TAMIL NADU VETERINARY AND ANIMAL SCIENCES UNIVERSITY
DEPARTMENT OF VETERINARY PREVENTIVE MEDICINE
MADRAS VETERINARY COLLEGE

International
e-Conference on

AN INTEGRATED APPROACH TO ELIMINATE CANINE AND FELINE VIRAL DISEASES IN INDIA

30.11.2020 & 01.12.2020

Organized by

DEPARTMENT OF VETERINARY PREVENTIVE MEDICINE
MADRAS VETERINARY COLLEGE
CHENNAI - 600 007, TN, India

ABOUT THE INTERNATIONAL e- CONFERENCE

Infectious diseases of viral, bacterial and haemoparasitic origin are clinically important and commonly encountered among companion animals. Of the various etiologies, virus imposes serious disease in both dogs and cats. In India, these viral diseases *viz* canine parvoviral enteritis, canine distemper, rabies, feline panleukopenia, rhinotracheitis and calici viral infections are life-threatening and endemic diseases in dogs and cats even with the availability of vaccines. Various attributes like semi and free ranging pattern of dogs and cats along with uncontrolled population with poor husbandry practices, lack of implementation of prevention and control strategies, epidemiology, global climatic variation, increased susceptibility, vaccination failures, lack of knowledge on early diagnosis, misdiagnosis, and lack of awareness among the pet parents are the influencing determinants for the endemicity of the above said diseases in our country. Globally, efforts to control some of these viral diseases have been achieved by implementing strict vaccination schedule and Veterinary services. In India, vaccines against CPV 2, corona, rabies, kennel cough, panleukopenia, calici, and rhinotracheitis are readily available, but how it is used successfully in the field is a question of concern. As a forerunner in Veterinary Science we at the department of Veterinary Preventive Medicine, MVC is currently focussing on molecular epidemiology, disease forecasting models, diagnostic approaches, and vaccine studies on various infectious diseases of companion animals continuously to aid in the treatment and devising control strategies. This e-conference was initiated with the aim to integrate Veterinary scientist, faculties, research scholars, practitioners, students and pet parents to discuss on important developments and challenges happening in India and Global level on these viral diseases of dogs and cats through this virtual platform during this pandemic situation.

PET PARENTS play a pivotal role in breaking the transmission cycle of infectious agents in pets by implementing appropriate vaccination schedules and biosecurity measures. In this context, educating the pet parents about recent updates on vaccination and bioscecurity measures is of prime importance to create awareness. In continuation of past successful pet parents meet, this year we are organizing **NATIONAL PET PARENTS MEET** for the benefit of pet owners through online mode on 02.12.2020.

ABOUT THE HOST

Tamil Nadu Veterinary and Animal Sciences University (TANUVAS) is one of the leading Universities among Veterinary and Animal Sciences University. Madras Veterinary College (MVC) is one of the pioneering oldest and constituent institute of TANUVAS started way back in 1903. Department of Veterinary Preventive Medicine was first of its kind started in the year 1958 at MVC and it is focussing on teaching and research on various infectious diseases of farm and companion animals. Till now more than 200 research scholars have graduated from this prestigious department. This department is currently working on molecular epidemiology, disease forecasting models, and vaccine studies on canine viral diseases, brucellosis, tuberculosis, Johne's diseases, toxoplasmosis, and other economically important diseases.

RESOURCE PERSONS

Time (IST)	Name of Speakers	Topics
DAY-1 - 30.11.2020		
SESSION -I		
9.30 AM - 10.30 AM	**Dr. MICHAEL LAPPIN** Professor and Chair **One Health Committee** **World Small Animal Veterinary Association (WSAVA)** Small Animal Internal Medicine College of Veterinary Medicine and Biomedical Sciences Colorado State University, USA	**An Update on Canine Parvovirus Infections; The USA Perspective**
SESSION -II		
11.15 AM - 12.00 AM	**Dr. G. DHINAKAR RAJ** Director Centre for Animal Health Studies (CAHS), TANUVAS Madhavaram Milk Colony Chennai - 600 0051, India	**Canine Parvo Virus Vaccine - A Translational Sojourn**
12.00 PM - 1.00 PM	**Abstract Presentation Technical Session -I**	**Faculty, Researchers, PG, Ph.D., & UG (Final Year) Students**
SESSION -III		
2.00 PM - 3.00 PM	**ALAN RADFORD** **Professor** Veterinary Health Informatics University of Liverpool Institute of Infection and Global Health, UK	**Feline Calicivirus – A Rapidly Evolving Virus in a Slowly Changing World**
3.00 PM - 4.00 PM	**Abstract Presentation Technical Session -II**	**Faculty, Researchers, PG, Ph.D., & UG (Final Year) Students**
DAY - 2 - 01.12.2020		
SESSION- IV		
Time	**PRACTITIONER'S PERSPECTIVE**	**Problems in Infectious Disease (Viral Origin) Practice in India with Special Reference to Dogs and Cats**
9.30 AM - 9.40 AM	**Dr. Lakshmi Srinivasan** Private Veterinary Physician Hyderabad, India	
9.40 AM - 9.50 AM	**Dr. Kunal Dev Sharma** Private Veterinary Physician New Delhi, India	
9.50 AM - 9.55 AM	**Dr. J. Venkatesh** Private Veterinary Physician Chennai, India	
9.55 AM - 10.00 AM	**Dr. Ramani Jairam** Private Veterinary Physician Mumbai	

RESOURCE PERSONS

SESSION- V		
10.00 AM - 11.15. AM	**RICHARD SQUIRES** Associate Professor and **Chairman, Scientific Advisory Committee WSAVA Vaccination Guidelines** Companion Animal Medicine Discipline of Veterinary Science James Cook University Queensland 4811, Australia	**Canine and Feline Vaccinations and Main Reasons for Apparent Vaccination Failure**
11.15 AM - 12.00 PM	**RICHARD SQUIRES** Associate Professor Companion Animal Medicine Discipline of Veterinary Science James Cook University Queensland 4811, Australia	**A Special Talk on "Unusual Clinical Manifestations of Canine Leptospirosis"**
SESSION - VI		
12.00 PM – 12.45 PM	**Dr. P.V. TRESAMOL** Associate Dean College of Veterinary and Animal Sciences, KVASU, Mannuthy Thrissur, Kerala, India	**Canine Rabies-Control Strategy for India**
12.45 PM – 01.45 PM	**Abstract Presentation Technical Session - III**	**Exclusively for Private Practitioners and Vets from State Animal Husbandry Veterinary Services**
SESSION – VII		
2.00 PM - 2.30 PM	**Dr. VISHAL CHANDER** Scientist, Virology Lab., Centre for Animal Disease Research and Diagnosis (CADRAD) ICAR-Indian Veterinary Research Institute, Bareilly, UP, India	**Current Strategies on Infectious Canine Hepatitis in Dogs**
3.00 PM - 3.30 PM	**Dr. M. NARAYANA BHAT** Dean, Veterinary College Hebbal, Bengaluru, India	**Diagnosis and Prevention of Canine Distemper - A Relook**

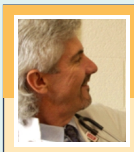
EXTENDED ABSTRACT PRESENTATION - RULES

Abstract Theme	:	Canine and Feline Infectious Diseases: Viral, Bacterial, Fungal and Parasitic Origin
Title	:	Times new Roman 14pt, Bold and Upper case
Author names	:	Times new Roman/12pt/ V. First name [1*] (Underline the name of the presenting author),V. First name [2], V. First name [3]….*Phone number and email ID of the corresponding authors are to be given Affliation[1] (Times new Roman 10pt), Address[1], Email[1] Affliation[2], address[2]….
Abstract Format	:	The extended abstract must contain the following sections: Abstract and keywords (3-5 words), introduction, methodology, results and discussion or findings, conclusion, and references. Section can be named differently and subsections can be included. The extended abstract should contain a minimum of 1000 words and a maximum of 2500 words. The extended abstract can contain figures, tables and images. Pages should not be numbered. The Research Paper should be data oriented and should reflect the major findings of the paper.
Communication	:	Authors are requested to submit Abstracts via the conference **email: pmdmvcconference@gmail.com**
Last Date for Submission	:	**25.11.2020**

AWARDS FOR BEST PAPERS

Technical Session – I (Faculty, Researchers and Students)	**MSD Animal Health Awards** MSD Animal Health	**Best Abstract Presentation - Cash Awards for Rs. 10,000**
Technical Session – II (Faculty, Researchers and Students)	**Indian Immunologicals Awards** INDIAN IMMUNOLOGICALS LIMITED	**Best Abstract Presentation - Cash Awards for Rs. 10,000**
Technical Session – III (Exclusively for Private practitioners and State Animal Husbandry Veterinary Services)	**Indian Immunologicals Awards** INDIAN IMMUNOLOGICALS LIMITED	**Best Abstract Presentation - Cash Awards for Rs. 10,000**
Technical Sessions	**Veterinary Preventive Medicine MVC Award**	**OVER ALL BEST PAPER AWARD**

ABOUT THE SPEAKERS

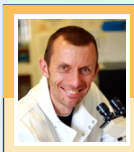


Dr. MICHAEL LAPPIN
Professor, Small Animal Internal Medicine
College of Veterinary Medicine and
Biomedical Sciences, Colorado State University, USA

Dr. Lappin graduated from Oklahoma State University and then completed his internship and PhD program at the University of Georgia. Dr. Lappin is the director of the "Center for Companion Animal Studies" and also the chair of the 'WSAVA One Health Committee'. His principal areas of interest are prevention of infectious diseases, the upper respiratory disease complex, infectious causes of fever, infectious causes of diarrhoea, and zoonoses. His research group has published over 300 primary papers, book chapters concerning small animal infectious diseases. His awards include the Norden Distinguished Teaching Award, NAVC Small Animal Speaker of the Year, the European Society of Feline Medicine International Award for Outstanding Contribution to Feline Medicine, the Winn Feline Research Award, the ACVIM Robert W. Kirk Award for Professional Excellence, the WSAVA Scientific Achievement Award, and the AVMA Clinical Research Award.

Dr. G. DHINAKAR RAJ
Director, Centre for Animal Health Studies
Tamil Nadu Veterinary and Animal Sciences University
Madhavaram Milk Colony, Chennai - 600 051

He is the Director, Centre for Animal Health Studies at TANUVAS. Earlier he established the unique Translational Research Platform for Veterinary Biologicals (TRPVB) which is a partnership programme between TANUVAS and Department of Biotechnology, GoI for commercialization of research for the benefit of farmers. He has several awards to his credit, some of them include the Tamil Nadu Scientist Award (1994); DBT-National Bioscience Award (2007); He is the first veterinarian to obtain the DBT- Tata-innovation fellow (2012) and TANUVAS Best Researcher Award (2012). He has been the Principal Investigator (PI) of more than 20 external funded projects and Co-PI in 21 external funded schemes. He has more than 240 publications and has guided 6 Ph. D, 9 M. V. Sc, 5 M. Phil and 1 M. Tech student. He has filed 11 patents and has been granted one. He has been involved in the commercialized 18 products from TANUVAS and TRPVB. He has fostered collaborations with 13 national institutions and 3 international institutions. He is a member of the DBT Task Force and played a significant role in establishing the Veterinary Incubation Foundation (VIF) @TANUVAS.



ALAN RADFORD, BSc, BVSc, PhD, MRCVS
Professor of Veterinary Health Informatics
University of Liverpool, Institute of Infection
and Global Health, UK

Dr. Alan graduated from University of Liverpool in UK with degrees in veterinary science and molecular biology. He did his internship in Small Animal Medicine in Dublin and PhD in Liverpool on the evolution of feline calicivirus. Since then he has continued using "next generation" sequence data to understand the biology of infectious diseases. Alan helped in establishing the Small Animal Veterinary Surveillance Network (SAVSNET). SAVSNET collects large volumes of companion animal electronic health data from veterinary practitioners and diagnostic laboratories across the UK and generates real-time data on diseases. These are collated centrally, and used for research and surveillance. Recent projects include demographics, ticks, babesiosis, antibacterial use, fly strike, and vaccination. Quarterly surveillance reports are published in the Veterinary Record.

Dr. RICHARD A. SQUIRES
PhD, DVR, Dip ACVIM, Dip ECVIM-CA,
Prof. of Companion Animal Medicine,
Discipline of Veterinary Science,
James Cook University, Queensland 4811, Australia
World Small Animal Veterinary Association's
Chairman, Scientific Advisory Committee
WSAVA Vaccination Guidelines

Dr. Richard graduated from Bristol veterinary school in England, obtained clinical training at the Universities of Cambridge and Pennsylvania and research training at Glasgow. He is a Diplomate of both the American and European Colleges of Veterinary Internal Medicine and holds the Royal College of Veterinary Surgeons Diploma of Radiology. His PhD involved a hunt for canine retroviruses. He held faculty positions at the Universities of Liverpool, Pennsylvania, Wisconsin and at Massey University in New Zealand. Most of his research has been on canine and feline infectious diseases. In New Zealand, he taught and carried out research in veterinary virology for 5 years. Richard was a member of the World Small Animal Veterinary Association's Scientific Advisory Committee from 2008 – 2019. He has been a member of the WSAVA Vaccination Guidelines Group since 2010 and recently became chair of that committee.

Dr. P.V. TRESAMOL, M.V.Sc & Ph.D
Associate Dean, College of Veterinary and
Animal Sciences, Mannuthy, Kerala

Dr. P.V. Tresamol has her expertise in the field of infectious diseases of livestock, companion and wild animals and birds. She graduated from College of Veterinary and Animal Sciences, Mannuthy and Post graduation from Madras Veterinary College. During the period of 26 years of service as a faculty, she was associated with teaching, research and extension activities in the field of Veterinary Epidemiology and Preventive Medicine. She has handled 20 research projects as principal/Co-principal investigator and has guided 40 PG scholars and 3 doctoral scholars as major/minor advisor. She organized various seminars, training programmes, health camps and disease outbreak investigations in University and in the field and she is recipient of several national and state awards. She has published around 140 research articles in various national and international journals.

Dr. VISHAL CHANDER
Scientist, Virology Laboratory, IVRI

Dr. Vishal graduated from College of Veterinary and Animal Sciences, Palampur and his Master's from IVRI. He joined as a Scientist during 2009 and is working at Virology Laboratory, CADRAD, ICAR-IVRI, in the area of surveillance, epidemiology and diagnosis of different viral diseases of Livestock, companion and wild animals. His area of interest is infectious diseases of animals and has focused on development of diagnostics, vaccines and therapeutics against different viral pathogens of animals. He is presently working on canine vaccines and understanding the events of pathogenesis of infectious canine diseases. The main emphasis is on the molecular epidemiology of various canine pathogens including canine adenovirus causing infectious canine hepatitis. He has filed a patent on a novel canine parvo virus vaccine candidate.

Dr. M. NARAYANA BHAT
Dean, Veterinary College, KVAFSU
Hebbal, Bengaluru – 560 024

Dr. Narayana Bhat was graduated from UAS, Bangalore and completed his MVSc from Bangalore and Ph. D. programme from TANUVAS, Chennai. He has 35 years of teaching and research experience. Dr. Bhat acted as Director, Institute of Wildlife Veterinary Research, Head of Division, Veterinary Clinical Science, KVAFSU, Professor and Head of Department of Veterinary Clinical Complex, Veterinary Medicine, and Veterinary Preventive Medicine, Veterinary Colleges of Bengaluru and Hassan. He acted as a Chief Editor, Frontier Journal of Veterinary and Animal Sciences (Official Journal of KVAFSU, Bidar). His awards include Soumya Nayakamma Gold Medal in Veterinary Medicine, best Ph.D. Thesis Award and best paper awards. He has published around 55 research and 50 extension articles on various infectious diseases.

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Registration Link for e-Conference: https://forms.gle/uYEuEoc28SD2qu6T7

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Registration Criteria

Who can register?

1. Veterinary faculty
2. Veterinary Private Practitioners & Vets from State AH Veterinary Services
3. Veterinary UG (Final Year), PG and PhD students
4. Scientists working on canine and feline infectious diseases and epidemiology

Note:

1. Registration Fee: Free
2. Login ID , Meeting ID, Password and link will be provided to your registered mail after registration
3. Registration cut-off date: **Before 6.15 Pm on 29.11.2020**

e- certificate and e- compendium(ISBN number) will be sent to the registered mail after successful completion of all the sessions and submission of feedback form.

A Hard Copy of the certificates will be sent to your communication address (Conditions Apply)

Canine and Feline Vaccinations including Main Reasons for Apparent Vaccination Failures

Richard A. Squires,
Discipline of Veterinary Science,
James Cook University,
Townsville, QLD, Australia.

Introduction

The most recent companion animal vaccination guidelines that consider the needs of both dogs and cats worldwide were produced by the World Small Animal Veterinary Association (WSAVA) Vaccination Guidelines Group (VGG) and published in the *Journal of Small Animal Practice* in January 2016.[1] The most recent guidelines dealing with dogs only were published in 2017 by the American Animal Hospital Association (AAHA) and slightly updated in 2018.[2] The AAHA guidelines are primarily intended for North American readers but parts of the document are more broadly relevant. This year, 2020, AAHA teamed up with the American Association of Feline Practitioners (AAFP) and produced updated feline vaccination guidelines.[3] Other valuable guidelines have been published by the European Advisory Board on Cat Diseases (ABCD).[4]

Although these groups develop their guidelines independently of one other, there is much consensus in their recommendations.[5] All of these guidelines include multiple tables that provide the fine details about when and how to use vaccines to best effect. The WSAVA guidelines contain more than 100 frequently asked questions. These tables and FAQs are well worth careful scrutiny. Table 1, below, provides links to the guidelines produced by these organisations and also shows the dates guidelines were published, going back to the first ones produced by AAFP in 1998.

