Overview of vaccine use and disease prevalence in dogs and cats within the EU

Prof. emer. Marian C. Horzinek
Bilthoven/Niederlande

Don Quichote de la Mancha
...the metaphor of a hopeless battle with a wrongly assessed, very powerful or imaginary adversary

The routine of yearly revaccinations from the third year onward is questionable

MCH’s 10 commandments of pet vaccinology

1) The pup schedule should be extended to include a vaccination at 16 wk of age
2) Base immunization is complete only after the booster in the second year of life
3) The routine of yearly revaccinations from the third year onward is questionable
4) A yearly revaccination interview, not necessarily an injection, should become the standard
5) The yearly revaccination interview is a professional service that must be taught, expertly performed and invoiced
VACCINATION AV SÄLLSKAPSDJUR – EN VETERINÄRMEDICINSK OMVÄRDERING – I & II
Föreläsare: Prof. emer. Dr. h. c. mult. Marian C. Horzinek. Editor-in-Chief Veterinary Sciences Tomorrow, www.vetscite.org. Utrecht University, The Netherlands

ORGANISERAD HUNDSMUGGLING TILL SVERIGE – BAKGRUND OCH NULÄGE
Föreläsare: Leg. vet. Johan Beck-Friis, Informationschef SVF

MCH’s 10 commandments of pet vaccinology
6) Adult animals should be “vaccinated to measure”, taking age, breed, lifestyle, the epidemiologic situation etc. into account
7) Post-vaccination serology should become a guide in revaccination decisions
8) For a solid herd immunity, more animals of the population must be vaccinated
9) The profession should issue regular updates of the ‘code of vaccination practice’
10) To counteract vaccinophobia, a concerted action of academia, the veterinary profession and industry is of paramount importance

A pediatrician presents her cat to a vet and asks:
“Doctor, why do I need to pay you a yearly visit for revaccination of my cat? I see my children no more than twice!”

Childhood Vaccinations Netherlands
- 6x (4 of which in the first year) - diphtheria, tetanus, polio
- 5x (4 of which in the first year) - pertussis, Haemophilus influenzae B
- 2x - mumps, measles, rubella: at 14 months and 9 years
- 1x - Meningococcus C: at 14 months
A pediatrician presents her cat to a vet and asks:

“Doctor, why do I need to pay you a yearly visit for revaccination of my cat? I see my children no more than twice in their lifetimes!”

What do you suggest as an answer?

Can you perhaps be more creative than this is what we always did this is in the product documentation this is what most clients want this is what representatives of our profession want us to do this does not hurt this is because the immunity conferred by veterinary vaccines is short-lived this is scientifically correct...

3) Yearly revaccination of dogs and cats...
- used to be a hot issue in the US and is it now in Europe
- is a veterinary specialty
- has been a success story of marketing
- is a joke in the biomedical environment
- is a pseudoproblem
but: it would be unwise to turn a blind eye on the public discussion...

Scenario Germany (2003)

- The declaration of war: lay public, journalists (Monika Peichl)
- The foe image: vets, the biologicals industry

Wissenschaft

Impfen bis zum Umfallen

Wie viele Pikser sind wirklich nötig?

Express 17.01.2003

- The declaration of war: lay public, journalists; >30 british vets (John Saxton, Leeds)
- The foe image: vets, the biologicals industry
- Quotes: “unnecessary”, “potentially dangerous”, “fraud by misrepresentation, fraud by silence, theft by deception”, “complete overkill”

The scenario world-wide
Intervet symposier - Vaccinationsrelaterade överväganden i en snabbt föränderlig värld

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Perceived Risks vs. True Risks
- Overvaccination
- Side effects
- No protection
- Indiscriminate vaccination
- Antagonism; paranoia; persecution
- Mania; complot theories
- Organized militant campaigning
- Against vaccination
- Scaremongering
- "Infection parties" (measles, parvo)
- Decrease in herd immunity; re-emergence of epidemics

Vaccinophobia is as old as vaccination (18th Century)

Scientific arguments in favour of less-than-yearly revaccinations:
- Persistence of antibody titters
  - Dog: >7yr CDV, CPV (Twark & Dodds, 2000)
  - Cat: >4yr FPV, FCV, FHV (Mouzin et al., 2004)
- Longevity of memory B- and T-cells
- Duration of immunity (DOI) – this symposium; Gore et al., 2005)
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Where does memory come from?

