product in an “off-label” situation. There are now vaccines available that are registered to last 3 years and these are the ones that should be used in that manner.” Email communication 6 January 2009. Issues raised by Dr Twentyman’s comments will be addressed in this paper.

¹² Schultz, R.D. Current and future canine and feline vaccination programs. *Veterinary Medicine*. March 1998, 233-254.

¹³ Schultz, R.D. Duration of immunity for canine and feline vaccines: A review. *Veterinary Microbiology*. 2006. 117, 75-79.

¹⁴ Smith, C.A. Are we vaccinating too much? *JAVMA*. 1995. Vol 207, No. 4 August 15, 421-425.

¹⁵ *Ibid*

¹⁶ Klingbord, D.J., Hustead, D.R., Curry-Galvin, E.A., Gumley, N.R., Henry, S.C., Fairfield, T.B., Paul, M.A., Boothe, D.M., Blood, K.S., Huxsoll, D.L., Reynolds, D.L., Riddell, G.Jr., Reid, J.S., Short, C.R. AVMA Council on Biologic and Therapeutic Agents’ report on cat and dog vaccines. *JAVMA*. 2002. Vol. 221, No. 10, 1401-1407.

¹⁷ Paul, M.A., Appel, M.J., Barrett, R., Carmichael, L.E., Childers, H., Cotter, S., Davidson, A., Ford, R., Keil, D., Lappin, M., Schultz, R.D., Thacker, E., Trumpeter, E., Welborn, L. Report of the American Animal Hospital Association (AAHA) Canine Vaccine Task Force: 2003 Canine Vaccine Guidelines, Recommendations, and Supporting Literature

¹⁸ Paul, M.A., Carmichael, L.E., Childers, H., Cotter, S., Davidson, A., Ford, R., Hurley, K.F., Roth, J.A., Schultz, R.D., Thacker, E., Welborn, L. 2006 AAHA Canine Vaccine Guidelines, Revised: <http://www.aahanet.org/PublicDocuments/VaccineGuidelines06Revised.pdf>

¹⁹ Day, M.J., Horzinek, M.C., Schultz, R.D. Guidelines for the Vaccination of Dogs and Cats, compiled by the Vaccination Guidelines Group (VGG) of the World Small Animal Veterinary Association (WSAVA). *Journal of Small Animal Practice* . 2007. 48 (9), 528-541: http://www.wsava.org/PDF/Misc/VGG_09_2007.pdf

²⁰ “to ensure continuity of protection” is an example of advice on a common brand of vaccine product.

²¹ Paul, M.A., Carmichael, L.E., Childers, H., Cotter, S., Davidson, A., Ford, R., Hurley, K.F., Roth, J.A., Schultz, R.D., Thacker, E., Welborn, L. 2006 AAHA Canine Vaccine Guidelines, Revised: <http://www.aahanet.org/PublicDocuments/VaccineGuidelines06Revised.pdf>

²² Schultz, R.D. Current and future canine and feline vaccination programs. *Veterinary Medicine*. March 1998, 233-254.