Table 1: List of organisations that have published vaccination guidelines over the last two decades.

Name of organization	Publication dates for guidelines	Species covered	Link to their most recent guidelines
AAFP	1998, 2000, 2006, 2013	Cats	https://journals.sagepub.com/doi/pdf/10.1177/1098612X13500429
AAHA/AAFP	2020	Cats	https://catvets.com/guidelines/practice-guidelines/aafp-aaha-feline-vaccination
AAHA	2003, 2006, 2007, 2011, 2017	Dogs	https://www.aaha.org/guidelines/canine_vaccination_guidelines.aspx
WSAVA	2007, 2010, 2016	Both	https://www.wsava.org/guidelines/vaccination-guidelines
ABCD	2009, 2013, 2015, 2017	Cats	http://www.abcdcatsvets.org/guidelines/

Abbreviations: AAFP, American Association of Feline Practitioners; AAHA, American Animal Hospital Association; WSAVA, World Small Animal Veterinary Association; ABCD, European Advisory Board on Cat Diseases.

The latest WSAVA Vaccination Guidelines are freely available in multiple languages via the WSAVA website (https://www.wsava.org/guidelines/vaccination-guidelines). At that address there are additional resources, including some for owners and breeders. The same is true of the updated AAHA/AAFP feline vaccination resources page.

Potted history about companion animal vaccination guidelines

The previously-widespread practice of vaccinating every adult dog and cat against "everything" every year was never based on scientific evidence of need.[6] In the early days of canine distemper vaccines, the possible need for repeated vaccination(s), beyond the primary puppy course, was discussed vigorously by veterinarians but little scientific evidence was available for consideration. There was some early evidence of robust, long-lasting protection afforded by vaccination against distemper[7] and next to nothing to the contrary. Nevertheless, a few sets of guidelines were developed from the 1970s onwards, based loosely on what was being done by practitioners (mostly in North America), rather than upon scientific evidence or basic immunological principles. A few pet owners and many veterinary immunologists knew that annual revaccination against "everything" was not soundly based upon evidence, but their concerns, writings[8] and public statements on the subject were largely ignored.

In 1991-1993 it was first recognised that feline leukaemia virus and rabies vaccines could (rarely) cause injection site sarcomas in cats. These rare tumours were very difficult to manage successfully and often led to the cat's death. Later, it was shown that other vaccines and injected substances could also cause these malignancies (feline injection site sarcomas; FISS). The veterinary profession in USA responded within a few years by producing guidelines for the use of vaccines in cats that were more science-based than had previously been the case. The American Association of Feline Practitioners (AAFP) was, unsurprisingly, the first professional group to produce such a set of guidelines (in 1998). The AAHA followed soon afterwards (2003) with canine vaccination guidelines. The first WSAVA Guidelines (authored by the Vaccination Guidelines Group; VGG) were published in 2007. European cat experts have subsequently produced the excellent ABCD guidelines (Advisory Board on Cat Diseases).

Core and non-core vaccines

A key feature of all of these guidelines is that vaccines are classified as core (all animals should receive), non-core (optional, use is based on a risk-benefit analysis) and not recommended (insufficient evidence to justify use). Rabies vaccines should be viewed as core or mandatory for both dogs and cats in countries where rabies is endemic.

- Globally, the core vaccines for dogs protect against canine distemper virus (CDV), canine parvovirus (CPV) and canine adenovirus (CAV). Vaccines contain CAV-2, which provides protection against both CAV-1 and CAV-2.
- The main non-core vaccines available for dogs protect against canine infectious respiratory disease complex (CIRDC) and leptospirosis. The CIRDC vaccines contain one or more of *Bordetella bronchiseptica*, CAV-2 and canine parainfluenza virus. In North America, separate canine influenzavirus vaccines are available. Antigens related to other causes of CIRDC are not yet included. There are numerous different non-core leptospira vaccines containing from 1 to 4 different serovars, protecting against members of 1 to 4 different serogroups. In many countries, veterinarians recommend that every dog should be protected against leptospirosis. In some countries, non-core vaccines to protect against *Borrelia burgdorferi* are available.
- The canine enteric coronavirus vaccine is not recommended by WSAVA, nor AAHA, because of insufficient evidence of efficacy.

- Globally, the feline core vaccines protect against feline panleukopenia virus (feline parvovirus; FPV), feline herpesvirus-1 (FHV-1) and feline calicivirus (FCV).

- There are multiple non-core feline vaccines protecting against *Chlamydia felis*, feline leukaemia virus (FeLV) and (in some countries) feline immunodeficiency virus (FIV).
- The vaccine intended to protect cats against feline infectious peritonitis (FIP) is designated as not recommended by WSAVA and AAHA/AAFP because of insufficient evidence of efficacy.

- Other not recommended vaccines against Giardia and ringworm are available for dogs and or cats in some countries.

The most recent updates to the WSAVA VGG guidelines

For those familiar with previous guidelines, the most significant updates in the latest WSAVA guidelines[9] are as follows:

1. The recommended timing of the last primary kitten and puppy vaccine is adjusted upwards from 14–16 weeks of age to 16 weeks of age or later. The decision to make this change was based on further evidence from the field that maternal antibodies can sometimes cause interference, in both puppies and kittens, even at 14 weeks of age and beyond.[10-12] Indeed, in one rather alarming peer-reviewed publication, 36.7% of kittens did not seroconvert to feline parvovirus after vaccination at the ages of eight, 12 and 16 weeks.[12] In another study, a total of 15%, 44% and 4% of repeatedly-vaccinated kittens had insufficient serological evidence of active immunity against FPV, FHV and FCV, respectively, at 17 weeks of age.[10] Interestingly, on this particular topic, less published evidence is available for puppies than for kittens.[11]

THESE SOMETIMES LONG-LASTING, INTERFERING MATERNAL ANTIBODIES CAN PREVENT SUCCESSFUL IMMUNIZATION, AND ARE CONSIDERED TO BE THE MAJOR CAUSE OF APPARENT VACCINATION FAILURES IN MANY COUNTRIES. In many cases of apparent vaccination failure, the final puppy / kitten vaccination was given too early, before the animal reached the age of 16 weeks.

2. The “first annual booster” is reconsidered, including its name, in light of what it is thought to actually achieve immunologically. Its main purpose is to immunize the minority of animals that failed, earlier, to respond actively to one or more vaccine components, even if vaccinated at 16+ weeks of age. This failure is almost invariably a consequence of passively-transferred, maternal interfering antibodies. WSAVA guidelines recommend that the “first annual booster” BE RECONSIDERED AND RESCHEDULED EARLIER, MOVING IT FROM 12–16 MONTHS TO 6–12 MONTHS OF AGE. This vaccination should be renamed and considered as the last of the “puppy or kitten vaccinations”. Why should we leave the window of opportunity for these pathogens open for longer than is necessary in those unfortunate individuals that failed to mount an active immune response earlier?

3. “Low risk” and “high risk” situations and feline lifestyles are more thoroughly described. Spending time in a boarding cattery is now explicitly designated as “high risk”. This has implications for the use of feline respiratory virus vaccines. FHV and FCV vaccine should be given annually to cats that regularly visit boarding catteries. Administration of the vaccine in the weeks leading up to the cattery visit, rather than (say) many months earlier would be advisable.

4. There is updated consideration of the possible anatomical sites for injection of vaccines (perhaps in particular adjuvanted vaccines) in cats. This includes brief consideration of distal tail vaccination. Tail vaccination has been reported to be surprisingly well tolerated by cats.[13] The distal limbs are another suitable site, strongly recommended in the latest AAHA/AAFP guidelines.[3]

5. The guidelines are much more thoroughly referenced, although there is scope for further improvement. Quality of evidence is considered using a novel system specifically developed by the authors for use in veterinary vaccinology.

Antibody testing

Antibody testing (or "titre testing") relies upon the detection of antibodies in the patient, generally in its serum, to judge whether it is already protected against disease and therefore does not need to be revaccinated. Antibody testing is used extensively in humans, for example to determine whether a previously-vaccinated person needs revaccination against rabies. The use of antibody testing in companion animals is an extension of its use in humans. Some clients would not want themselves or their children unnecessarily vaccinated or revaccinated if they were already protected. They would not want to take the (albeit usually small) risk of an adverse event. They would be prepared to pay "extra" to find out their status and only receive vaccination or revaccination if required. Indeed, they may have no choice in the matter. The medical system may require this approach to be taken. Some clients extend their views about vaccination of human family members to their dogs and cats. Some veterinarians feel strongly that vaccination in the face of pre-existing immunity is an unnecessary, potentially harmful medical procedure. Others cite the low incidence of serious vaccine-associated adverse effects[14] and are less concerned.

Titre testing is only relevant to <u>some</u> of the vaccines we administer. That is because antibody presence correlates reliably with protection (at least in one direction, presence indicating protection) only for some infectious agents. Titre testing is most relevant to FPV and the three canine core vaccines (those against the CPV-2 variants, canine adenoviruses 1 and 2, and canine distemper virus, CDV). For these viruses, presence of antibody in an adult reliably predicts that the animal is protected. Animals that lack antibody, or have so little that the test in use cannot detect antibody, may nevertheless be protected by memory B cells or cellular immunity, but the safest assumption in that situation would be that the animal lacks protection, and therefore should be revaccinated out of an abundance of caution. Antibodies against feline herpesvirus-1 and feline calicivirus are, overall, less reliable indicators of protection against disease and are not widely used to make judgements about the need, or otherwise, for revaccination of adult cats against these viruses.

For the moment, antibody testing is relatively expensive, but it is becoming increasingly convenient and less expensive for veterinarians to choose this option if they or their clients are inclined to do so. The risk of vaccinating dogs unnecessarily with core, non-rabies vaccines has been reported to be very low[14] but this does not discourage some owners from requesting "titre testing".

"Titre testing" is another example of a name that we should encourage to disappear soon (along with "first annual booster"). Most veterinarians would find "quantitative antibody testing" and "qualitative antibody testing" more straightforward and self-explanatory. A titre is a measure of dilution, in this case, of serum antibodies. Strictly speaking, titre testing is quantitative antibody testing, done mostly in diagnostic laboratories. If a large concentration of an antibody is present in serum, the serum can be diluted a great deal, for example, 640-fold in the case of CPV (a "high titre") and the effects of that antibody (for example, virus neutralization or inhibition of haemagglutination) can still be detected. Laboratories can provide a true antibody titre, if the veterinarian needs to know the amount of antibody present. In contrast, an increasing number of in-practice antibody detection tests report only positive /

negative results, so the use of the word “titre” in that setting is inappropriate. In addition, for some important vaccine-preventable diseases, mere *presence* of detectable antibody (not the amount) in adult animals is reported to correlate with robust protection. So the in-practice, qualitative tests that produce a positive or negative result can be of substantial practical value. We often do not require the rigour of quantitation. Conversely, the titre (or amount) of antibody *does* matter a great deal in puppies and kittens, before they mount their own active immune responses. A large amount (i.e. a high titre) of maternally-derived antibody would interfere more and for longer with attempts to immunize than would a smaller amount (or lower titre) of antibody.

Further well-written details about the indications and interpretation of qualitative (plus/minus) antibody test results can be found in the AAHA guidelines, here:
https://www.aaha.org/guidelines/canine_vaccination_guidelines/antibody_testing.aspx

References

1. Day MJ, Horzinek MC, Schultz RD, et al. WSAVA Guidelines for the vaccination of dogs and cats (Printed Summary). J Small Anim Pract 2016;57:4-8.
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DEPARTMENT OF VETERINARY PREVENTIVE MEDICINE
MADRAS VETERINARY COLLEGE

International
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AN INTEGRATED APPROACH TO ELIMINATE CANINE AND FELINE VIRAL DISEASES IN INDIA

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DEPARTMENT OF
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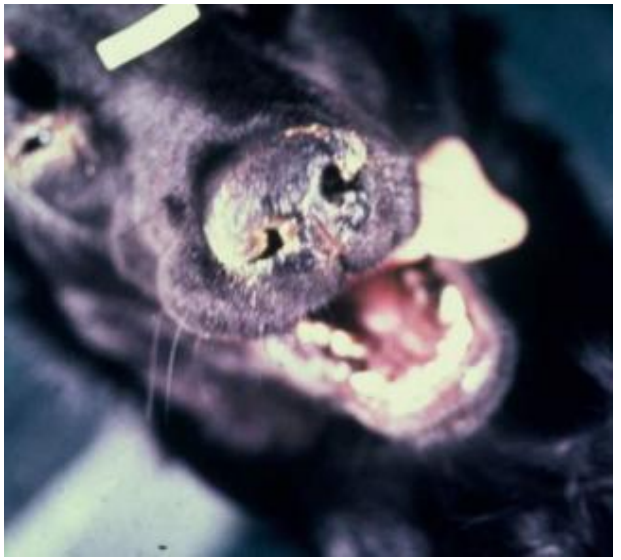
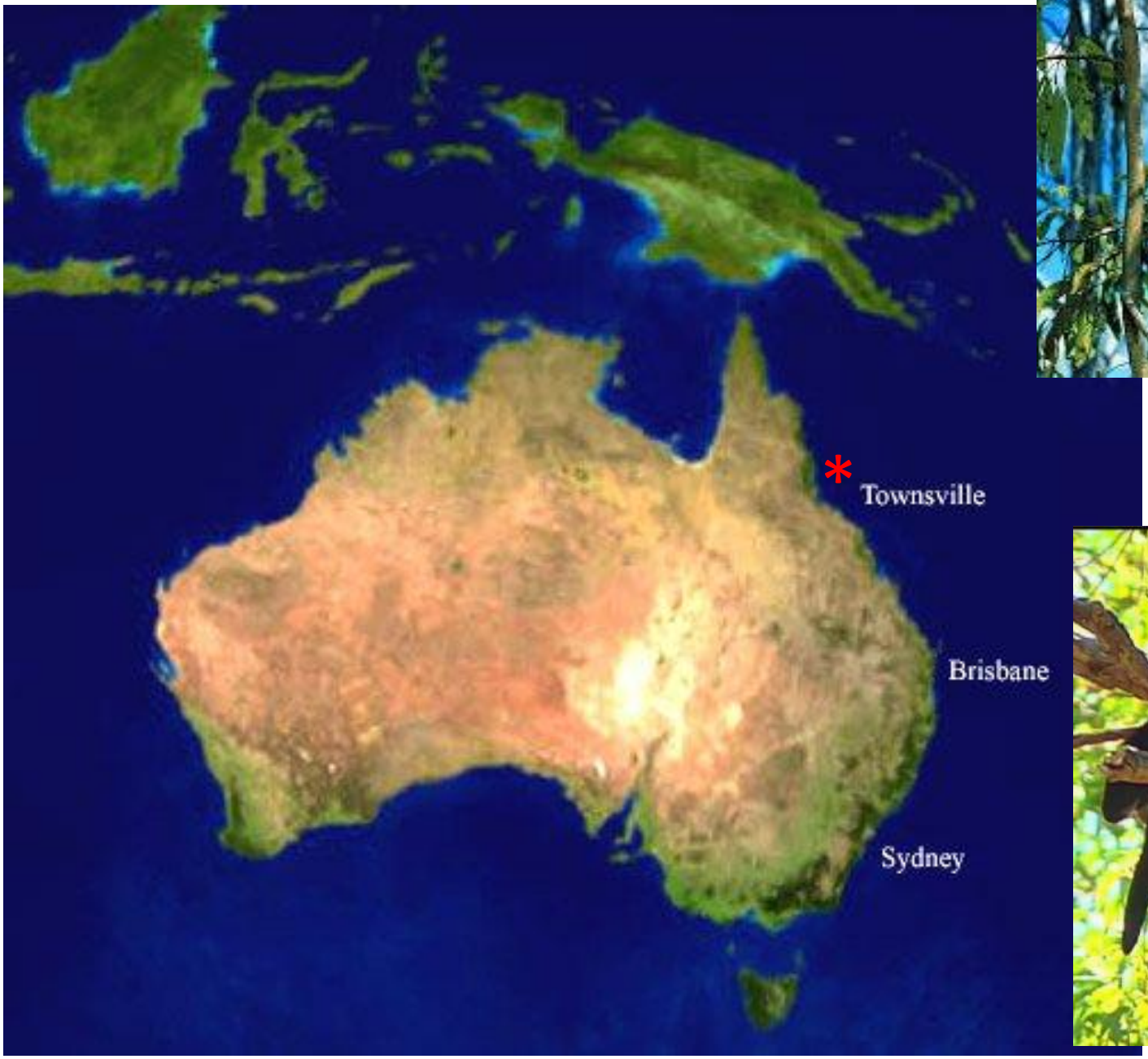
Canine and Feline Vaccinations including Main Reasons for Apparent Vaccination Failures



Richard A. Squires
Veterinary Clinical Sciences,
James Cook University,
Queensland, Australia.