- Long lived cells (~5 months in mice)
- Permissive for viral growth
- Hold antigens complex of surface (via FcR and C8)
- Antigen can persist for months/years

Follicular Dendritic Cells

- Longevity of memory B- and T-cells:
  - B cell marker (hum) CD27
  - T cell marker (hum) CD45RO

4) A yearly revaccination interview, not necessarily followed by an injection, should become the standard
   - The Interview: anamnesis, counter-indications, agreements, informed consent
   - The clinical Examination: only healthy animals are vaccinated
   - The Assessment of immunization: interpretation of serology data

Why yearly?
Why interview?
What about?
How?

Let’s face it:
Vaccination is not sexy
- An injection is not as exciting as an osteosynthesis
- The client does not see anything,
  - ...if she does, it is the failures:
    - side effects
    - vaccination breaks
- The vet vaccinates, but cannot explain basic immunology and epidemiology,
  - nor can she show the effect of vaccination to the client
  
  The Shoot-and-Trust Principle!
5) The vaccination interview (1st year)

- The owner is informed about
- The preventable diseases
- The advantages of vaccination vs. treatment
- Possible side effects and complications
- Possible lack of protection
- Risk/benefit considerations
- How to handle the vaccinee after the shot
- The basic vaccination program (with the boosters in the second year)
- Begin and duration of protection

Vaccines are safe and effective

It is important to maintain the public trust in national immunization programs

INTERVET SYMPOSIUM – STOCKHOLM 2005-12-06 AND GÖTEBORG 2005-12-07
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The vaccination interview (1st year)

- The veterinarian is informed about
- The origin of the animal
- The responsibilities within the family
- Other animals in the household
- Vacations, holidays, travel plans (abroad)
- Medical (vaccination) history, previous treatments
- ...

...most important is the interested dialogue (we all like to hold monologues!)

Technique

- Did I practice active listening?
- Did I show empathy?
- Did I choose the right place, time, situation, climate?
- Did I feel pressed for time?
- Did I take in all messages?
- Did I use the correct query technique?
- Did I stimulate the client to ask questions?
6) The one-fits-all shot vs. vaccination to measure

- Ad hoc vaccinations must address the individual risks of infection and disease (epidemiology)
- A Devon Rex has a lifestyle different from a stray cat (exposure)
- The client’s companion is not just a dog or cat – it is a family member (psychology)
- The client is not just a nuisance – she is a partner in a conversation (empathy)
- The vet sells her knowledge (expertise)

Custom-taylored vaccination schedules

- For the free-roaming animal
- For the hunting and utility dog
- For the lap cat and dog
- For the travel companion
- For pets in border countries
- For the show cat and dog
- For the breeding cat and dog
- For the pedigree animal (breed)
- For the old animal
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Prevalence of viral infections EU: unknown
- CDV
- CAV
- CPV
- FPV
- FHV
- FCV
- FeLV
- FIV

But repeated evidence of infections in wild carnivores with spill-over into pets

Prevalence of viral infections in feral carnivores worldwide
- CDV
  - wolf CDN 67%
  - fox/coyote USA 46%
  - fox ARG 2%
- CAV
  - wolf CDN 89%
  - red fox AUS 47%
  - fox/coyote USA 81%
  - fox ARG 8%
  - fox CHINA occas.
- CPV
  - fox/coyote USA 96%
  - fox ARG 5%
- CHV
  - red fox AUS 2%

Prevalence data of FeLV and FIV infection (%)

<table>
<thead>
<tr>
<th>FeLV (p27)</th>
<th>FIV</th>
<th>Country</th>
<th>Domestic cats</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>6</td>
<td>Czech Republic</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>9</td>
<td>Germany</td>
<td>&gt;6000 cats</td>
</tr>
<tr>
<td>0</td>
<td>53</td>
<td>Great Britain</td>
<td>free-ranging farm cats</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>Great Britain</td>
<td>RSPCA</td>
</tr>
<tr>
<td>11</td>
<td>2</td>
<td>2</td>
<td>Switzerland</td>
</tr>
<tr>
<td>10</td>
<td>3</td>
<td>Switzerland</td>
<td></td>
</tr>
</tbody>
</table>