- ²³ “89% of veterinarians indicated that dog and cat vaccinations were indeed the number one contributor to practice turnover and 91% of veterinarians felt that a change from annual vaccination would have an adverse effect on their practice turnover. 80% of veterinarians also indicated that it would be difficult to attract clients on a regular basis should there be a change from annual vaccination.” Virbac Newsletter “Facts on Vaccination”, August 2005. (Australia)
- ²⁴ Kate O'Rourke reports many veterinarians responded to the three year guidelines with resistance. It was a “bitter pill”. The vexing vaccine issue. AVMA News. September 15, 2004: <http://www.avma.org/onlnews/javma/sep04/040915l.asp>
- ²⁵ Poubanne, Y. DOI and booster vaccination – dealing with the issue at practice level in France. Veterinary Microbiology. 2006. 117, 86-92.
- ²⁶ Schultz, R.D What everyone needs to know about canine vaccines and vaccination programs. 2007 National Parent Club Canine Health Conference: <http://www.spinoneus.org/forum/uploaded/Admin/Vaccinations2007.pdf>
- ²⁷ Horzinek, M.C. Vaccine use and disease prevalence in dogs and cats. Veterinary Microbiology. 2006. 117, 2-8.
- ²⁸ Schultz, R.D What everyone needs to know about canine vaccines and vaccination programs. 2007 National Parent Club Canine Health Conference: <http://www.spinoneus.org/forum/uploaded/Admin/Vaccinations2007.pdf>
- ²⁹ Rollin, B.E. The use and abuse of Aesculapian authority in veterinary medicine. JAVMA, Vol. 220, No.8, April 15, 2002, pp. 1144-1149.
- ³⁰ Rollin, B. E. “Case 19: Marketing Heartworm Regime” in An Introduction to Veterinary Medical Ethics. Iowa State University Press, 2006.
- ³¹ Heath, T.J. Number, distribution and concentration of Australian veterinarians in 2006, compared with 1981, 1991 and 2001. Australian Veterinary Journal. Vol. 86, No. 7, July 2008. 283-289.
- ³² Day, M..J., Horzinek, M.C., Schultz, R.D. Guidelines for the Vaccination of Dogs and Cats, compiled by the Vaccination Guidelines Group (VGG) of the World Small Animal Veterinary Association (WSAVA). Journal of Small Animal Practice. 2007. 48 (9), 528-541: http://www.wsava.org/PDF/Misc/VGG_09_2007.pdf
- ³³ *Ibid*
- ³⁴ Gaskell, R.M. Duration of immunity (DOI) – The regulatory issues. Veterinary Microbiology. 2006. 117, 80-85
- ³⁵ Smith, C.A. Are we vaccinating too much? JAVMA. 1995. Vol 207, No. 4 August 15, 421-425.
- ³⁶ Horzinek, M.C. Vaccine use and disease prevalence in dogs and cats. Veterinary Microbiology. 2006. 117, 2-8.
- ³⁷ Rottier, P.J.M., Sutton, D. Preface. Veterinary Microbiology. 2006. 117, p. 1.
- ³⁸ Meyer, E.K. Vaccine-associated adverse events. Veterinary Clinics of North America: Small Animal Practice. Vol. 31, No. 3 May 2001, 493-513.
- ³⁹ Husted, D.R. What you can and cannot learn from reading a vaccine label. Veterinary Clinics of North America: Small Animal Practice. Vol 31, No.3, May, 2001 539- 556.
- ⁴⁰ Moore, G.E., Franz, T.S., Guptil, L.F., Ward, M.P., Lewis, H.B., Glickman, L.T. Postmarketing surveillance for dog and cat vaccines: new resources in changing times. JAVMA. Vol. 227, No. 7, October 1, 2005, pp. 1066-1069.