Townsville
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VGG

WSAVA Global Veterinary Community | Vaccination Guidelines Group

GUIDELINES FOR THE VACCINATION OF DOGS AND CATS

COMPILED BY THE VACCINATION GUIDELINES GROUP (VGG) OF THE WORLD SMALL ANIMAL VETERINARY ASSOCIATION (WSAVA)

M. J. Day[1], M. C. Horzinek[2], R. D. Schultz[3] and R. A. Squires[4]

[1]University of Bristol, United Kingdom

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[3]University of Wisconsin-Madison, Wisconsin, USA

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http://www.wsava.org/guidelines/vaccination-guidelines

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Journal of Small Animal Practice • Vol 57 • January 2016 • © 2016 WSAVA

Journal of Feline Medicine and Surgery (2013) 15, 540–544

SPECIAL ARTICLE

ABCD

MATRIX VACCINATION GUIDELINES
ABCD recommendations for indoor/ outdoor cats, rescue shelter cats and breeding catteries

Margaret J Hosie, Diane Addie, Sándor Belák, Corine Boucraut-Baralon, Herman Egberink, Tadeusz Frymus, Tim Gruffydd-Jones, Katrin Hartmann, Albert Lloret, Hans Lutz, Fulvio Marsilio, Karin Möstl, Maria Grazia Pennisi, Alan D Radford, Etienne Thiry, Uwe Truyen and Marian C Horzinek

Overview: This article presents, in a user-friendly, tabluated form, the ABCD's current vaccination recommendations for four broad categories of cats: outdoor cats (ie, those with access outdoors that come into contact with other cats outdoors); indoor cats (ie, those with no contact with other cats from outdoors); rescue shelter cats; and cats in breeding catteries. Note that it is not always possible to make a clear distinction between these various categories and the definition in any individual case is left up to the veterinary surgeon conducting the vaccination interview.

Introduction

It was evident during the preparation of the complete ABCD vaccination guidelines that no single vaccination protocol would be appropriate for all cats across Europe. Rather, it is important to conduct a vaccination interview in order to devise a vaccination strategy appropriate to the lifestyle, geographical location and disease risks relevant to each feline patient. These matrix vaccination guidelines were compiled to assist veterinary surgeons during the vaccination interview, summarising the ABCD's vaccine recommendations. The 'core' vaccines should be administered to all cats, whereas 'circumstantial' vaccines are required under specific circumstances (for example, for cats travelling to areas where rabies is endemic, or cats with outdoor access and therefore at risk of infection with FeLV), and 'non-core' vaccines are recommended only for cats at risk of specific infections.

AAHA The Standard of Veterinary Excellence

For veterinary professionals and their practice teams.

AAHA Canine Vaccination Guidelines

Revised 2017

- Home
- Vaccination Recommendations for General Practice
- Frequently Asked Questions
- Lifestyle-Based Vaccine Calculator
- Antibody Testing Versus Vaccination
- Rabies Vaccination
- Overdue for Vaccination
- Vaccine Adverse Reactions
- Vaccination Recommendations for Shelter-Housed Dogs
- Licensing of Vaccines
- Vaccine Storage & Handling
- The Vaccine Label
- Vaccine Types
- Therapeutic Biologics
- Legal Considerations
- Resources
- References

2017

Revised September 5, 2017

The American Animal Hospital Association is pleased to introduce the first online (mobile-ready) version of the Canine Vaccination Guidelines. By converting to a web-based format, the Canine Vaccination Task Force is enabled to provide timely updates on vaccination recommendations, references, and newly licensed biologics for use in dogs in clinical practice and shelters in the United States and Canada.

The guidelines were prepared by a task force of experts convened by the American Animal Hospital Association. The information in this website is intended as a guideline only, not an AAHA standard of care. These guidelines and recommendations should not be construed as dictating an exclusive protocol, course of treatment, or procedure. Variations in practice may be warranted based on the needs of the individual patient, resources, and limitations unique to each individual practice setting. Evidence-based support for specific recommendations is cited whenever possible and appropriate.Other recommendations are based on established immunological principles, practical clinical experience, and expert consensus. Further research is needed to document some of these recommendations. Because each case is different, veterinarians must base their decisions on the available scientific evidence in conjunction with their own knowledge and experience.

Variance between manufacturer recommendations as they are published in the product Package Insert and Task Force recommendations occasionally occur. In each case, Task Force recommendations have been reviewed with the appropriate manufacturer(s).

AAHA Canine Vaccination Task Force

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https://www.aaha.org/guidelines/canine_vaccination_guidelines.aspx

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Serology and Diagnostics
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Not Recommended Vaccines
Staff and Client Education
Summary
References

2020 AAHA/AAFP Feline Vaccination Guidelines

Now available: Creating Individualized Feline Vaccine Protocols
Join members of the *2020 AAHA/AAFP Feline Vaccination Guidelines* task force for a free, RACE-approved webinar on creating individualized feline vaccine protocols.

For a printable PDF, click here.

On a mobile device? Scroll down for the navigation menu.

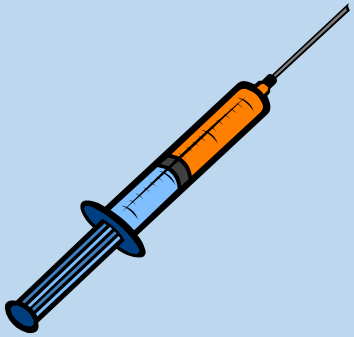
Abstract

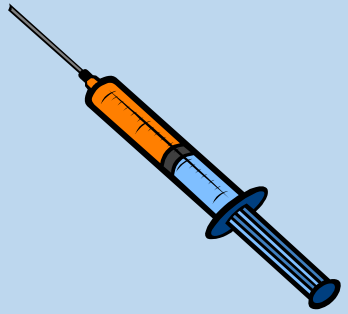
The guidelines are a consensus report on current recommendations for vaccination of cats of any origin, authored by a Task Force of experts. The guidelines are published simultaneously in the *Journal of Feline Medicine and Surgery* (volume 22, issue 9, pages 813–830, DOI: 10.1177/1098612X20941784) and the *Journal of the American Animal Hospital Association* (volume 56, issue 4, pages 249–265, DOI: 10.5326/JAAHA-MS-7123). The guidelines assign approved feline vaccines to core (recommended for all cats) and non-core (recommended based on an individualized risk-benefit assessment) categories. Practitioners can develop individualized vaccination protocols consisting of core vaccines and noncore vaccines based on exposure and susceptibility risk as defined by the patient's life stage, lifestyle, and place of origin and by environmental and epidemiologic factors. An update on feline injection-site sarcomas indicates that occurrence of this sequela remains infrequent and idiosyncratic. Staff education initiatives should enable the veterinary practice team to be proficient in

https://www.aaha.org/aaha-guidelines/2020-aahaaafp-feline-vaccination-guidelines/feline-vaccination-home/

Outline of this talk

- Core and non-core vaccines
- List the key take-home points
- Background: how did we get here?
- More scrutiny of those key points
- Q & A





Core and non-core vaccines

Core vaccines protect against…

- Canine distemper virus
- Canine adenovirus (1 & 2)
- Canine parvovirus-2 variants
- Rabies virus (where it is endemic)

All puppies should receive core vaccines, if at all possible, and all adult dogs should be managed in a way that maintains robust immunity against these infectious agents for life

Non-core vaccines (optional)

- Canine parainfluenzavirus
- Canine influenzavirus(es) (North America)
- *Bordetella bronchiseptica*
- *Leptospira* serovars (contents vary by region)

Not recommended

- Canine enteric coronavirus

Core vaccines protect against…

- Feline parvovirus (FPV)
- Feline herpesvirus-1 (FHV-1)
- Feline calicivirus (FCV)
- Rabies virus (where it is endemic)

All kittens should receive core vaccines, if at all possible, and all adult cats should be managed in a way that maintains robust immunity against these infectious agents for life

Non-core vaccines (optional)

- Feline leukaemia virus (FeLV)
- *Chlamydia felis*
- *Bordetella bronchiseptica* (some markets)
- Feline immunodeficiency virus (FIV)

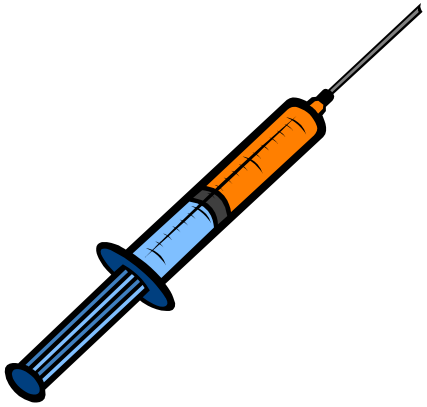
Not recommended

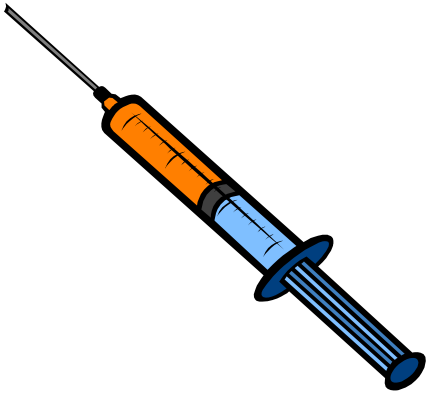
- Feline infectious peritonitis
- Giardia

List of key take-home points about canine and feline vaccines and vaccinations

What are the key points?

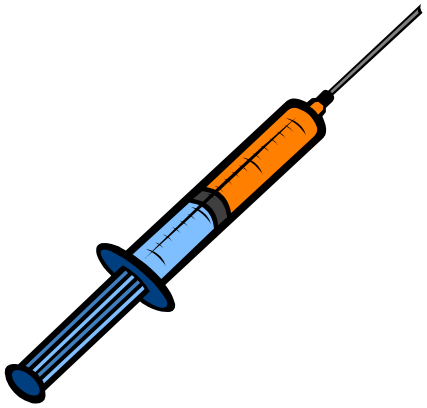
1. Good quality, well kept canine core vaccines and FPV vaccine provide very long-lasting protection. Non-core vaccines, much less so
2. The last of the “primary” kitten and puppy vaccines should be given ***no earlier than*** 16 weeks of age.
3. The “first annual booster” (so-called) should be reconsidered. It should be delivered at 26 - 52 weeks of age

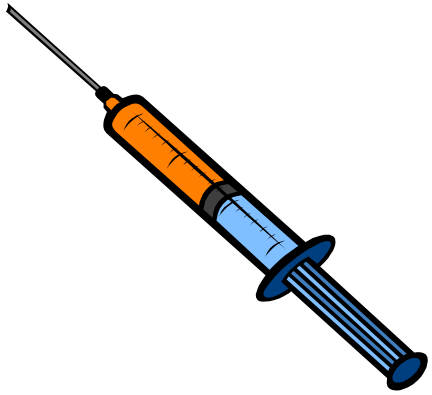




What are the key points?

4. “Low risk” and “high risk” lifestyles of cats need to be considered. This is especially relevant to the core feline respiratory virus vaccines, FHV-1 and FCV.
5. Anatomical sites for injection of vaccines into cats need to be reconsidered with safety in mind





Background:

how did we get to this point?

Vaccine hesitancy is not new

From The Lancet, May 2019

Editorial

Vaccine hesitancy: a generation at risk

Vaccine hesitancy, which is defined by WHO as a "delay in acceptance or refusal of vaccines despite availability of vaccination services", has been reported in more than 90% of countries in the world. In many areas, immunisation for measles, a vaccine-preventable disease that was largely eliminated following widespread use of the measles-mumps-rubella (MMR) vaccine, has decreased to less than the 95% threshold set by WHO as that required for herd immunity.

In the UK, for example, coverage of the MMR vaccine decreased to 91·2%, the fourth annual decline in a row and to its lowest level since 2011–12. In the USA, the percentage of children aged 19–35 months who received the MMR vaccine slightly decreased from 91·6% general public, and implementing policies that reduce the public health risks associated with vaccine hesitancy. WHO/Europe created the Guide to Tailoring Immunization Programmes that considers the need to tailor any intervention to account for the diverse reasons that make parents reluctant to vaccinate their children. Some countries have implemented specific sanctions for such families, and school entry requirements including specific vaccinations have been normal public health practice for many years. France has made vaccination with 11 vaccines mandatory for children—unvaccinated children cannot be enrolled at nurseries or schools. In Australia, parents of children who are not vaccinated are denied the universal Family Allowance welfare payments.

Carol Phanie/Science Photo Library

For **WHO tools to address vaccine hesitancy** see https://www.who.int/immunization/programmes_systems/vaccine_hesitancy/en/

Vet jabs kill our pets, say dog lovers

by JO KNOWSLEY

Vaccine damage: Hylda Reynolds with her dachshund Hannah, who she believes was left crippled following booster jabs

DOGS are being crippled and even killed by the annual veterinary jabs intended to protect them from disease, a study says.

The Canine Health Census, which conducted the survey of 2,700 dogs, claims the animals are up to 13 times more likely to succumb to a range of illnesses and disease if they are given annual vaccinations. In some cases the reaction is so severe that they die, or must be put down.

The main vaccines are against diseases such as hepatitis, leptospirosis, distemper and parvovirus. But the side-effects can range from vomiting and diarrhoea to serious illnesses such as epilepsy, arthritis and brain damage, the report claims.

It found that of dogs which had become sick, 55 per cent had done so within three months of being vaccinated, 41·75 per cent within 30 days, and 24·56 per cent within a week. The results are to be published this month in a book, *Who Killed the Darling Buds of May? What Vets Don't Tell You About Vaccines*.

Catherine O'Driscoll, who set up the Canine Health Census after her dogs died of illnesses she believes were vaccine-related, said: "Vets and vaccine manufacturers advise us to vaccinate our pets year after year and insist adverse reactions occur in only a 'tiny minority' of dogs. But we found they are much more common than that — about one in a hundred animals has some kind of reaction."

Hylda Reynolds, of Hawkhurst, Kent, says she nursed her miniature dachshunds for 13 months after they had a traumatic reaction to vaccines to prevent parvovirus, distemper and leptospirosis. Jamie, three, had to be put down because he was in so much pain while Hannah, seven, is crippled.

British veterinary authorities admit that some dogs have reactions to, and sometimes die from, the vaccines but say this is rare.

Simon Orr, president of the British Small Animal Veterinary Association, said: "These vaccines have been rigorously tested for safety and effectiveness and have dramatically reduced the outbreaks of diseases."

☐ *Canine Health Census can be contacted at PO Box 1, Longnor, Derbyshire, SK17 OJD (enclosing SAE)*