- high FIV seroprevalence in healthy cats
- sick cats are more often viraemic than healthy animals
7) Objective assessment of immunization: postvaccinal serology (PVS)

- Why?
  - To assess the result of vaccination: did the vaccinee’s immune system recognize the antigen – no assertion of protection (rabies!)
- When?
  - First in the 3rd year; later if desired
  - As an aid in the decision about revaccination
  - When the vaccination history is unknown
  - If requested by client (vaccination interview)
- What?
  - Demonstration of antibodies (no titers!)
  - Against:
    - distemper, parvovirus (dog & cat)

Pet vaccination is the only veterinary measure that is not checked for success

PVS – a proposal

- Why?
  - To assess the result of vaccination: did the vaccinee’s immune system recognize the antigen – no assertion of protection (rabies!)
- When?
  - First in the 3rd year; later if desired
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What is the significance of antibodies against herpes/caliciviruses and what are the minimum protective titers?

- Antibodies only show that the immune system has „seen” the test virus in the past
- In mucosal infections, serum antibody titers don’t tell anything about protection or susceptibility
- Generally, titer values as correlates of protection are only of statistical significance, for the individual animal this is irrelevant
- Vaccination with any vaccine will (in the extremes of the normal distribution) result in protected animals without antibodies and susceptible ones with antibodies

Protection

- Poor
- Normal
- Excellent

The Answer of Industry:

Putting Titers to work in your clinic

For Puppies
- Evaluate the vaccine and antibody levels shortly after birth.
- Follow the decrease of maternal antibody levels.
- Determine when to start and adjust the vaccination schedule.
- Evaluate the CPV antibody level in difficult to vaccinate breeds such as Dachshunds and Beagles.
- Take vaccine program for individual puppies.

For Adults
- Evaluate the antibody status of dogs with unknown vaccine histories.
- Evaluate and possibly avoid vaccination.
- With history of vaccine-associated adverse events:
  - with high CDV and CPV titers:
  - administer a single dose of vaccine with concurrent inflammatory disease.
  - with allergies macabre by concurrent medication.
Forget about titers (titres)!

- Bad experience with FIP serology
- Values differ per laboratory
- "1:40" and "1:80" are no titers but dilutions
- "40" and "80" are no different titers
- Yes/no data should be communicated by the laboratory – which leave no room for doubt (interpretation)
- The vaccine industry should be involved

PVS in a nutshell

- The laboratory (or an in-practice test) gives a robust yes/no answer
- With a threshold value safely in the positive range
- If negative (false or true) vaccination is recommended
- A false negative test results in vaccination in spite of antibodies – this is the present situation
- If positive (false or true) vaccination is not recommended
- A false positive test is unlikely in view of the high prevalence of antibodies in the population
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8)
…we vaccinate too many animals too often
but too few animals in the population…
Marginal immune coverage
(a milkmaid’s calculation)

In Germany (2002)
- …there are ~ 5 Mio. registered dogs
- …there are ~ 2.4 Mio. vaccine doses reaching the market (SHPPiLT & SHPLT)
- …there are ~ 1.1 Mio. purebred dogs (most of which will be immunized)
- …the remaining 1.3 Mio. vaccine doses thus are applied to 3.9 Mio. dogs = 30%

The distemper epidemic in Finland
1994-1995

Ek-Kommonen et al., 1997. Outbreak of canine distemper in vaccinated dogs in Finland.

A Satanic Motto:
…hunt the last unvaccinated animal like the devil chases the poor soul!
- vaccinate the same animal less frequently
- but more animals (>70%) in your area
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**Overall Conclusions**

Prof. emer. Marian C. Horzinek
Bilthoven/Niederlande

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**Don Quichote de la Mancha**

... a hopeless battle?

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**Distinguish between:**

- **Injection** (with the intention to immunize)
- **Immunization** (with the intention to vaccinate)
- **Vaccination** (with the intention to protect)
- **Protection**
For those with short-time memory
(Thursday, Sept. 8):
- CPV – do all vaccines still protect as well? Truyen (DE)
- The challenge of FCV. Radford (UK)
- Canine leptospirosis – do we have a problem? André-Fontaine (FR)
- Overview of new vaccines and technologies Chalmers (UK)
- New understanding of immunological mechanisms Saalmüller (Austria)
- Serological testing – an alternative to boosters? Burr (UK)
- Canine vaccination – providing broader benefits in disease control Cleaveland (UK)

Truyen: Need for new parovirus vaccines?
- CPV-2 vaccines protect dogs against challenge infection with CPV-2a and its mutants and variants.
- FPV modified live virus vaccines protect cats against challenge infection with CPV-2b isolated from a cat (Chalmers et al., 1999).