- ⁴¹ Day, M..J., Horzinek, M.C., Schultz, R.D. Guidelines for the Vaccination of Dogs and Cats, compiled by the Vaccination Guidelines Group (VGG) of the World Small Animal Veterinary Association (WSAVA). Journal of Small Animal Practice. 2007. 48 (9), 528-541: http://www.wsava.org/PDF/Misc/VGG_09_2007.pdf
- ⁴² “One thing that I feel you rightly highlighted is the under reporting of adverse reactions. This does occur in the veterinary as well as human medicine fields”. Quote from email correspondence from Bruce Twentyman, Deputy Veterinary Director, Australian Veterinary Association, 6 January 2009.
- ⁴³ Jean Dodds notes: “Few clinicians are prepared...for encountering an adverse event and may overlook or even deny the possibility”. Dodds, W.J. Vaccination Protocols for Dogs Predisposed to Vaccine Reactions. Journal of the American Animal Hospital. May/June 2001, Vol. 37, 211-214.
- ⁴⁴ Ronald Schultz notes “there is a reluctance to report reactions, even those that lead to the death of an animal”. Schultz, R.D. Current and future canine and feline vaccination programs. Veterinary Medicine. March 1998, 233-254.
- ⁴⁵ Meyer, E.K. Vaccine-associated adverse events. Veterinary Clinics of North America: Small Animal Practice. Vol. 31, No. 3 May 2001, 493-513.
- ⁴⁶ Dodds, W.J. Vaccination Protocols for Dogs Predisposed to Vaccine Reactions. Journal of the American Animal Hospital. May/June 2001, Vol. 37, 211-214.
- ⁴⁷ Schultz, R.D. Current and future canine and feline vaccination programs. Veterinary Medicine. March 1998, 233-254.
- ⁴⁸ Schultz, R.D. Considerations in designing effective and safe vaccination programs for dogs. In : Carmichael, L.E. (Ed.), Recent Advances in Canine Infectious Diseases. International Veterinary Information Service. 2000: http://www.ivis.org/advances/Infect_Dis_Carmichael/schultz/IVIS.pdf
- ⁴⁹ Dodds, W.J. Vaccination Protocols for Dogs Predisposed to Vaccine Reactions. Journal of the American Animal Hospital. May/June 2001, Vol. 37, 211-214.
- ⁵⁰ Novak, W. Predicting the “unpredictable” vaccine reactions. Proceeding of the NAVC North American Veterinary Conference. Jan. 13-27, 2007, Orlando, Florida.
- ⁵¹ Moore, G.E., Guptil, L.F., Ward, M.P., Glickman, N.W., Faunt, K.K., Lewis, H.B., Glickman, L.T. Adverse events diagnosed within three days of vaccine administration in dogs. JAVMA. Vol. 227, No. 7, October 1, 2005. 1102-1108.
- ⁵² Rollin, B. E. “Case 82: “Can Annual Vaccinations Be Justified?” in An Introduction to Veterinary Medical Ethics. Iowa State University Press, 2006.
- ⁵³ *Ibid*
- ⁵⁴ Ford, R.B. Infectious Disease Prevention Change is in the Wind. 30th World Congress of WSAVA, Mexico City, Mexico, May 2005: <http://www.vin.com/proceedings/Proceedings.plx?CID=WSAVA2005&Category=1554&PID=10911&O=Generic>
- ⁵⁵ What you need to know about canine cancer. June 6 2009. K9 magazine: <http://www.dogmagazine.net/archives/2701/what-you-need-to-know-about-canine-cancer/>
- ⁵⁶ What is the incidence of cancer in our pets? Texas A&M University: <http://www.cvm.tamu.edu/oncology/faq/questions/incide01.html>
Frequently Asked Questions: <http://www.cvm.tamu.edu/oncology/faq/FAQ.html>