Vets – all rip-offs great and small

Booster jabs 'unnecessary' say vets

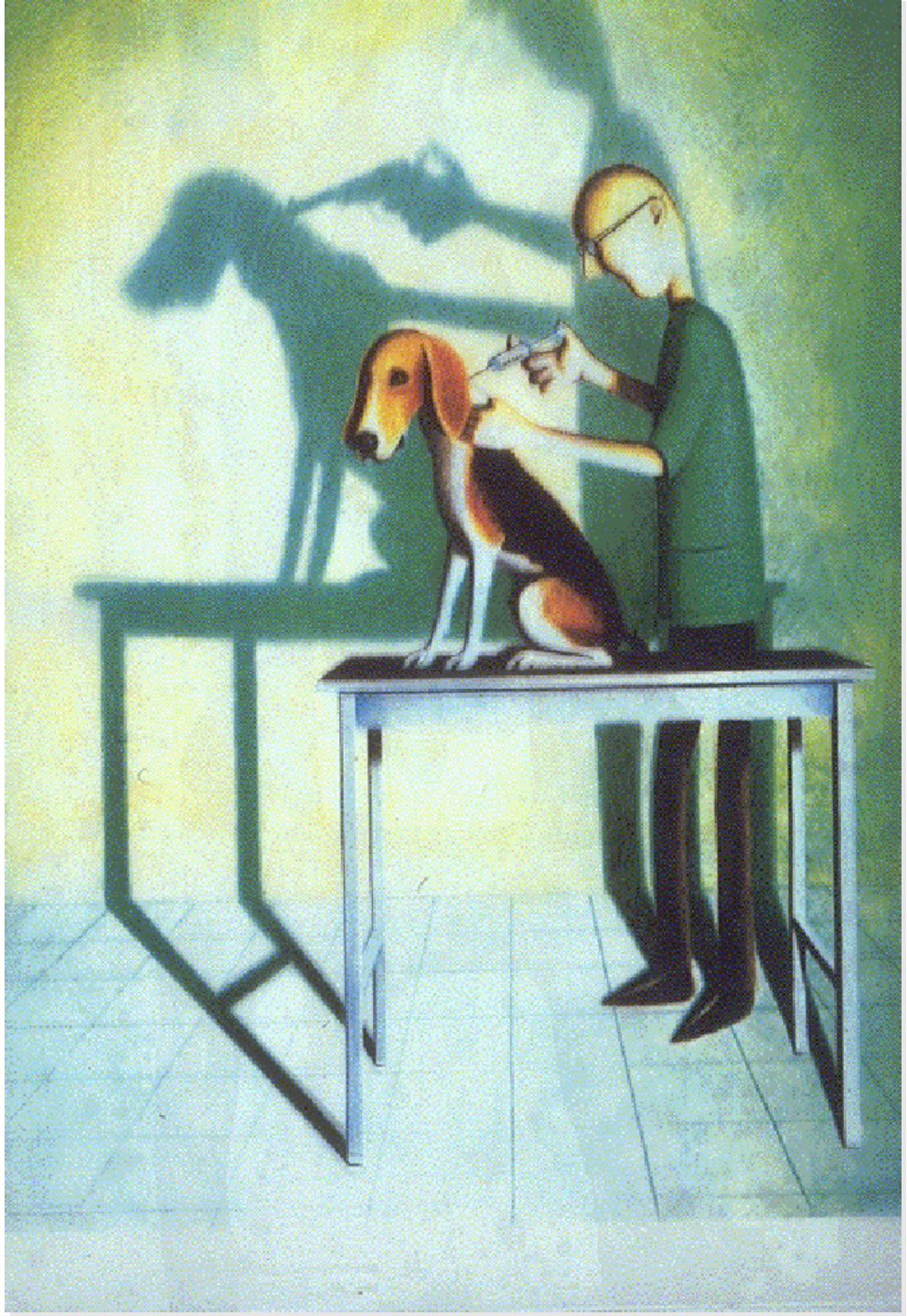
Pets' jabs are a fraud, s

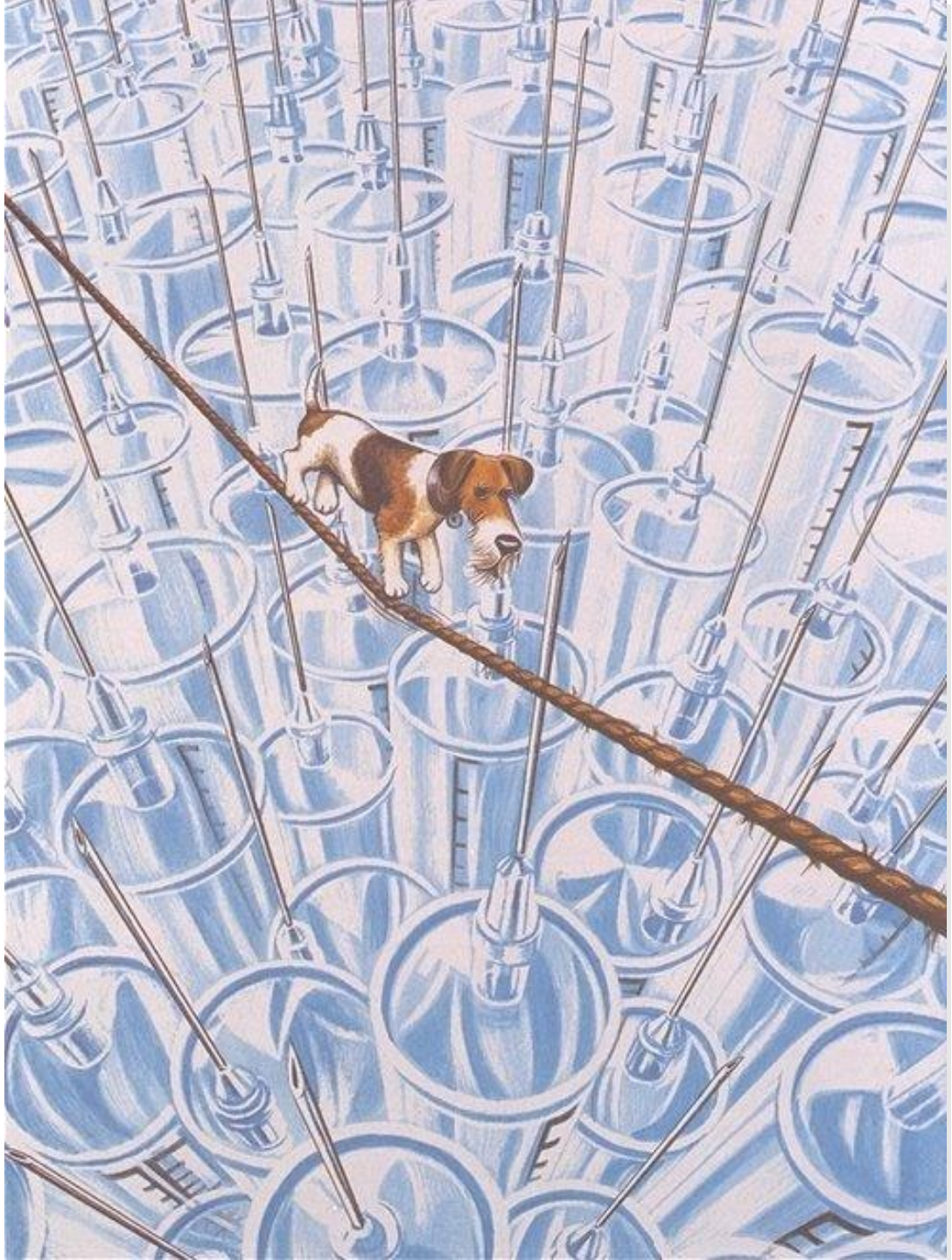
BEN GURR

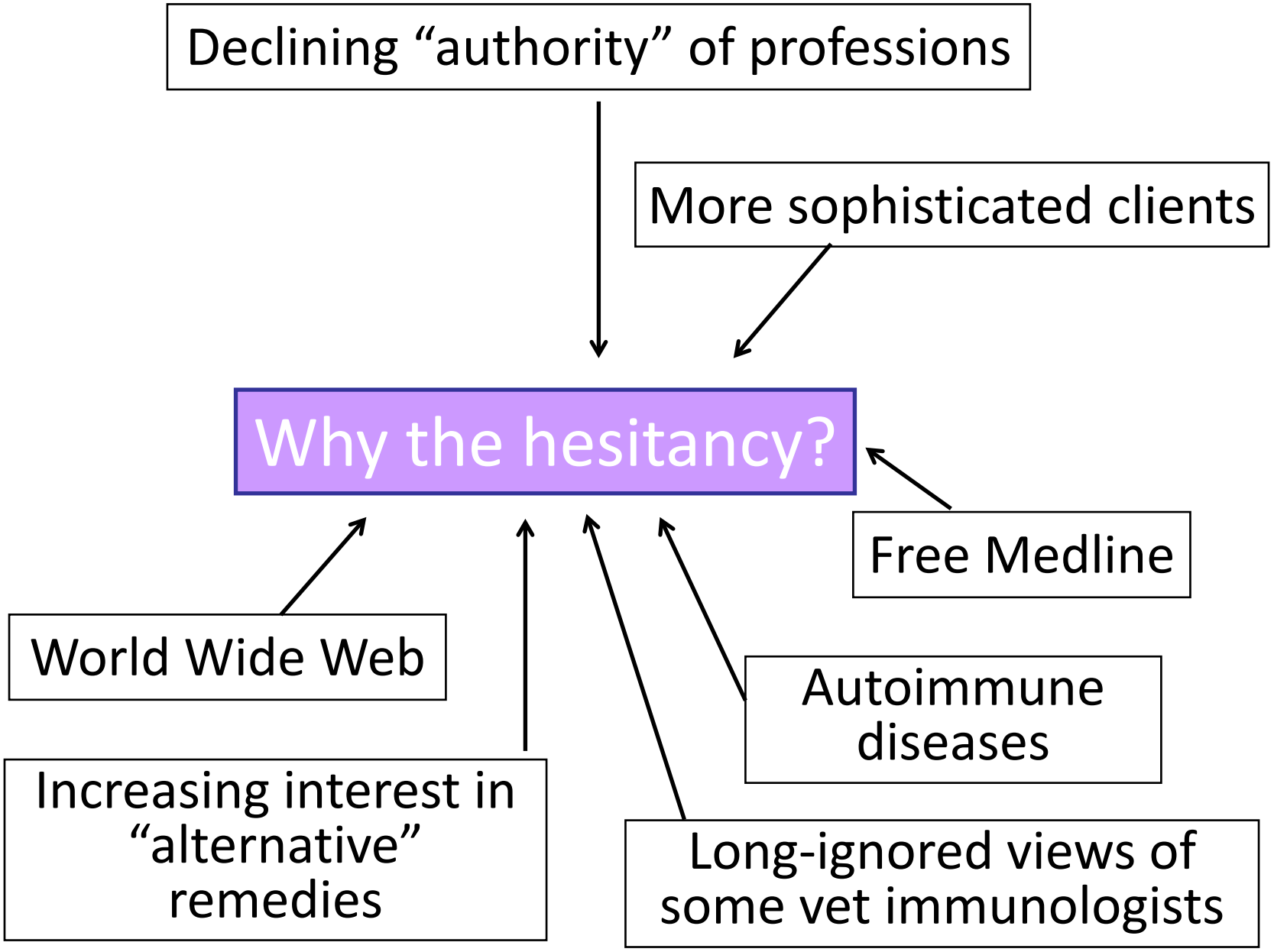
Pets

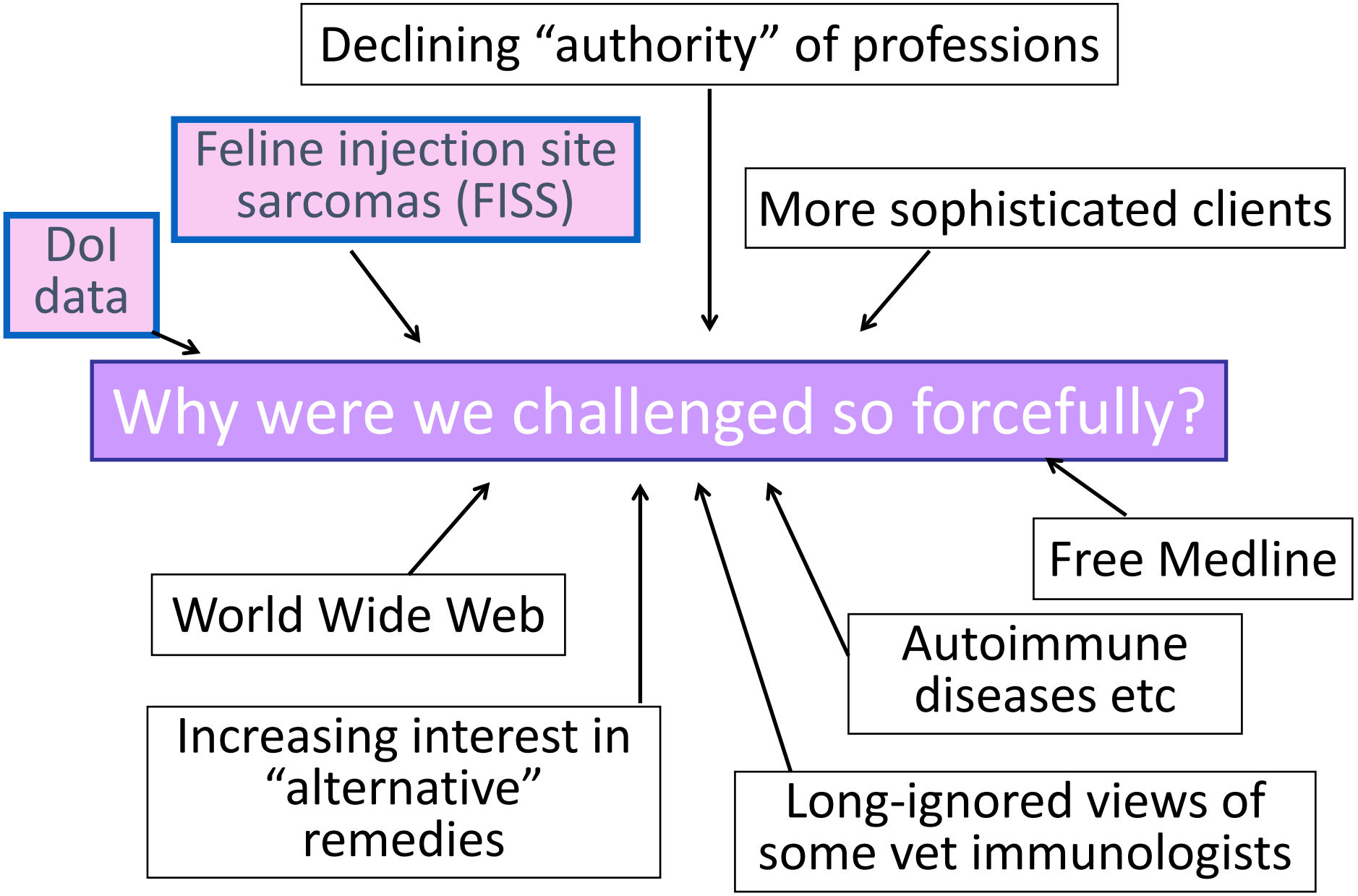
Booster jabs 'waste of money'

Owners 'wasting millions on pet jabs'

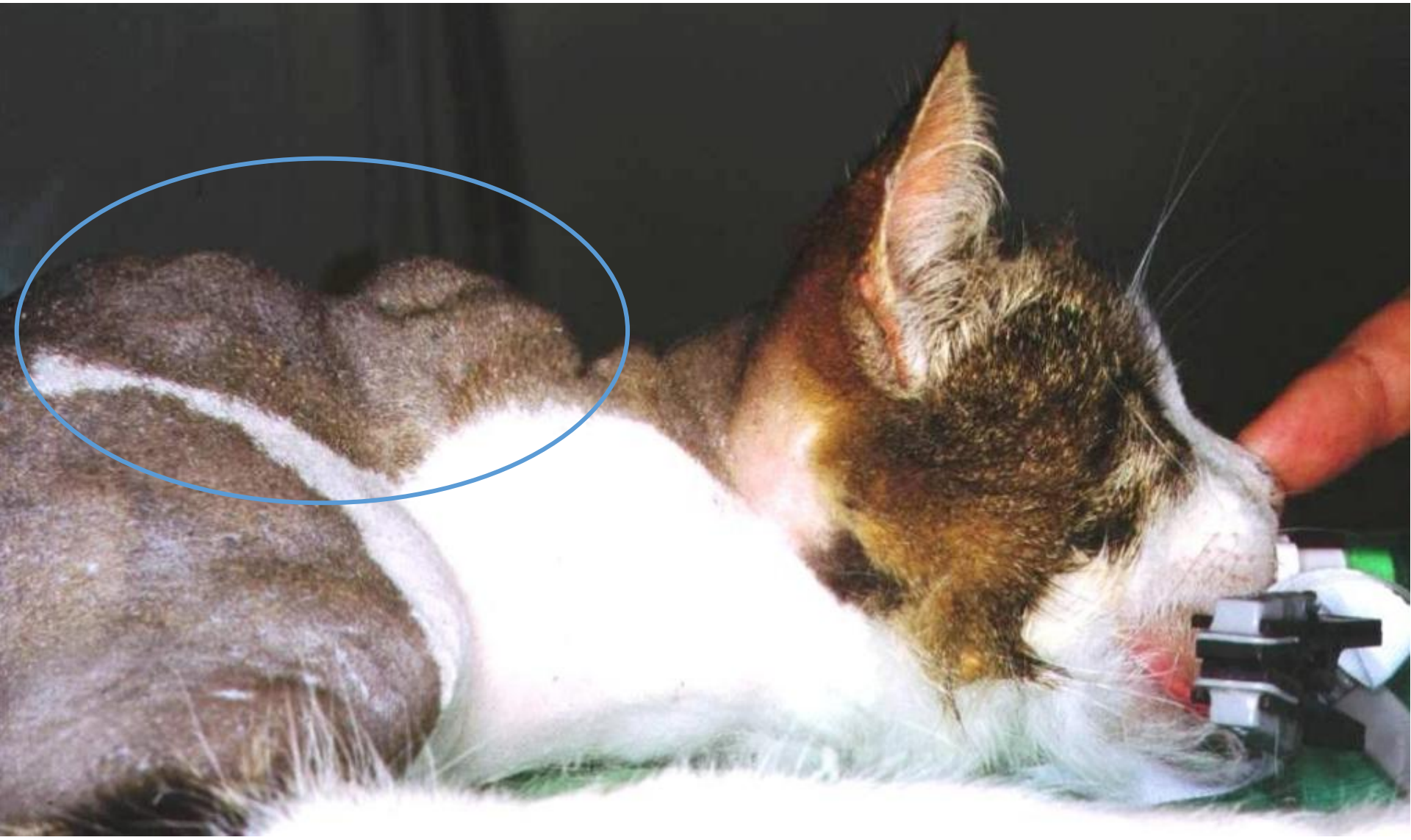





Declining “authority” of professions
More sophisticated clients
Why the hesitancy?
Free Medline
World Wide Web
Autoimmune diseases
Increasing interest in “alternative” remedies
Long-ignored views of some vet immunologists


Declining “authority” of professions
Feline injection site sarcomas (FISS)
More sophisticated clients
DoI data
Why were we challenged so forcefully?
World Wide Web
Free Medline
Autoimmune diseases etc
Increasing interest in “alternative” remedies
Long-ignored views of some vet immunologists

Evidence of harm



Injections occasionally induce fibrosarcomas in cats

Hendrick MJ, Goldschmidt MH. *Journal of the American Veterinary Medical Association* (1991) 15;199(8):968. Hendrick MJ Goldschmidt M

Epidemiologic evidence for a causal relation between vaccination and fibrosarcoma tumorigenesis in cats

Kass PH, Barnes WG, Spangler WL, *et al.*

Journal of the American Veterinary Medical Association (1993) **203:** 396-405.