There are differences in the neutralizing activity in sera of dogs vaccinated with a CPV-2 vaccine when tested against CPV-2 and CPV-2b, but not vice versa (Pratelli et al., 2001).

- of cats vaccinated with an FPV vaccine when tested against FPV and the various antigenic types of CPV 2

Radford: The challenge for the next generation of feline calicivirus vaccines
- Reduce / eliminate shedding post-infection
- Increase strain coverage
- Protect against FCV-associated VSD
- Role of vaccine virus in the field
- Impact on evolution of virulence
- In vitro marker of protection
Chalmers: NEW TECHNOLOGY/NEW DISEASE
Leishmaniasis, Babesiosis, flu
Recombiant (vector) vaccines
- Recombinant (subunit) vaccines
- DNA vaccines
- Marker vaccines

Routes of administration
- Intramuscular, Subcutaneous, Intranasal, Oral (Conjunctivae)
- OGI, DOI

Therapeutic Vaccines
- Malignancies – canine melanoma
- Contraceptive – human
- Anti-allergy – human

Saalmüller: Vaccine-specific immune response

Vaccine
Immune response
Antigen-specific antibodies
Humoral immune response
B lymphocytes
Plasma cells
Cellular immune response
Helper T cells
Effectors
Antigen-specific memory cells
Adjuvants
Activation/maturity
Antigen-specific immune response
Innate immunity
Antigen-specific antibodies
Adjuvants
Production of cytokines
Lipopolysaccharides (TLR-4)
CpG-ODN (TLR-9)

André-Fontaine: Canine Leptospirosis-do we have a problem?

- Seropositive cats are without acute clinical signs
- Serological response of cats with polyuro/polydipsy syndrome: 48% positive.
  - L. canicola: 35% of the positive cats
  - L. sejroe: 30%
  - L. australis: 12%
  - L. icterohaemorrhagiae (8%)
**Burr: Serological Testing**

- **Yes**
  - Animals with decent antibody levels are almost certainly protected and do not need boosting at that time.
- **But**
  - Interpretation subjective
  - Costly and not always convenient

**Cleaveland: DOG VACCINATION**

**Aims:**
- To minimise disease impacts on human and wildlife health
- To use as a tool to identify reservoirs of disease
- To investigate cost-effectiveness of different strategies
- Total cost per dog vaccinated in Tanzania $1.73 ($0.84-2.69)
- Economic savings from reduced PET costs exceed cost of campaigns
- No wildlife rabies in the Serengeti National Park since 2000

**The Friday, Sept. 9 talks:**
- Vaccine side effects – fact & fiction *Day (UK)*
- Feline Injection Site Sarcoma – is it a reason to change our vaccination policies? *Kippenstein (NL)*
- Epidemiological approaches to safety investigation *Wood (UK)*
- Communicating vaccine benefit & risk – lessons from the medical field. *Yarwood (UK)*
- Duration of immunity for canine and feline vaccines *Schultz (US)*
- DOI – the regulatory issues *Gaskell (UK)*
- DOI & booster vaccination – dealing with the issue at practice level *Hill (UK) & Poubanne (FR)*
8) ...we vaccinate too many animals too often but too few animals in the population...

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The profession should issue updates of the ‘code of vaccination practice’

The veterinary standard of care...

...is the result of a democratic process that is largely independent from scientific insight, taking professional, societal, emotional, managerial, financial etc. arguments into account.