- ⁵⁷ O'Byrne K.J., Dalgleish, A.G. Chronic immune activation and inflammation as the cause of malignancy. *British Journal of Cancer*. 2001 Aug 17;85(4):473-83.
- ⁵⁸ What you need to know about canine cancer. June 6 2009. K9 magazine:
<http://www.dogmagazine.net/archives/2701/what-you-need-to-know-about-canine-cancer/> – quote from Dr Ali Mobasher.
- ⁵⁹ Email correspondence from Walt Ingwersen, WSAVA, 31 May 2009.
- ⁶⁰ Holloway, S. Current issues in Vaccination. Proceedings of the 32nd WSAVA Congress, Sydney, Australia, August 2007.
<http://www.vin.com/proceedings/Proceedings.plx?CID=WSAVA2007&Category=2984&PID=18190&O=Generic>
- ⁶¹ Australian Veterinary Association's (AVA) "Draft Policies and Position Statements – For members' comment by 13 March 2009" (recently accessible on the internet) refers to "Responsible use of veterinary vaccines for dogs and cats". This draft policy admits that "annual vaccination is the currently accepted practice in Australia".
- ⁶² AVA Draft policies. (Appendix X guidelines for responsible use of veterinary immunobiological in cats and dogs). *Australian Veterinary Journal*. Vol. 77, No. 7, July 1999.
- ⁶³ This contravenes the Australian Veterinary Association's Code of Professional Conduct Item 7.a:
http://avacms.eseries.hengsystems.com.au/AM/Template.cfm?Section=Code_of_Conduct&Template=/CM/HTMLDisplay.cfm&ContentID=5741
- ⁶⁴ This contravenes the Australian Veterinary Association's Code of Professional Conduct Item 3.b. *Ibid*
- ⁶⁵ Veterinary Surgeons' Board of South Australia. Code of practice for the operation of boarding establishments:
<http://www.vsbbsa.org.au/boarding.pdf>
- ⁶⁶ Hern, J.C. "Professional conduct and self-regulation" in *Veterinary Ethics: An Introduction*. Ed. Legood, G. London, New York. Continuum. 2000.
- ⁶⁷ Email correspondence from Mark Lawrie, President, Australian Veterinary Association, 26 March 2009.
- ⁶⁸ Email correspondence from Marcia Balzac, National Communications Manager, Australian Veterinary Association, 2 June 2009.
- ⁶⁹ The WSAVA guidelines note that it is "necessary to continually re-evaluate vaccination practice".
- ⁷⁰ Email correspondence from Marcia Balzac, National Communications Manager, Australian Veterinary Association, 27 May, 2009.
- ⁷¹ The APVMA's mission is to "protect the health and safety of people, animals and crops, the environment, and trade, and support Australian primary industries, through evidence-based, effective and efficient regulation of pesticides and veterinary medicines". Australian Pesticides and Veterinary Medicines: Vision, mission and purpose:
http://www.apvma.gov.au/about_us/vision.shtml
- ⁷² The author has repeatedly asked the APVMA to provide evidence to support vaccine product label revaccination recommendations, but the APVMA has refused to respond to these requests
- ⁷³ Schultz, R.D. 1998. Current and future canine and feline vaccination programs. *Veterinary Medicine*. March 1998, 233-254.
- ⁷⁴ "Most of the APVMA's operational income is collected from registrants of pesticides and veterinary medicines": Cost Recovery Review: http://www.apvma.gov.au/about_us/costrecovery.shtml
- ⁷⁵ United States Department of Agriculture (USDA), Center for Veterinary Biologics Notice Draft No. 327 on the subject of "Studies to Support Label Claims of Duration of Immunity":
http://www.aphis.usda.gov/animal_health/vet_biologics/publications/Noticedraft327.pdf
- ⁷⁶ American Veterinary Medical Association letter, re Center for Veterinary Biologics Notice Draft No. 327: Studies to Support Label Claims of Duration of Immunity dated October 27 2008:
http://www.avma.org/advocacy/federal/regulatory/practice_issues/vaccines/duration_of_immunity_ltr.pdf
- ⁷⁷ After a telephone discussion with the author, Simon Cubit, Manager Public Affairs, Australian Pesticides and Veterinary Medicines Authority arranged a meeting of senior scientific staff to consider the problem of over-vaccination of pets on 15 April 2009.
- ⁷⁸ Email correspondence from James Suter, Acting Program Manager, Veterinary Medicines, Australian Pesticides and Veterinary Medicines Authority dated 17 April 2009 and 5 June 2009.
- ⁷⁹ Thiry, E., Horzinek, M.C. Vaccination guidelines: a bridge between official requirements and the daily use of vaccines. *Veterinary Sciences Tomorrow* – 29 June 2007: <http://www.vetscite.org/publish/articles/000065/index.html>
- ⁸⁰ Schultz, R.D. Duration of immunity for canine and feline vaccines: A review. 2006. *Veterinary Microbiology*. 2006. 117, 75-79.
- ⁸¹ Australian Pesticides and Veterinary Medicines Authority Fact Sheet: Veterinarians and Veterinary Medicines:
http://www.apvma.gov.au/about_us/pdf/Veterinarians.pdf
- ⁸² "One thing that I feel you rightly highlighted is the under reporting of adverse reactions. This does occur in the veterinary as well as human medicine fields". Quote from email correspondence from Bruce Twentyman, Deputy Veterinary Director, Australian Veterinary Association, 6 January 2009.
- ⁸³ Jean Dodds notes: "Few clinicians are prepared...for encountering an adverse event and may overlook or even deny the possibility". Dodds, W.J. Vaccination Protocols for Dogs Predisposed to Vaccine Reactions. *Journal of the American Animal Hospital*. May/June 2001, Vol. 37, 211-214.
- ⁸⁴ Ronald Schultz notes "there is a reluctance to report reactions, even those that lead to the death of an animal". Schultz, R.D. Current and future canine and feline vaccination programs. *Veterinary Medicine*. March 1998, 233-254.