Kass *et al.* 1993

- FeLV vaccine recipients were 2.78 - 5.49 times more likely to get a sarcoma at an injection site rather than elsewhere on their body
- Rabies vaccine recipients were 1.2 - 1.99 times more likely to get a sarcoma at an injection site rather than elsewhere on their body
- The more vaccines injected simultaneously, the greater the risk

Veterinary Clinics:
Small Animal Practice

March 2018

Prevention of Feline Injection-Site Sarcomas

Is There a Scientific Foundation for Vaccine Recommendations at This Time?

Philip H. Kass, DVM, MPVM, MS, PhD

KEYWORDS

• Injection-site sarcoma • Vaccines • Adverse reactions • Cat

KEY POINTS

- Authority figures have made vaccine recommendations to reduce the incidence of feline injection-site sarcomas.
- The evidence supporting these vaccine recommendations is surprisingly weak.
- Until additional research is performed, there is little evidence supporting the recommendation that use of certain vaccines will prevent sarcoma formation.

Inflammation

Adjuvant

Neoplasia

Veterinary Immunology and Immunopathology 145 (2012) 447–452

Contents lists available at SciVerse ScienceDirect

Veterinary Immunology and Immunopathology

journal homepage: www.elsevier.com/locate/vetimm

Research paper

Large-scale survey of adverse reactions to canine non-rabies combined vaccines in Japan

Kazuki Miyaji[a], Aki Suzuki[a], Hidekatsu Shimakura[a], Yukari Takase[a], Akio Kiuchi[a], Masato Fujimura[b], Goro Kurita[c], Hajime Tsujimoto[d], Masahiro Sakaguchi[a,*]

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[b] *Fujimura Animal Hospital, 5-10-26, Aomatanihigashi, Minou, Osaka 652-0022, Japan*

[c] *Kurita Animal Hospital, Furukawa, Furukawa, Ibaraki 306-0016, Japan*

[d] *Department of Veterinary Internal Medicine, Graduate School of Agricultural and Life Sciences, The University of Tokyo, 1-1-1 Yayoi, Bunkyo-ku, Tokyo 113-8657, Japan*

Other safety issues

Hydranencephaly and cerebellar hypoplasia in two kittens attributed to intrauterine parvovirus infection

Sharp NJ, Davis BJ, Guy JS, *et al.*

Journal of Comparative Pathology

121: 39-53 (1999)

"an in-utero parvovirus infection,
possibly due to vaccination" [italics mine]

Other safety issues

Outbreak of fatal salmonellosis in cats following use of a high-titer modified-live panleukopenia virus vaccine

Foley JE, Orgad U, Hirsh DC, *et al*

Journal of the American Veterinary Medical Association

(1999) **214:** 67-70.

Other safety issues

Abortion and death in pregnant bitches associated with a canine vaccine contaminated with bluetongue virus

Levings RL, Wilbur LA, Evermann JF *et al.*

Developments in Biological Standardization (1996) **88:** 219-20.

Other safety issues

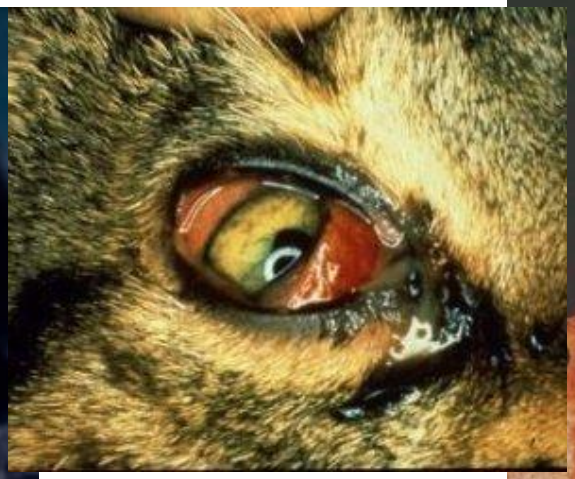
Vaccine-associated immune-mediated hemolytic anaemia in the dog

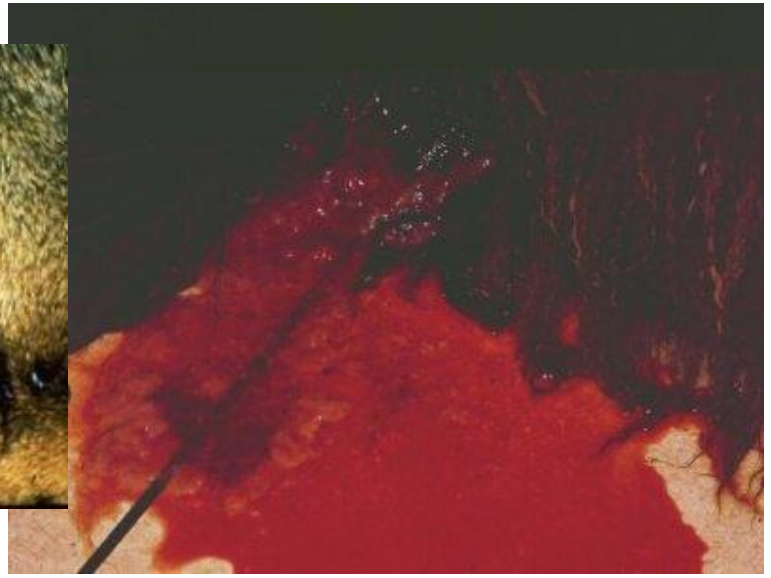
Duval D, Giger U.

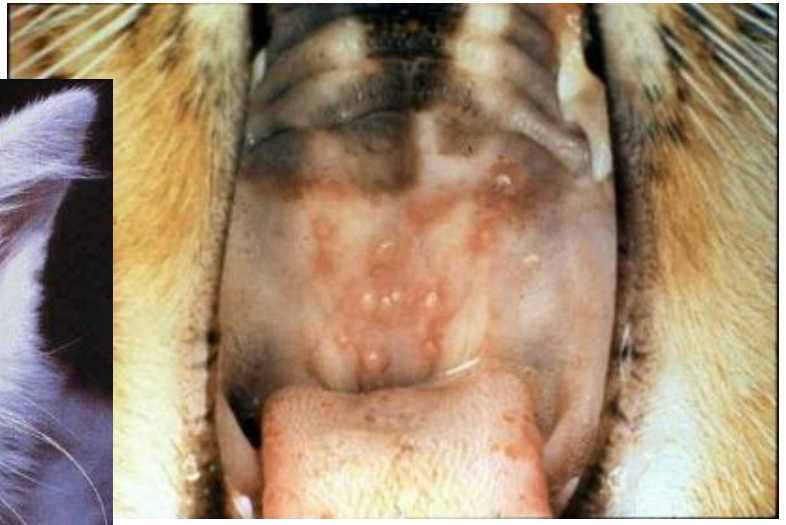
Journal of Veterinary Internal Medicine
10: 290-295. (1996)

The risks of adverse consequences are real but *small*

On the other side of the coin…







On the other side of the coin…

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Vaccine 22 (2004) 3270–3273

Vaccine

www.elsevier.com/locate/vaccine

Vaccination and ill-health in dogs: a lack of temporal association and evidence of equivalence

D.S. Edwards*, W.E. Henley, E.R. Ely, J.L.N. Wood

Animal Health Trust, Lanwades Park, Kentford, Newmarket, Suffolk CB8 7UU, UK

Received 16 September 2003; accepted 9 March 2004

"Results demonstrated that recent vaccination (<3 months) does not increase signs of ill-health by more than 0.5% and may actually decrease it by as much as 5%."

Continuing to revaccinate with core vaccines frequently

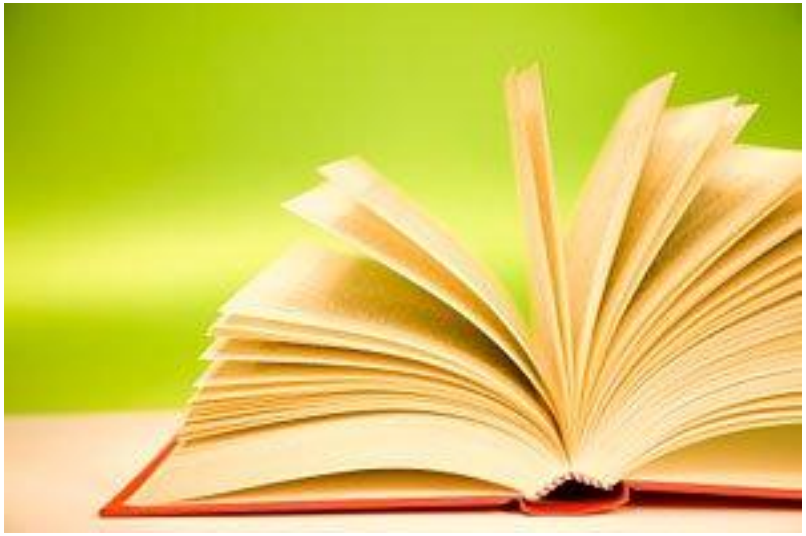
Is it safe?

Is it efficacious?

Is it scientifically justifiable?

i.e. does the necessity for <u>frequent</u> core vaccine boosters stand up to scientific scrutiny?

DoI Evidence



DoI – Dogs

37

- Studied 30 dogs imported to Iceland, where there is no canine distemper
- Last vaccine given at 6 to 16 weeks of age, 10 of 30 only ever received one shot
- Median time since last vaccine: 5.5 years
- At least 73.3% still had 'protective' titres ≥ 1:16
- That % compares favourably with dogs vaccinated annually

38

- Old study, done well, but now largely irrelevant except that it was misquoted repeatedly in the vaccination debate
- Only 5/32 had SN Abs > 1:80 at 36 months
- They used an inactivated vaccine too early to break through maternal immunity.
- In the discussion: *"...when a modified-live CPV vaccine is used... Protection is also markedly longer, at least 3 years."*

39

- Serological study of 122 dogs brought to Missouri Vet School for revaccination 271-1665 days after their last vaccination
  - 27% had "less than protective" CPV HI titres
  - 21% had "less than protective" CDV SN titres
  - Breed, sex and weight had no influence
  - Older dogs had significantly lower CPV titres
  - "Protective" titre cut-off values were extremely unconventional and were not explained

40

Duration of serologic response to five viral antigens in dogs

From Veterinary Medicine Biologicals Research and Development, Pfizer Animal Health, Pfizer Inc, 7000 Portage Rd, Kalamazoo, MI 49001

JAVMA, Vol 224, No. 1, January 1, 2004

p. 55-60

41

Duration of serologic response to five viral antigens in dogs

Pfizer. Four years…

Results—The percentage of dogs that had titers at or greater than the threshold values or responded to revaccination with a ≥ 4-fold increase in titer was 98.1% for CDV, 98.4% for CAV-1, 99.0% for CAV-2, 100% for CPIV, and 98.1% for CPV.

42

Serum antibody titres to canine parvovirus, adenovirus and distemper virus in dogs in the UK which had not been vaccinated for at least three years

M. Böhm, H. Thompson, A. Weir, A. M. Hasted, N. S. Maxwell, M. E. Herrtage

Veterinary Record (2004) 154, 457-463

43

Serum antibody titres to canine parvovirus, adenovirus and distemper virus in dogs in the UK which had not been vaccinated for at least three years

144 adult dogs that had not been vaccinated in the last 3 to15 years.

- Protective Abs to CPV present in 95%
- Protective Abs to CDV in 71.5%
- Protective Abs to CAV in 82%.

44

Serum antibody titres to canine parvovirus, adenovirus and distemper virus in dogs in the UK which had not been vaccinated for at least three years

The prevalence of protective titres did not decrease with increasing time interval from the last vaccination for any of the three diseases studied.

FPV, FHV, FCV

- Scott FW, Geissinger CM. (1997) Duration of immunity in cats vaccinated with an inactivated feline panleukopenia, herpesvirus and calicivirus vaccine. *Feline Practice* **25:** 12-19.
- Scott FW, Geissinger CM. (1999) Long-term immunity in cats vaccinated with an inactivated trivalent vaccine. *American Journal of Veterinary Research* **60:** 652-658.

Duration of serologic response to three viral antigens in cats

From Veterinary Medicine Biologicals Research and Development, Pfizer Animal Health, Pfizer Inc, 7000 Portage Rd, Kalamazoo, MI 49001

JAVMA, Vol 224, No. 1, January 1, 2004

p. 61-66

Duration of serologic response to three viral antigens in cats

Pfizer. Four years…

Results—The percentage of cats that had titers at or above the threshold values or responded to revaccination with a ≥ 4-fold increase in titer was 96.7% for FPV, 97.8% for FCV, and 88.2% for FHV.

Duration of Immunity data

CDV: Olson *et al.* (1997)

- Studied 30 dogs imported to Iceland, where there is no canine distemper
- Last vaccine given at 6 to 16 weeks of age, 10 of the 30 only ever received one vaccination
- Median time since last vaccine: 5.5 years
- At least 73.3% still had ‘protective’ titres $\geq$ 1:16
- That % compares favourably with dogs vaccinated annually

Serum antibody titres to canine parvovirus, adenovirus and distemper virus in dogs in the UK which had not been vaccinated for at least three years

M. BÖHM, H. THOMPSON, A. WEIR, A. M. HASTED, N. S. MAXWELL, M. E. HERRTAGE

Antibody titres to canine distemper (CDV), canine parvovirus (CPV) and canine adenovirus (CAV) were measured in 144 adult dogs that had not been vaccinated for between three and 15 years. Protective antibodies to CPV were present in 95 per cent of the population, to CDV in 71·5 per cent and to CAV in 82 per cent. The prevalence of protective titres did not decrease with increasing time interval from the last vaccination for any of the three diseases studied. Booster vaccination increased the dogs CAV titres. For comparative purposes, 199 puppies were sampled at the time of their first and second vaccination. In the case of CPV and CAV a significantly higher proportion of the adult dogs were protected than of the puppies immediately after they were vaccinated. Natural CPV boosting was strongly suspected because the dogs had significantly higher titres three years after their primary vaccination than two weeks after it and three unvaccinated dogs had acquired protective antibody levels uneventfully. There was no evidence of natural exposure to CDV.

Veterinary Record (2004)
154, 457-463

Serum antibody titres to canine parvovirus, adenovirus and distemper virus in dogs in the UK which had not been vaccinated for at least three years

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Duration of serologic response to five viral antigens in dogs

Douglas E. Mouzin, MS, MBA; Marianne J. Lorenzen, DVM; John D. Haworth, DVM, PhD; Vickie L. King, PhD

Pfizer. Four years…

Results—The percentage of dogs that had titers at or greater than the threshold values or responded to revaccination with a ≥ 4-fold increase in titer was 98.1% for CDV, 98.4% for CAV-1, 99.0% for CAV-2, 100% for CPIV, and 98.1% for CPV.

JAVMA, Vol 224, No. 1, January 1, 2004

Revaccination of individual adult cats and dogs – why 3 years?

Every year?

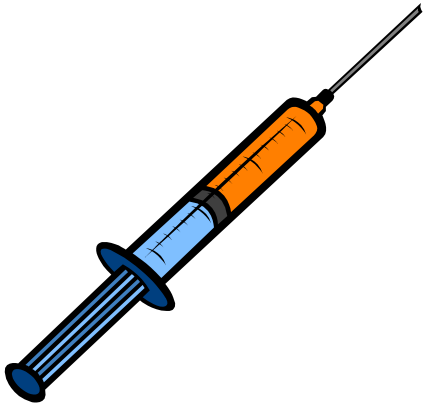
4 years?

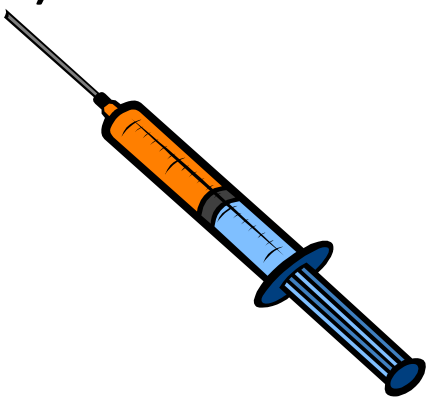
7 years?

3 years?