It is about "defining", not about "knowing"

"...conformity to custom is not in itself an exercise of care as a matter of law"

30 AmJur2nd Evidence §1123
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„Die Gebrauchsinformation ist der bindende Rahmen für die Anwendung jedes Mittels“
Selbitz und Moos (2003)

VACCINATION WARRANTY
Optimum Wellness Plans® keep all your Pet’s vaccinations boosted with superior-quality vaccines, and they include protection for diseases that other practices might not vaccinate against. If your Pet acquires a disease against which we’re protecting him within a year of vaccination, we’ll cover the cost of treatment at our hospital, up to $1,000.
The Income Issue

The veterinary vaccination scene
- In Europe is still in the stage of polemics
- Requires joint re-thinking by vets, clients and the biologicals industry
- Requires pro-active (instead of reactive) initiatives

The Liability Issue
- In the past, by adhering to label instructions, vets could shift litigation to the manufacturer
- In 1996, the US Supreme Court refused review of the Lynbrook Farms vs. SmithKline Beecham Corp. (117 S.Ct.178) case
- Only USDA requirements of safety, efficacy, potency and purity must be met by the manufacturer
- Future consumer claims will be centered at the practitioner:
  - Malpractice
  - Failure to adhere to standard of care
  - Wrong vaccine selection and administration
  - No informed consent

The Public Outrage Issue
The Public Outrage Issue

- **Vaccinophiles**: don't burn cattle, pigs and chickens! Protect them, we are not in the Middle Ages!
- **Vaccinophobes**: don't shoot obscure mixtures into dogs and cats! You make them sick, and it is unnatural!

The intended provocation

- We vaccinate too often – but too little
- We use scientific arguments only to support our prejudices
- We rather repeat a measure than to convince ourselves that the last one was successful
- We rather believe than provide evidence
- We rather preach than enter into an exchange of information
- We rather stay put than change position

This is the Future:

Standardization (and legal coverage) at McDonald’s as in veterinary practice:
- Quality Assurance
- From the Hamburger to the Rottweiler

INTERVET SYMPOSIER – STOCKHOLM 2005-12-06 OCH GÖTEBORG 2005-12-07
10) A concerted action of academia, the profession and industry is of paramount importance.

Formal logic: Necessary and sufficient conditions

- Breathing is necessary
- Under most circumstances it is sufficient to breathe every 2 seconds
- Pet vaccination is necessary
- Under most circumstances it is sufficient to revaccinate every ≥3 years

Sufficient measures are justifiable, unnecessary measures are ethically dubious…
Ökad efterfrågan - hund som modeobjekt/accessoar
De inhemska uppfödarna kan inte tillgodose efterfrågan
Andra aktörer ser sin chans

Kraftigt ökad illegal införsel

Ca 200 påträffade smuggelhundar sedan oktober 2004
Innan max 20 påträffade hundar per år
Påträffade hundar utgör 5-10 procent av alla införda hundar.
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Vilka hundar smugglas?
I början främst småhundar
Hösten 2005 - fler hundar av större raser uppptäckta

Tillvägagångssätt:
Massapel i valpfabriker, främst i Östeuropa
Avskiljning från tiken så fort som möjligt, sedan biltransport till västland
Försäljning via annonser på Internet eller i tener

Exempel:
Centrala organisatörer
Bulvaner som för in hundarna och säljer dem
Kontantkontakten enda kontakt
Smittskyddsrisken

- Rabies
- Echinococcus multilocularis
- andra hundsmitter (leptospiros, valpsjuka, parvo etc.)

Rabies

Även småhundar och valpar kan drabbas

Förekomst i Europa
**Intervet symposier - Vaccinationsrelaterade överväganden i en snabbt föränderlig värld**

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**Echinococcus multilocularis**

1. Livscykel för *Echinococcus multilocularis*
2. Utbredning i Europa
3. Övriga hundsmittor

**Ökad risk för utbrott:**
Större smittryck och fler ovaccinerade hundar därför viktigt att ha den inhemska hundpopulatiomen väl vaccinerad.
**Djurskyddsrisken**

- Dålig uppfödning
- För tidig avvänjning
- Plågsamma transporter
- Olämplig förvaring innan försäljning
- Dålig hälsa: virus, bakterier, parasiter
- Mental påfrestning

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**Arbetsskyddsrisken**

- Zoonosaspekten – är personalen medveten om riskerna och skyddat?
- Rabiesvaccinering av anställda bör övervägas + återkommande smittskyddsinfo kring tänkbara zoonoser

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**Åtgärder**

- Information till potentiella köpare - minska efterfrågan
- Bättre kontroll och engagemang vid gränspassage
- Kannibals truff för smugglare
- Rapportering av alla misstänkta fall till SJV
Sammanfattning

Förebyggande åtgärder:
- Information till allmänheten
- Smittoförebyggande rutiner
- Uppmärksamhet och rapportering vid misstanke på klinik

Tack för uppmärksamheten