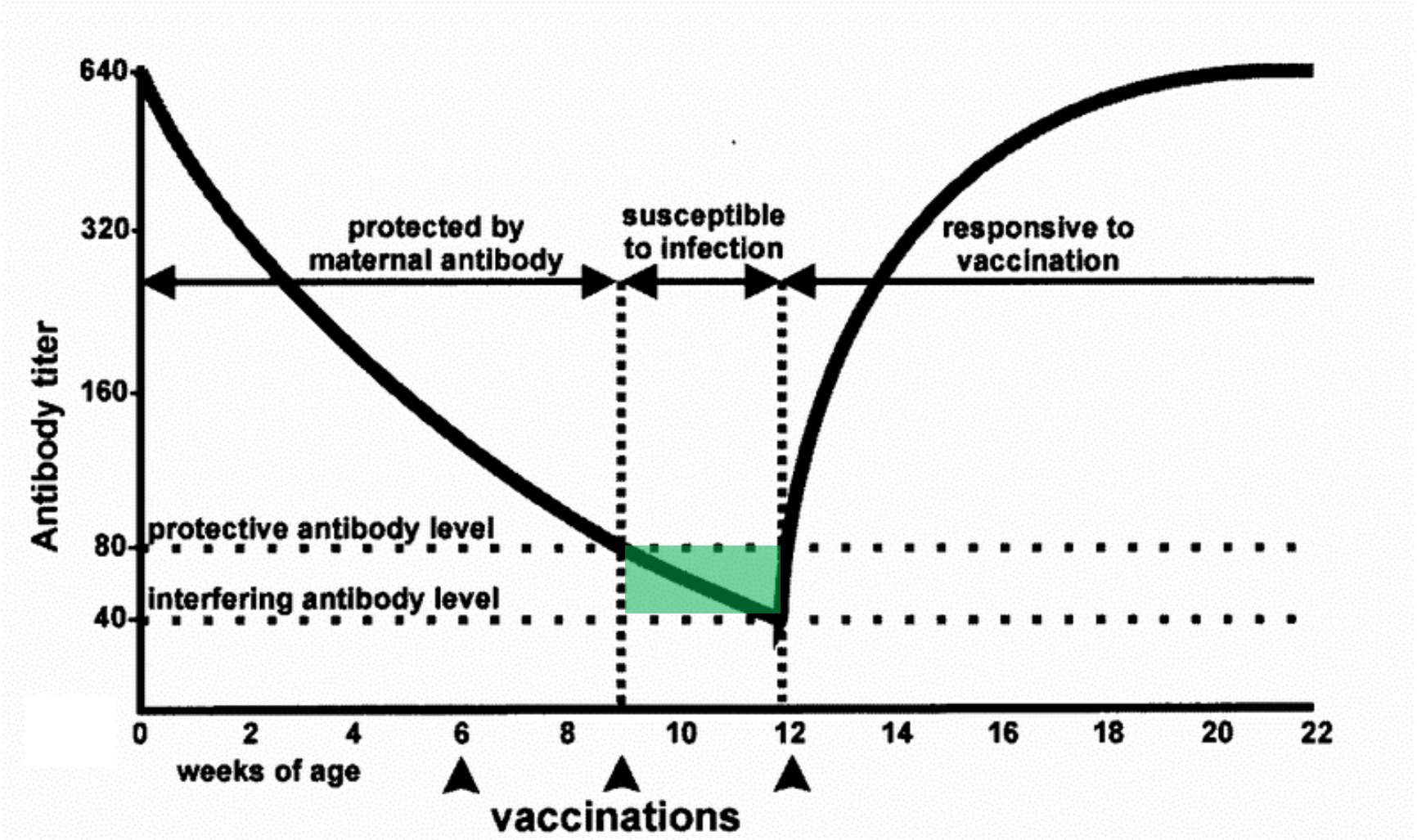
Explaining the key points

1. Last primary puppy and kitten vaccine goes up from 14 – 16 weeks to 16 weeks +
2. “First annual booster” (so called) in both species goes from 12 – 16 months to 26 – 52 weeks
3. “Low risk” and “high risk” feline lifestyles and situations are much better defined (especially relevant to the respiratory virus vaccines)



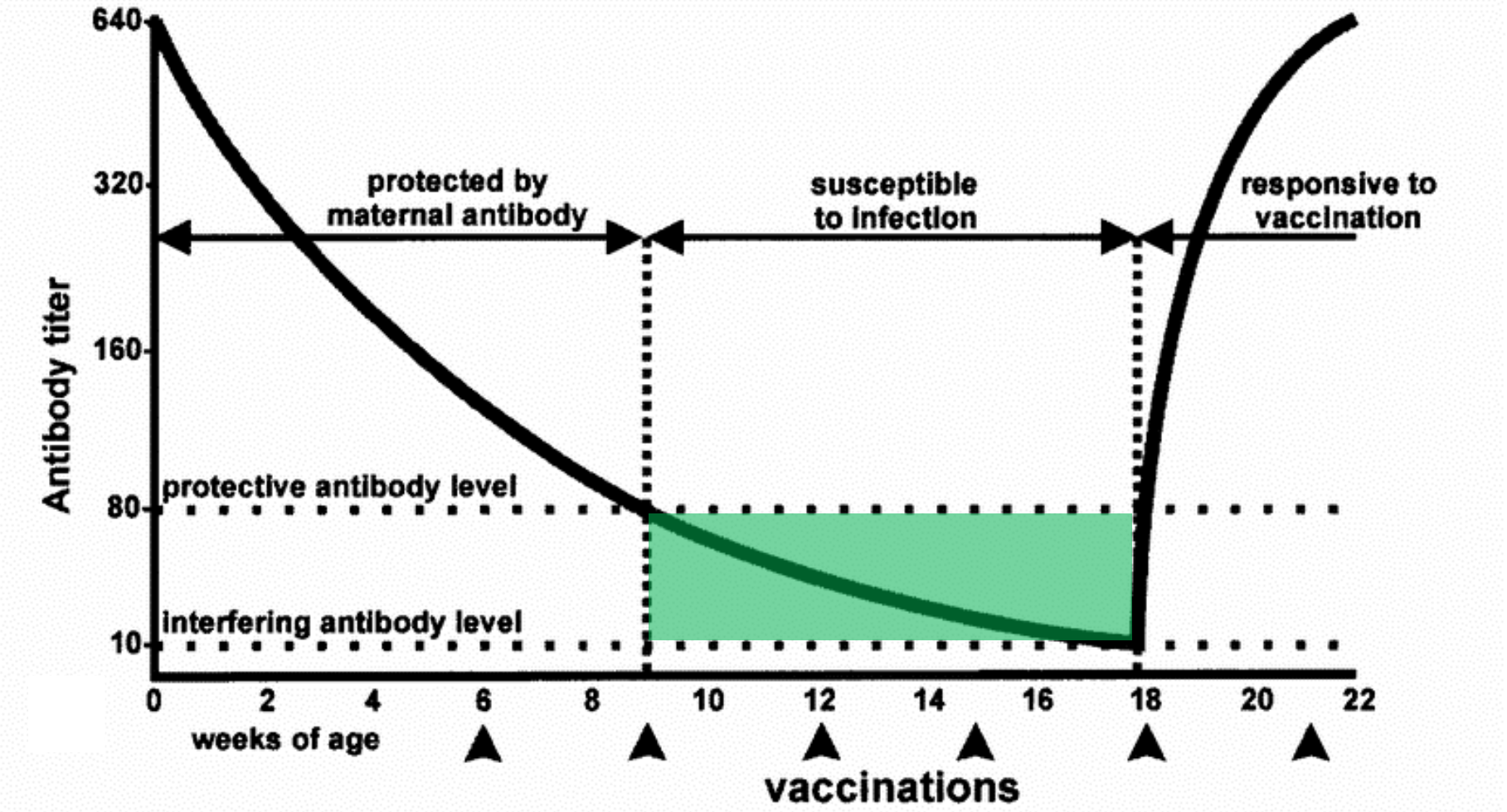


Effect of interfering maternal antibody

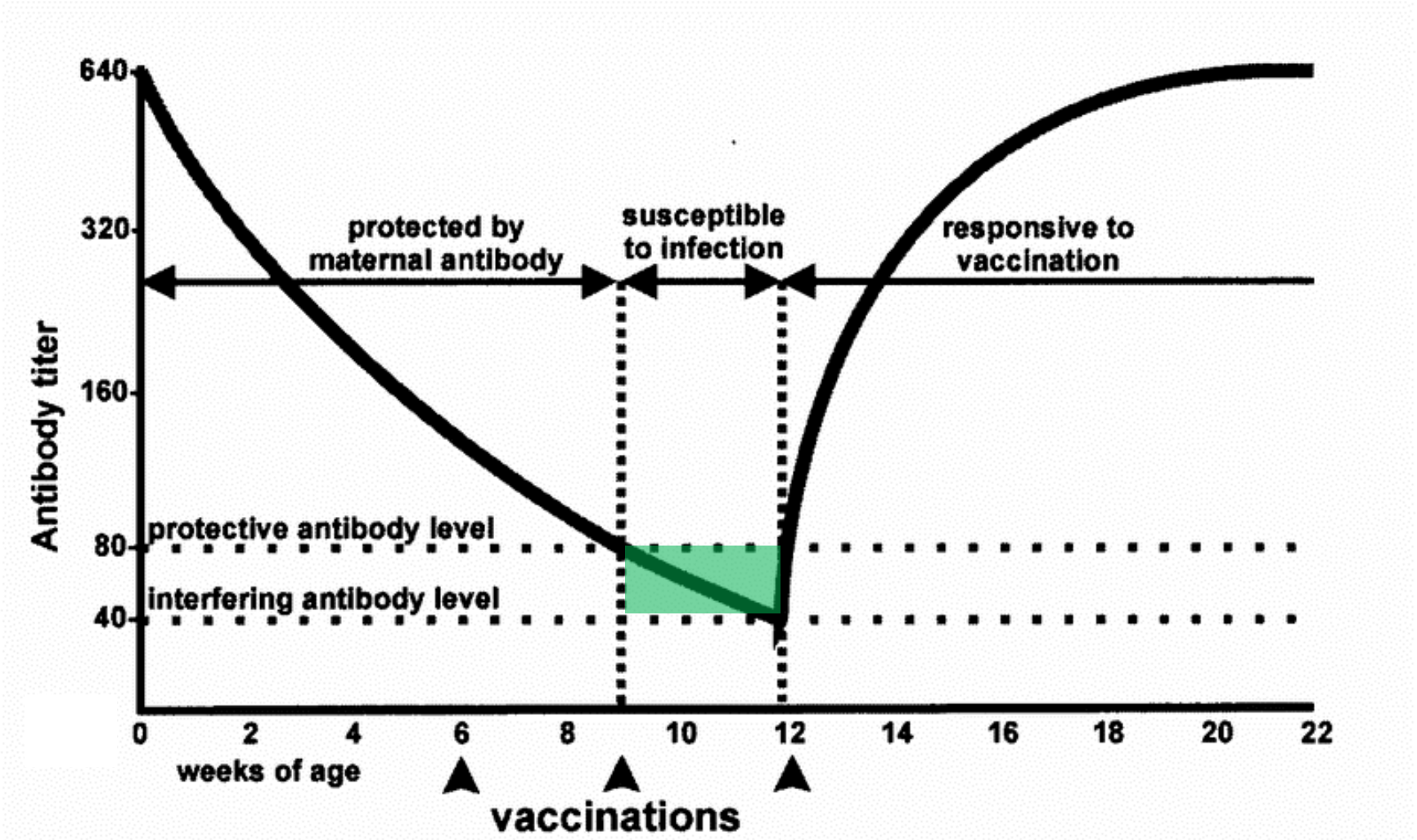


Effect of interfering maternal antibody

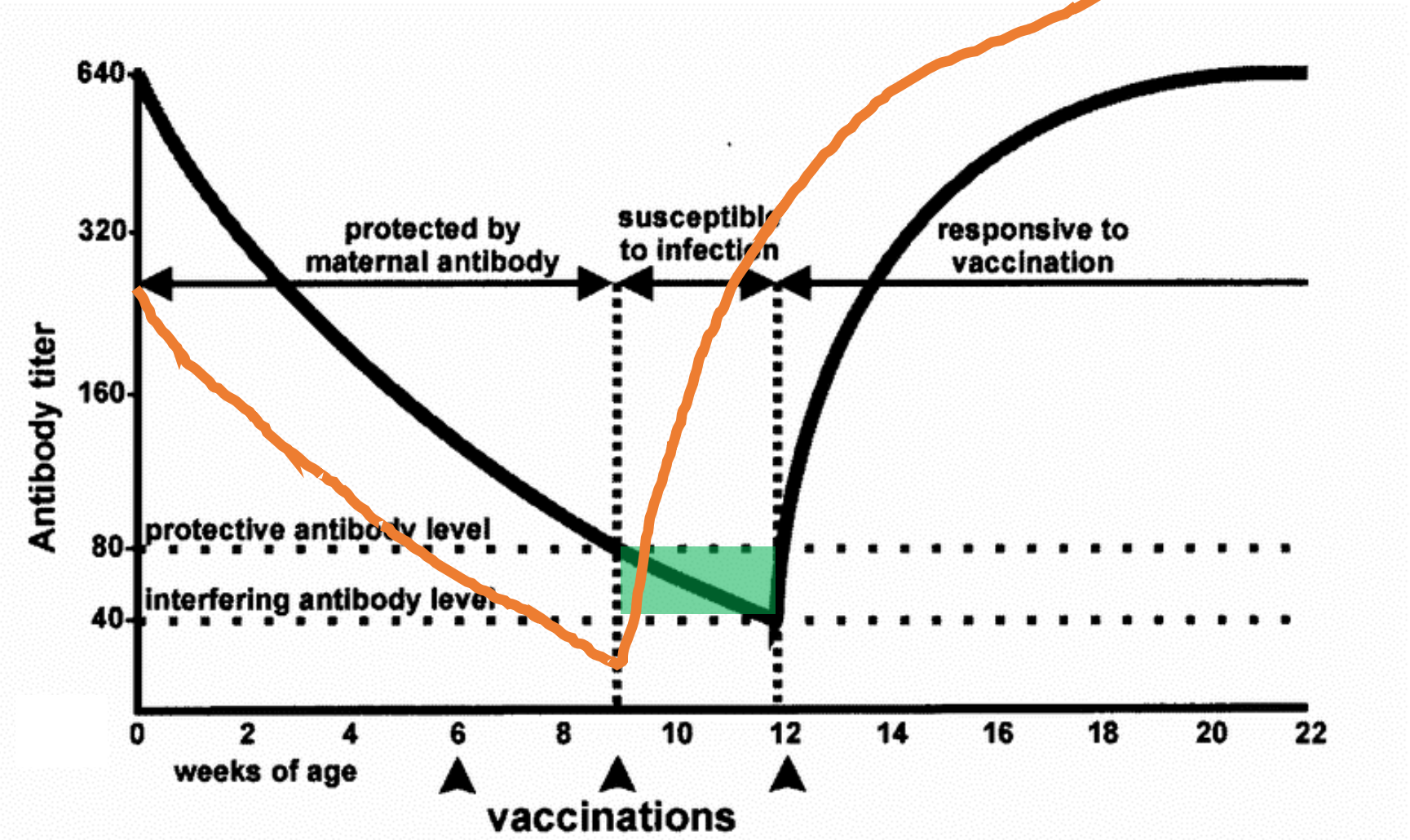
"Weaker" vaccine



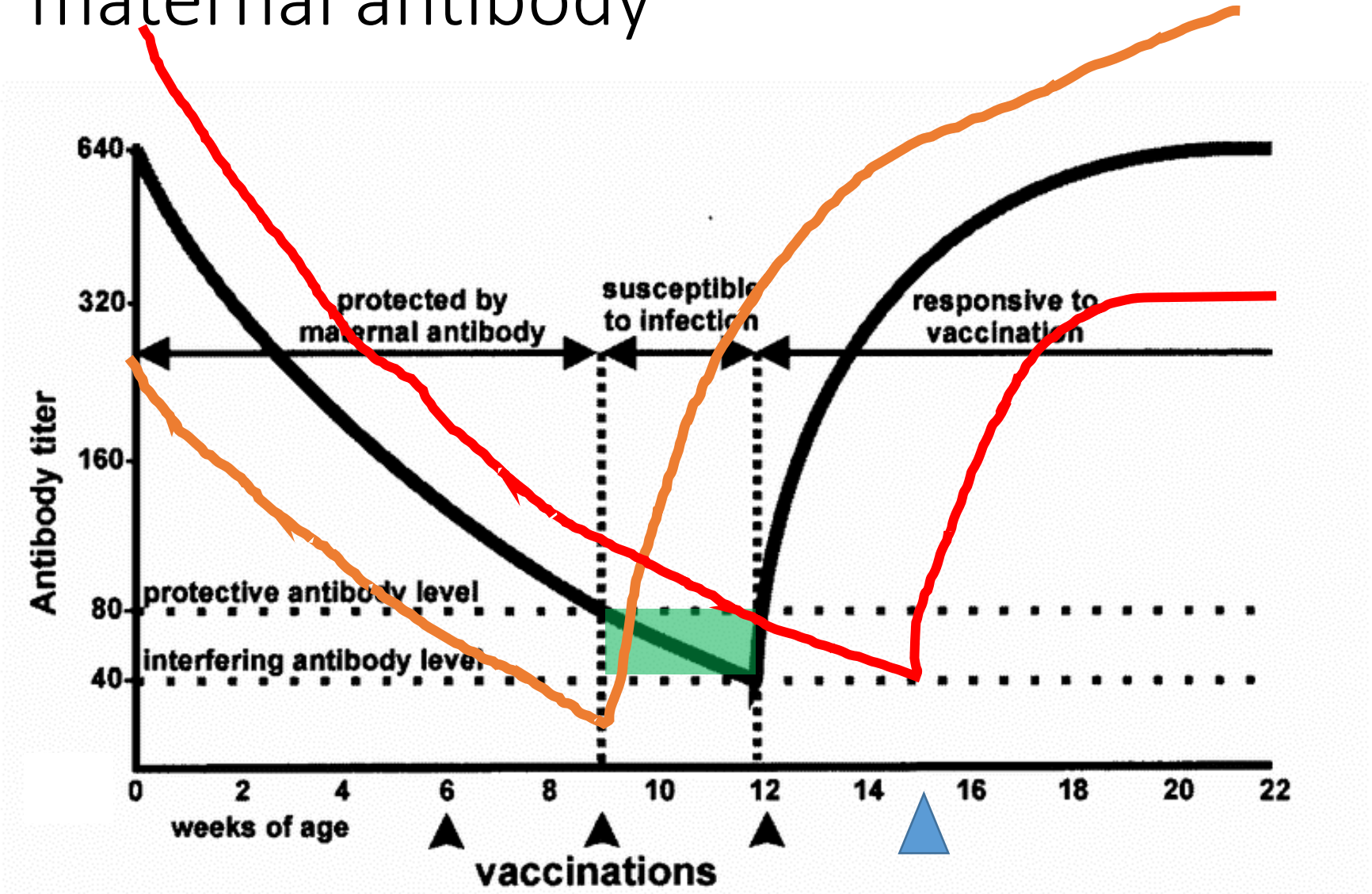
Effect of interfering maternal antibody



Effect of interfering maternal antibody



Effect of interfering maternal antibody



2011

Original Article

Journal of Feline Medicine and Surgery
14(2) 118–123

DOI: 10.1177/1098612X11432239
jfms.sagepub.com
SAGE

Effects of maternally-derived antibodies on serologic responses to vaccination in kittens

Brian A DiGangi[1], Julie K Levy[2], Brenda Griffin[1], Michael J Reese[1], Patricia A Dingman[2], Sylvia J Tucker[2] and Edward J Dubovi[3]

Abstract

The optimal vaccination protocol to induce immunity in kittens with maternal antibodies is unknown. The objective of this study was to determine the effects of maternally-derived antibody (MDA) on serologic responses to vaccination in kittens. Vaccination with a modified live virus (MLV) product was more effective than an inactivated (IA) product at inducing protective antibody titers (PAT) against feline panleukopenia virus (FPV). IA vaccination against feline herpesvirus-1 (FHV) and feline calicivirus (FCV) was more effective in the presence of low MDA than high MDA. Among kittens with low MDA, MLV vaccination against FCV was more effective than IA vaccination. A total of 15%, 44% and 4% of kittens had insufficient titers against FPV, FHV and FCV, respectively, at 17 weeks of age. Serologic response to vaccination of kittens varies based on vaccination type and MDA level. In most situations, MLV vaccination should be utilized and protocols continued beyond 14 weeks of age to optimize response by all kittens.

Accepted: 12 November 2011

2012

Jakel et al. BMC Veterinary Research 2012, 8:62
http://www.biomedcentral.com/1746-6148/8/62

BMC Veterinary Research

RESEARCH ARTICLE Open Access

Vaccination against Feline Panleukopenia: implications from a field study in kittens

Verena Jakel[1*†], Klaus Cussler[1], Kay M Hanschmann[1], Uwe Truyen[2], Matthias König[3†], Elisabeth Kamphuis[1] and Karin Duchow[1]

Abstract

Background: Feline Panleukopenia (FPL) is a serious disease of cats that can be prevented by vaccination. Kittens are routinely vaccinated repeatedly during their first months of life. By this time maternally derived antibodies (MDA) can interfere with vaccination and inhibit the development of active immunity. The efficacy of primary vaccination under field conditions was questioned by frequent reports to the Paul-Ehrlich-Institut on outbreaks of FPL in vaccinated breeding catteries. We therefore initiated a field study to investigate the development of immunity in kittens during primary vaccination against FPL.
64 kittens from 16 litters were vaccinated against FPL at the age of 8, 12 and 16 weeks using three commercial polyvalent vaccines. Blood samples were taken before each vaccination and at the age of 20 weeks. Sera were tested for antibodies against Feline Panleukopenia Virus (FPV) by hemagglutination inhibition test and serum neutralisation assay in two independent diagnostic laboratories.

Results: There was a good correlation between the results obtained in different laboratories and with different methods. Despite triple vaccination 36.7% of the kittens did not seroconvert. Even very low titres of MDA apparently inhibited the development of active immunity. The majority of kittens displayed significant titres of MDA at 8 and 12 weeks of age; in some animals MDA were still detected at 20 weeks of age. Interestingly, the vaccines tested differed significantly in their ability to overcome low levels of maternal immunity.

Conclusions: In the given situation it is recommended to quantify antibodies against FPV in the serum of the queen or kittens before primary vaccination of kittens. The beginning of primary vaccination should be delayed until MDA titres have declined. Unprotected kittens that have been identified serologically should be revaccinated.

2000

388 dogs

58 litters

4 manufacturers

Aus dem Institut für Medizinische Mikrobiologie, Infektions- und Seuchenmedizin der Tierärztlichen Fakultät der Ludwig-Maximilians Universität München

Untersuchung der Wirksamkeit von Parvovirusimpfstoffen und der Effektivität zweier Impfschemata

Katrin Friedrich und U. Truyen

Praktischer Tierarzt 81: 12, 988–994 (2000)

ISSN 0032-681 X

ZUSAMMENFASSUNG: In dieser Feldstudie wurde an 388 Welpen aus insgesamt 58 Würfen verschiedener Hunderassen die Wirksamkeit verschiedener in Deutschland zugelassener Impfstoffe auf ihre Fähigkeit zur Induktion von Antikörpern gegen das canine Parvovirus untersucht. Dabei wurden zwei Impfschemata verglichen, die entweder nur Kombinationsvakzinen oder zusätzlich eine Impfung mit einer Parvovirus-Monovakzine beinhalteten. Nach korrekter Grundimmunisierung mit insgesamt zwei beziehungsweise drei Immunisierungen gegen CPV wiesen 92 Prozent der Hunde protektive Antikörperspiegel auf, 8 Prozent blieben ungeschützt. Nach einmaliger Immunisierung mit einer Lebendvakzine in der 6. Woche waren bereits 63 Prozent der Welpen geschützt. Die Ergebnisse dieser Studie implizieren, dass die Grundimmunisierung gegen die Parvovirose in der 6. Lebenswoche der Welpen beginnen sollte, damit der Großteil der Welpen in der kritischen Phase geschützt ist. Sie zeigen aber auch, dass zu einer abschließenden Impfung in der 15. bis 16. Lebenswoche zu raten ist. Die Nutzung des Muttertiertiters als Basis zur Berechnung des günstigsten Zeitpunk-

Einleitung

Die Parvovirose des Hundes wird durch das canine Parvovirus (CPV) hervorgerufen und ist heute die wichtigste Infektionskrankheit des Hundes. Neben seiner großen veterinärmedizinischen Bedeutung besitzt das CPV auch Modellcharakter für das Studium der viralen Evolution, da es sich um ein Virus handelt, das erst vor relativ kurzer Zeit (1978) erstmals in den Hundepopulationen nachgewiesen wurde. Nach seinem plötzlichen Auftreten breitete es sich innerhalb weniger Monate in einer von einer hohen Mortalität gezeichneten Pandemie weltweit aus. Während seiner Adaption an den Wirt Hund kam es 1979 und 1984 zum Auftreten umschriebener Mutationen im Strukturproteinen des Virus, die antigenetische Unterschiede bewirkten (Truyen 1994). Diese Unterschiede ließen sich durch monoklonale Antikörper nachweisen, und die betreffenden Isolate wurden daher als neue „antigene Typen" CPV-2 a und CPV-2 b bezeichnet. Zwischen den antigenen Typen des CPV besteht eine vollständige Kreuzprotektion, obwohl Unterschiede im Neutralisationsverhalten beobachtet werden. Als wichtige biologische Eigenschaft der neuen antigenen Typen ist die Erweiterung des Wirtsspektrums um den Wirt Katze festzustellen (Truyen 1996).

…92.2% seroconverted to CPV after the 12-week vaccination. Possible reasons for the non-responsiveness of nearly 10% of the puppies are discussed.

2006

Veterinary Record (2006)
159, 733-736

PAPERS & ARTICLES

Comparative trial of the canine parvovirus, canine distemper virus and canine adenovirus type 2 fractions of two commercially available modified live vaccines

J. G. H. E. BERGMAN, M. MUNIZ, D. SUTTON, R. FENSOME, F. LING, G. PAUL

The results of vaccinating two groups of puppies with commercial vaccines, both of which claimed to provide adequate protection with a final vaccination at 10 weeks of age, were compared. Groups of 19 and 20 puppies with similar titres of maternally derived antibodies against canine parvovirus (CPV), canine distemper virus (CDV) and canine adenovirus type 2 (CAV-2) at four weeks of age were vaccinated at six and 10 weeks of age and their responses to each vaccination were measured by comparing the titres against CPV, CDV and CAV-2 in the serum samples taken immediately before the vaccination and four weeks later. After the vaccination at six weeks of age, all 19 of the puppies in group 1 had responded to CPV and CDV, and 14 had responded to CAV-2; in group 2, 17 of the 20 had responded to CPV, 19 to CDV and 15 to CAV-2. In both groups the puppies that did not respond to the first vaccination had responded serologically to CPV, CDV and CAV-2 at 10 weeks of age.

39 dogs

2 vaccines

1:320 highest puppy titre

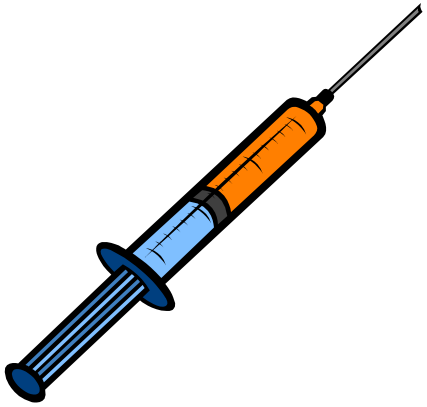
http://wallpapersafari.com/w/TfhMHb

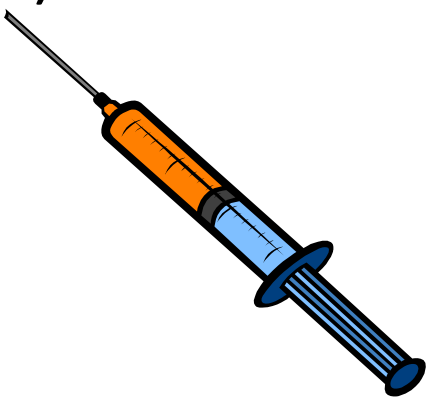
http://cutepuppyclub.com/wp-content/uploads/2015/05/White-Cute-Puppy-.jpg

What does this 16 + week finish mean for the number of required primary puppy / kitten vaccinations?

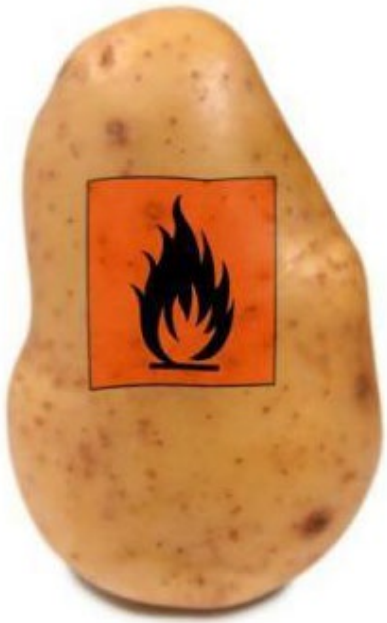
Explaining the key points

1. Last primary puppy and kitten vaccine goes up from 14 – 16 weeks to 16 weeks +
2. “First annual booster” (so-called) in both species goes from 12 – 16 months to 26 – 52 weeks
3. “Low risk” and “high risk” feline lifestyles and situations are much better defined (especially relevant to the respiratory virus vaccines)



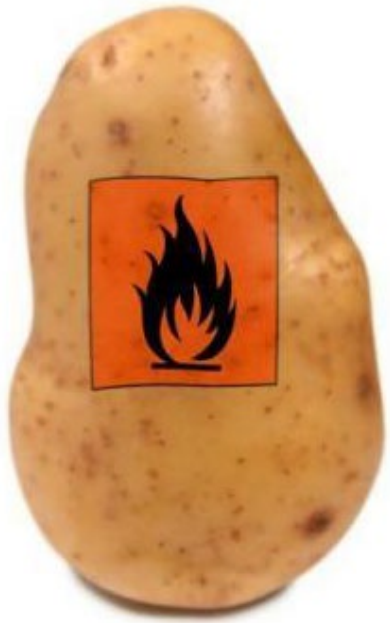


“First annual booster”



- Change to 26 – 52 weeks of age
- The only immunological rationale for the 12-16 month “booster” (when using modern MLV core vaccines) has been to catch the small percentage of puppies and kittens that fail to respond immunologically at 16 weeks.
- *So why leave them open to infection until they are 12 – 16 months of age?*
- <u>Absolutely does not preclude a first annual health check</u>

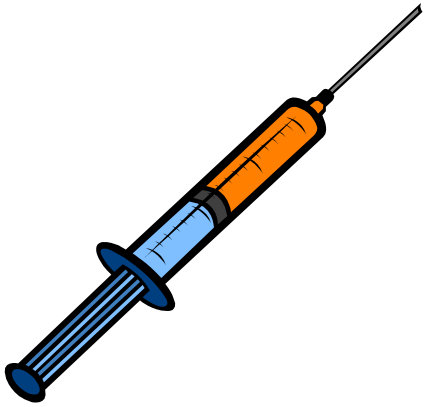
“First annual booster”

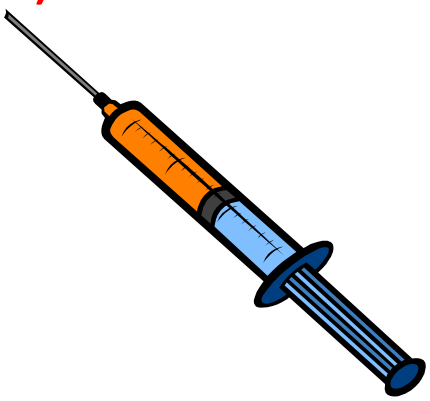


- The “first annual booster” needs a much better name, because…
  1. It is not really a booster;
  2. It is not the first in a series of annual revaccinations;
  3. VGG &AAHA/AAFP recommend it should not be delayed until the animal is 12 – 16 months of age; and
  4. After it is given, revaccination against “core” agents needs to be done no more often than every 3 years in typical low risk situations

Explaining the updates

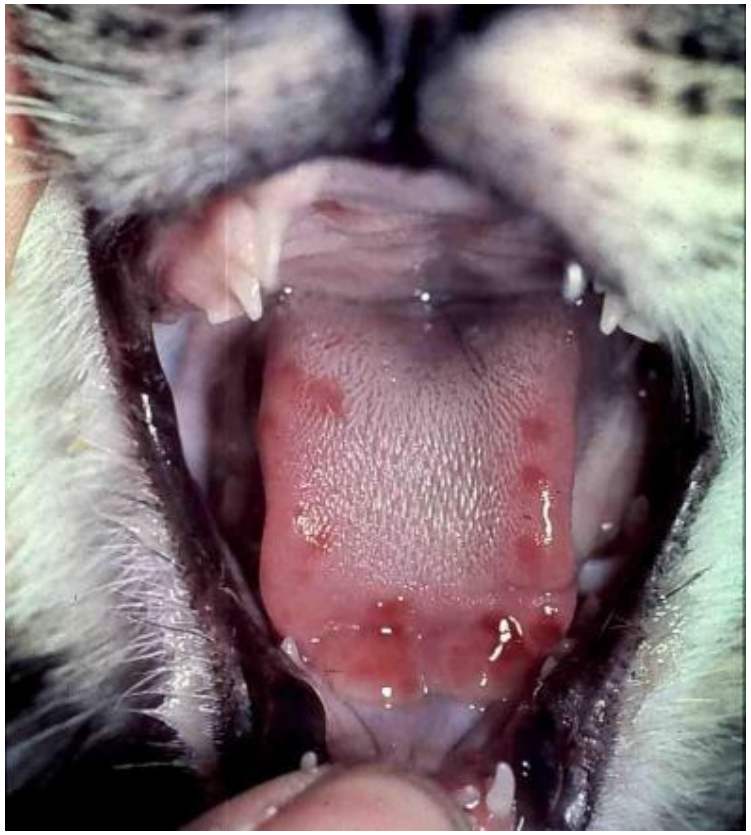
1. Last primary puppy and kitten vaccine goes up from 14 – 16 weeks to 16 weeks +
2. “First annual booster” (so called) in both species goes from 12 – 16 months to 26 – 52 weeks
3. “Low risk” and “high risk” feline lifestyles and situations are much better defined (especially relevant to the respiratory virus vaccines)





What is a “high risk” lifestyle for a cat?

- Cats that go into boarding catteries should be vaccinated against FCV / FHV-1 annually, with the injection preferably in the weeks or months leading up to boarding



Duration of Immunity (DoI) induced by feline respiratory virus vaccines

FPV, FHV-1, FCV

- Scott FW, Geissinger CM. (1997) Duration of immunity in cats vaccinated with an inactivated feline panleukopenia, herpesvirus and calicivirus vaccine. *Feline Practice* **25:** 12-19.
- Scott FW, Geissinger CM. (1999) Long-term immunity in cats vaccinated with an inactivated trivalent vaccine. *American Journal of Veterinary Research* **60:** 652-658.

2015

Veterinary Microbiology 177 (2015) 123–131

Contents lists available at ScienceDirect

Veterinary Microbiology

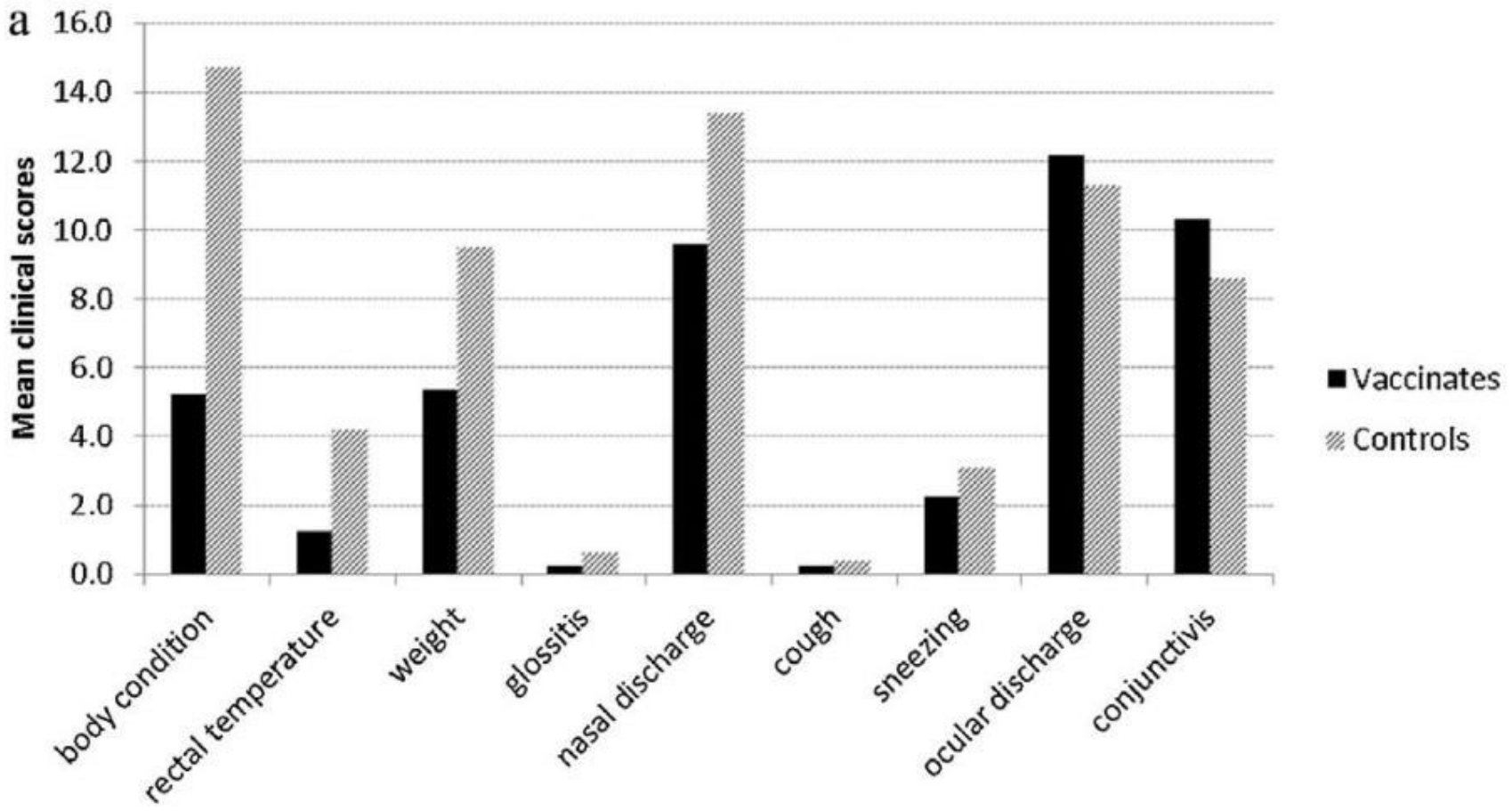
journal homepage: www.elsevier.com/locate/vetmic

Three-year duration of immunity for feline herpesvirus and calicivirus evaluated in a controlled vaccination-challenge laboratory trial

Dominique Jas, Valérie Frances-Duvert, Delphine Vernes, Pierre-Michel Guigal, Hervé Poulet *

Merial S.A.S., R&D, 254 avenue Marcel Mérieux, 69007 Lyon, France

Notwithstanding the title of this paper, vaccinated cats developed more significant illness than did the cats in the much earlier Scott & Geissinger study. Control cats were worse affected than vaccinates, but protection was rather limited, *esp*. against FHV-1



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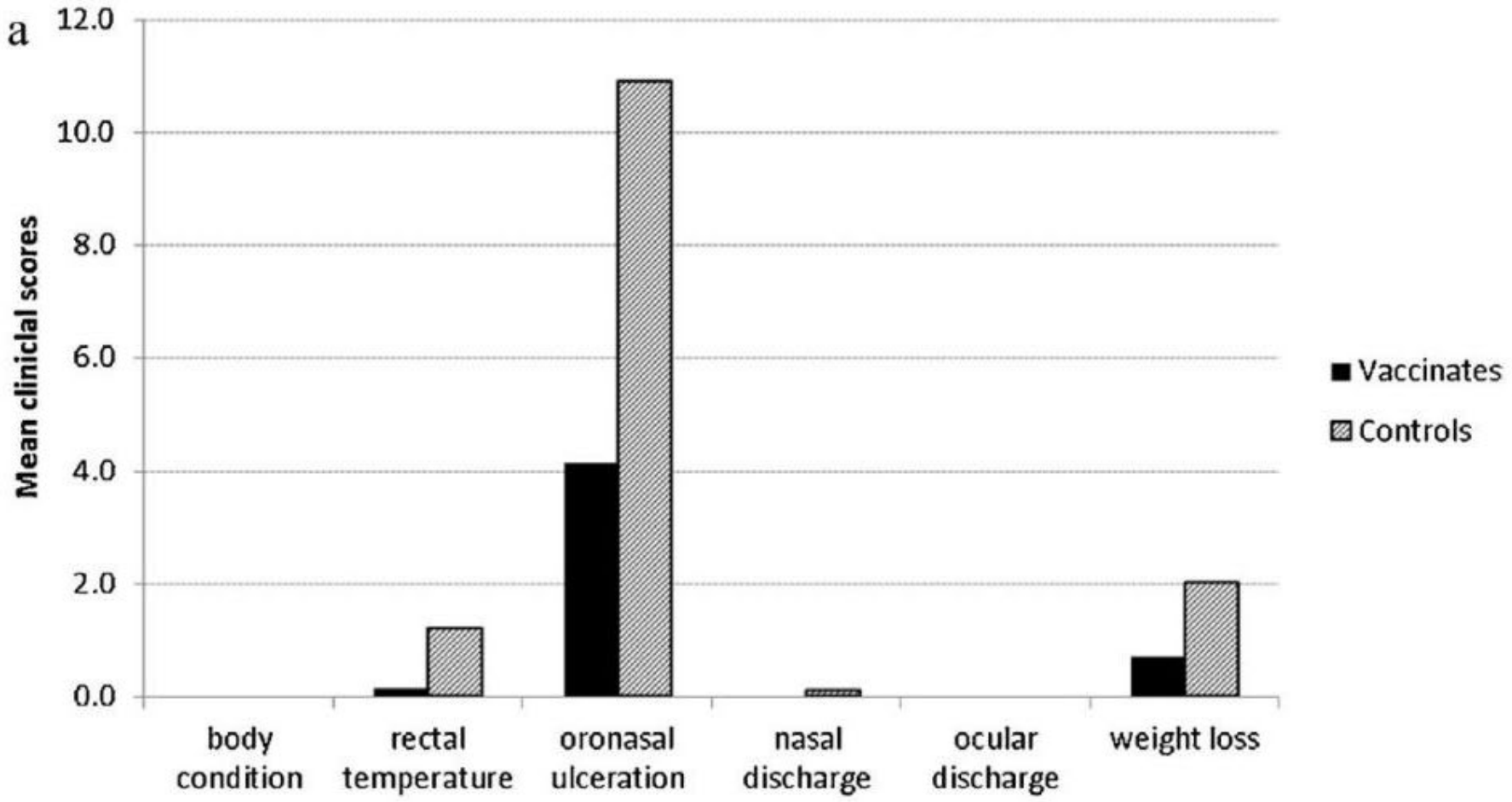

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Vet. Res. 38 (2007) 337–354
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DOI: 10.1051/vetres:2006063

Review article

Feline herpesvirus

Rosalind GASKELL[a*], Susan DAWSON[b], Alan RADFORD[b], Etienne THIRY[c]

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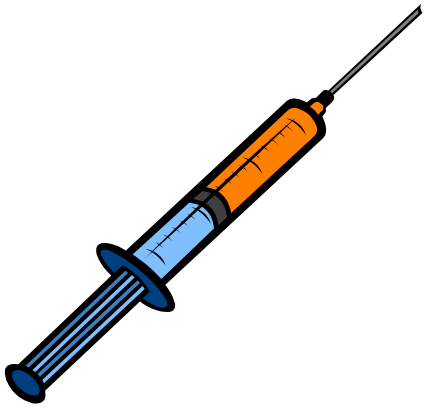
[b] Department of Veterinary Clinical Sciences, Faculty of Veterinary Science, University of Liverpool, Leahurst, Chester High Road, Neston, S. Wirral, CH64 7TE, United Kingdom
[c] Virology, Department of Infectious and Parasitic Diseases, Faculty of Veterinary Medicine, University of Liège, Boulevard de Colonster 20, B43b, 4000 Liège, Belgium

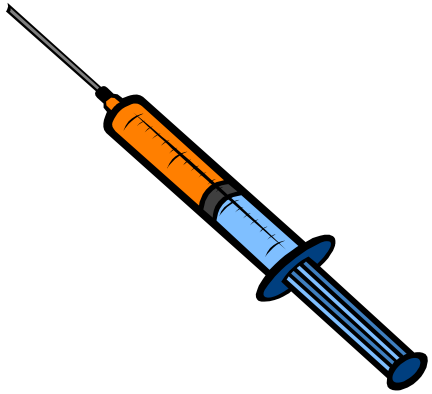
(Received 6 October 2006; accepted 14 December 2006)

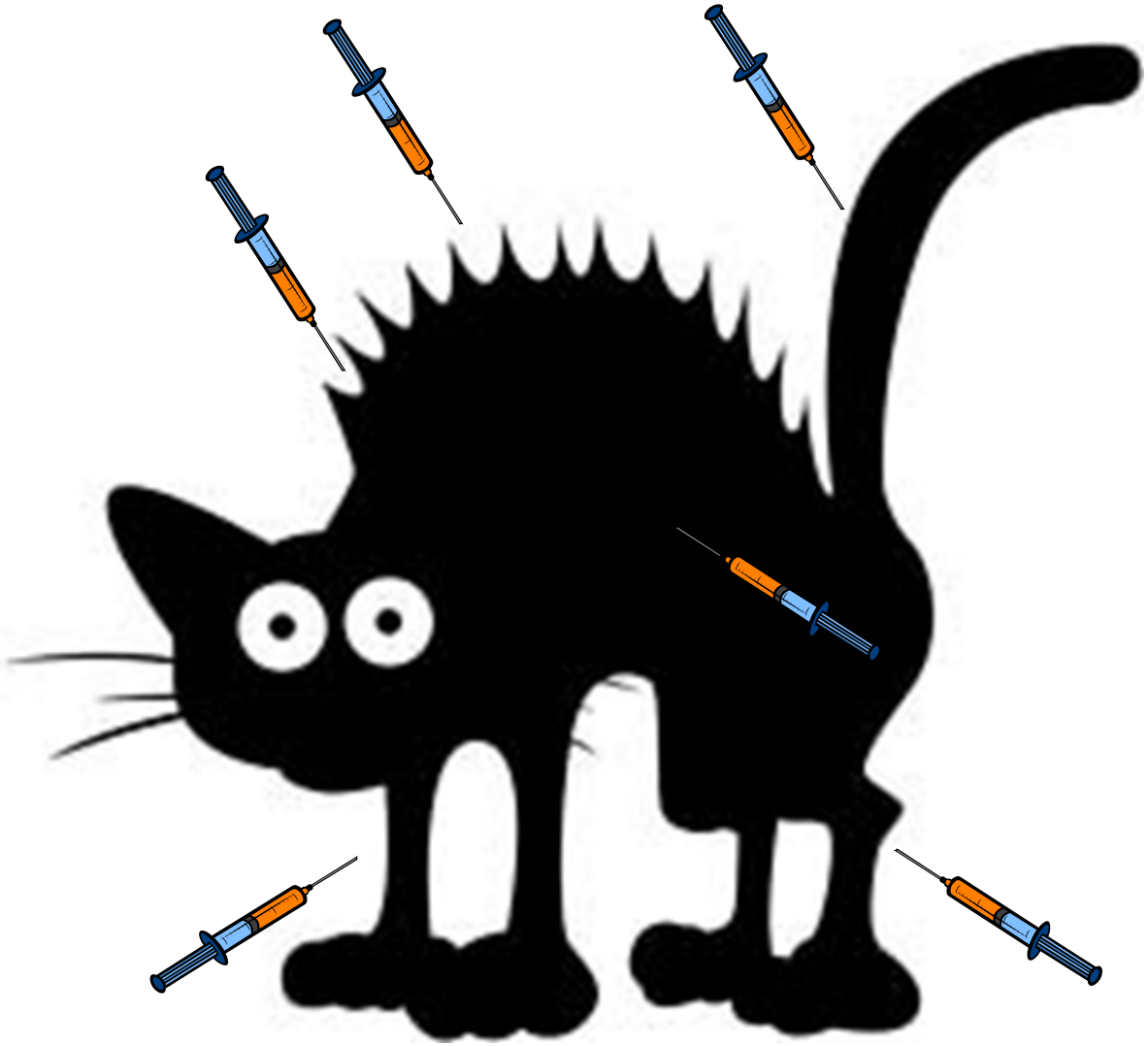
"After primary FeHV-1 infection, cats are largely resistant to disease following further challenge but after six months or more, protection may only be partial."
"Thus in cats with a previously low risk of exposure going into a high risk situation such as a boarding or rescue shelter for example, annual vaccination might still be considered appropriate."
"…the relative efficacy was shown to decrease from 95% shortly after primary vaccination, to 52% after 7.5 years".

Explaining the key points

4. Updated consideration of anatomical sites for injection of vaccines in cats







Original Article

jfms Journal of Feline Medicine and Surgery

Journal of Feline Medicine and Surgery
2014, Vol. 16(4) 275–280

DOI: 10.1177/1098612X13505579
jfms.com
SAGE

Tail vaccination in cats: a pilot study

Cleon G Hendricks[1], Julie K Levy[1], Sylvia J Tucker[1], Shaye M Olmstead[2], P Cynda Crawford[1], Edward J Dubovi[3] and Cathleen A Hanlon[4]

Abstract

Feline injection site sarcomas affect 1–10 cats per every 10,000 vaccinated and are associated with high mortality. Radical resection may be curative, but is often associated with prolonged recovery, disfigurement and loss of function when tumors occur at currently recommended injection sites. The objective of this study was to assess alternatives to currently recommended vaccination sites in terms of preference by oncology practitioners, ease of injection and serological responses. Surgical, radiation and medical oncology practitioners were surveyed regarding their preference for vaccination sites based on the ease of tumor resection. A six-point Likert scale was used to measure each cat's behavioral reaction to vaccination when injected subcutaneously in the distal hind limb or the distal tail. Serum collected before and 1–2 months after vaccination was tested for antibody titers against feline panleukopenia virus (FPV) and rabies virus (RV). The preferred sites for vaccination by 94 oncology practitioners were below the stifle (41%) and the tail (30%). There were no significant differences in the cats' behavioral reaction to vaccination below the stifle (n = 31) and in the distal tail (n = 29). Of the cats seronegative for FPV at the time of vaccination, 100% developed protective antibody titers (≥40) against FPV 1–2 months following vaccination. For cats seronegative for RV, all but one cat (tail vaccine) developed acceptable antibody titers (≥0.5 IU/ml) against RV. Tail vaccination was well tolerated and elicited similar serological responses to vaccination in the distal limbs.

Accepted: 22 August 2013

Surprisingly good tolerance reported in this study

Vaccination of animals in shelters

- Shelters are highly variable, no one-size-fits-all
- Generally high infectious disease risk
- Start core vaccines on admission, as early as 4 – 6 weeks. Revaccinate every 2 weeks until 20 weeks of age
- Can give an intranasal or oral *Bordetella* vaccine as early as 3 weeks of age

Antibody testing as an alternative to “automatic” revaccination or to provide guidance when making decisions

Antibody testing

- Antibody testing has been used to assess the risk of individuals becoming infected in outbreak situations in shelters
- Breeding bitches and queens have been tested >1 week before or after parturition with the aim of guiding vaccination decisions relating to their puppies / kittens
- Individual adults can be tested to determine whether revaccination is needed
- Most relevant to canine core vax + FPV

Summary

- The most important vaccines that most dogs and cats ever receive are the core vaccines that they receive as puppies and kittens, especially the last in the primary series.
- Modern canine core vaccines and FPV vaccines are safe, effective and provide long-lasting protection
- Feline core respiratory virus vaccines do not provide such impressive protection as the other canine and feline core vaccines
- Non-core vaccines have not been shown to provide such strong or long-lasting protection and generally need to be given annually.

Q & A